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Shaping success together

At the AMB 2018 exhibition in Stuttgart, VOLLMER will present its new portfolio under the motto 'Shaping Success Together'. In addition to its grinding and eroding machines, VOLLMER will also present its digitalisation initiative, which enables the digital exchange of data between machines and opens the door to the world of Industry 4.0.

Trade fair visitors will be able to see the VGrind 360 carbide tool grinding machine in action, alongside the VPulse 500 wire erosion machine, the QXD 250 disk erosion machine as well as various automation solutions.

The VGrind 360 grinding machine processes carbide tools such as drills, milling cutters or reamers in one setup. The machine is available in two versions: one with two vertical spindles for grinding wheel packages and the other with one grinding wheel spindle and one high-frequency spindle (HF spindle) plus an automatic tool changer. The high-frequency spindle allows the grinding of special



pocket areas for PCD plates. In addition, the VGrind 360E is offered as an entry-level model, which is geared towards the specific requirements of service companies and smaller tool manufacturers.

A wheel sticking unit is also available as a VGrind 360 option for the automatic opening of the abrasive coating. This means that grinding residues on the diamond-tipped grinding wheel surface can be removed to guarantee the sharpness of the grinding wheel for longer. The machine also has the option to automatically change the grinding wheel sets as well as their coolant nozzles.

The HC 4 automation solution for the VGrind 360 comprises a chain magazine with 39 spaces for standardised HSK 63-A hollow shank tapers, or it can also optionally hold up to 158 shank workpieces. Users can use the HP 160 pallet magazine to supply up to 900 workpieces for around-the-clock, unmanned machining. Alternately, the HPR 250 free-arm robot can be used to automatically manufacture carbide tools with various shaft diameters, resulting in three times as much capacity for tool manufacturers.

VOLLMER will also showcase the VPulse 500 wire erosion machine for the machining of PCD tools. With its eroding generator and advanced technology, it can manufacture large quantities of high-quality PCD tools. Modern machine kinematics ensure high profile accuracy in both production and maintenance. With the VPulse 500 operating concept, the touch-screen allows operators to easily programme and control the tool for quick, error-free work.

Full article on page 20

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AMB Hall 5 Stand C35

STUDER extends favorit range

STUDER expanded its product portfolio and introduced a new machine to the market at GrindTec exhibition: the favorit with a centre distance of 1,600 mm (63").

If you believe that a large STUDER machine will exceed your budget, it's worth taking a look at the favorit. This machine, top in price and performance, can be used universally and, thanks to the centre distance of 1,600 mm (63"), can also handle long workpieces.

This CNC universal cylindrical grinding machine is designed for grinding both single part and series production and can be fitted with automation. With various options such as measuring control, balancing system, contact detection and longitudinal positioning, it can be subsequently adapted to other grinding tasks.

The favorit is a very reasonably priced machine. As with all STUDER cylindrical grinding machines, the proven machine bed made of solid Granitar® ensures maximum precision, performance and safety. The full enclosure provides an optimal view of the grinding process. The wheelhead, which can be automatically positioned every 3°, can accommodate a belt-driven external and internal grinding spindle.

Other features include: height of centres; 175 mm; maximum workpiece weight between centres 150 kg; cross slide (X-axis) maximum travel 370 mm; longitudinal slide (X-axis) maximum travel 1,750 mm.

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Thanks to the practice-oriented STUDER grinding software, with its proven Studer-pictogramming, even less experienced users can program grinding and dressing cycles quickly and efficiently. With the optionally available StuderGRIND software, special applications, such as profiling the grinding wheel for complex workpiece shapes, can



be efficiently programmed. Development, production, assembly and testing of the STUDER products are process-oriented and comply with the strict guidelines of VDA 6.4 and ISO 9001.

New BLOHM development to be unveiled
BLOHM will be showing its latest development at AMB. It is currently under wraps but is bound to create a lot of interest on the United Grinding stand.

The Jung J600 will also be on display, offering a host of potential applications from individual component production through to small batch production in all industries.

With the new J600, JUNG presents a modern surface grinding machine for the highest precision and surface quality. It offers a host of potential applications, from individual component production through to small batch production in all industries. The J600 realises its full potential particularly when grinding demanding applications in tool and die making.

The modular design can be optimally tailored to individual customer requirements. The J600 owes its outstanding damping characteristics not least to the EasySlide hydrodynamic guideways in the table axis. High-precision recirculating ballscrew drives ensure high acceleration and infeed speeds.

The German produced J600 offers unique ease-of-use. The double sliding door to the work area and additional maintenance doors guarantee optimal handling and cleaning of the machine.

In conjunction with the handwheel for the X- and Y-axis, an additional highlight,

EasyMode enables semi-automatic, manual grinding. This function enables increased utilisation.

With its grinding range of 300 x 600mm the J600 realises its full potential, particularly when grinding demanding applications in tool and die making industries.

The machine bed, column, saddle, table and wheelhead of the J600 are made of cast iron. Thanks to 3D-CAD and finite element analysis, the rigidity and weight of the machine have been optimised, for greater stability.

The new polygon grinding software enables grinding of 360-degree contours on the J600 in a single clamping. For this function, the machine can be equipped with a rotary index table (optionally with a tailstock).

Any external contour consisting of line and circular elements can be ground on the J600 with polygon grinding. External cylindrical and non-circular grinding tasks can be performed with the highest precision and surface quality.

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Visit the United Grinding stand at 12.00 on 18th September for the unveiling of the very latest grinding technology.

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DANOBAT presents its latest developments at AMB

DANOBAT will be presenting technologically advanced grinding machines as well as a hard turning lathe that achieves grinding precision at AMB.

In addition, the company will avail of this opportunity to share its digital value proposition, composed of in-house technological developments based on Industry 4.0 concepts, with an aim to advancing in the creation of intelligent manufacturing spaces, fitted with interconnected equipment and capable of autonomous operation.

Grinding quality with turning flexibility

With years of experience in grinding and turning, DANOBAT has combined its knowledge of these two technologies with the development of the LT-400.

The LT-400 is characterised by achieving maximum quality results with great flexibility and adaptability to the client's needs. It adjusts perfectly to the demands of short-run manufacturers, that are required to frequently modify the type of parts they manufacture, without needing to give up the precision of the grinding technology.

The development manages to adapt to manufacturers' different runs with maximum quality, thanks to the addition of a granite bed affording thermal stability and greater vibration damping.

The LT-400's bed is a support free of residual stress which maintains its geometrical accuracy, making the work area much more stable than if it were made of another material. In addition, it is at an incline of 45 degrees to favour optimum stock removal.

Cross slides equipped with contactless hydrostatic technology ensure zero wear in the guiding system, preventing the stick-slip effect and offering great damping capacity. The hydrostatic system ensures thermal stability through constant control of the oil temperature.

The linear motors on the X and Z axes are controlled by optical scales cooled to a controlled temperature. These motors significantly lengthen the maintenance intervals in comparison with other conventional systems for movement transmission because they lack intermediate mechanical elements.

The head is fitted with hydrostatic bearings and an integrated motor, both of which are cooled. The machine is also fitted with a mobile tailstock driven by a linear motor which helps speed up the process of setting up the change of the workpiece.

This lathe meets the requirements for manufacturing hydraulic pieces, bearings, spindle nuts and parts for equipment thanks to its capacity for machining high-hardness materials with precision to less than a micron.

The solution for non-cylindrical shapes and radii

The IRD-400 grinding solution offer from DANOBAT includes internal, external, surface and radius grinding, a solution especially designed for machining dies and moulds.

The main advantages offered by this development are the maximum precision results obtained for pieces with high geometric complexity and with high productivity.

The machine achieves highly accurate finishes thanks to its B0 axis which swivels up to 91 degrees. Axis control means complex internal shapes can be made using one single wheel and in one contour line, thus maximising productivity.

With this model, the 4-spindle turret includes a measuring probe integrated in the software with which the starting position of the workpiece can be detected. This ensures that, on the final finishing run, the system reaches the required measurement with precision. In round contours, roundness deviations of 0.5 µm can be reached.

Another highlight of this development is the high degree of exact synchronisation of all the movements of the axes, including the rotation axis of the workpiece (C0), thus enabling eccentric grinding. This feature means that complex geometries can also be



machined with the aid of coordinate grinding, while square, rectangular or freeform shapes can be made with great precision.

High precision grinding with the LG range

The LG ultra-precision grinding machines offer a high degree of customisation and guarantee very high machine availability, having been developed for grinding workpieces requiring high precision with efficiency and productivity and guaranteeing the highest of quality standards.

Typical applications for the LG family are precision hydraulic parts, automotive parts, cutting pieces, cams or components with eccentric diameters. In addition, it affords extraordinary repeatability, due to its natural granite bed, the linear motors and the added optical scales.

The wheelhead, fitted with cooled electro-spindles, reaches a maximum peripheral speed of 120 m/s covering the necessary range for grinding with conventional abrasives (45-60 m/s) or superabrasives (20 - 120 m/s).

This development also comes with DANOBAT DoGrind software, an intuitive, user-friendly system which was developed by the company's engineers.

DANOBAT

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Hall 5 Stand 5C32

S131

The universal machine for diverse applications in internal grinding.



If you want to have state-of-the-art technology for your internal grinding applications too, then take a few minutes for the S131. STUDER precision is based on the Granitan[®] machine bed and the StuderGuide[®] guideway system. During development the emphasis was placed on the machine ergonomics in relation to grinding, setup and maintenance.

www.studer.com – The Art of Grinding.



Hobbing and chamfering: perfectly integrated

After an upgrade, the universal LC 280 DC gear hobbing machine shines with improved operating comfort and technical refinements.

The standard LC 280 a version was presented in the Liebherr 2017/2018 magazine.

This entry-level hobbing machine is ideally suited for made-to-order gear manufacturers. The LC 280 DC, with an integrated ChamferCut unit, is the perfect sister machine to take up the banner for series production and customers in the automotive industry. The new model features ergonomic and technical improvements, especially for the extensive optimisation of the ChamferCut unit.

Large doors without a central column makes it much easier for users to access the working area of the ChamferCut station. The optimised machine bed provides for even better chip removal, especially for fine ChamferCut chips.

The LC 280 gear hobbing machine provides Liebherr quality with maximum flexibility and short delivery times. The new development relies on tried-and-tested know-how, while at the same time including many improved components.

In recent years, the gear market has been experiencing a trend towards outsourcing. As a result of this shift, many suppliers are receiving orders for the soft machining of gears. "With the LC 280 α, Liebherr developed a new generation of gear hobbing machines for such short-term requests," reports Dr.-Ing. Hansjörg Geiser, manager, development and design, gear cutting machines. "This gear cutting machine, equipped with the well-known Liebherr quality, offers maximum flexibility, maximum productivity and is available to the customer at short notice."

The criteria for an investment decision regarding a new gear cutting machine are primarily quality, maximum flexibility, and at the same time maximum productivity with low procurement costs. For the user, it is crucial which orders they can execute and how efficiently they can process them. The LC 280 α was developed precisely for these requirements. "It should offer the user the unique opportunity of being able to machine gears and shafts with a workpiece diameter up to 280 mm and a shaft length up to 500 mm. Most typical machining sizes



required for a gear fall within this range," says Hansjörg Geiser.

Some of the tried-and-tested components were adopted in the new development and many were improved. For example, the machine base was designed with a very steep bed, which prevents a deposit of chips. In addition, an optional complete stainless-steel housing was integrated, which reduces the thermal influence of the hot dry chips on the machine bed to a minimum.

The hob head was also redesigned for increased flexibility and productivity. "It is now possible to machine workpieces up to a module of 5 mm," explains Hansjörg Geiser. "The spindle speed was increased by 50 percent to 2,250 revolutions per minute compared with the previous model. At the same time, the shifting length increased to 200 mm and the maximum tool diameter increased to 150 mm."

As a result of these improvements, tool life is increased considerably with the use of longer tools. With the use of indexable carbide insert cutters, the process time for certain applications can be reduced by up to 30 percent and the tool costs per workpiece can also be lowered. As a result, the unit costs can be reduced significantly.

The proven and fast ringloader system was further optimised. Now, workpieces up to a maximum of 15 kg can be automatically loaded and unloaded very quickly. This internal automation concept is as fast as a double-table machine and is characterised



by high flexibility and efficiency. Setup and maintenance costs can be dramatically reduced.

With the new LHGe@rTec touch user interface, operators can control the machine quickly and easily. It can be individually configured and supports the user with simple user guidance, which detects and eliminates faults and offers suggested values. It guides the user through the program step by step for process and retooling cycles.

Liebherr has been manufacturing highly productive gear hobbing machines for decades. The large selection of machine types fulfils specific customer requirements, from the automotive industry to wind turbine manufacturers.

Liebherr-Verzahntechnik GmbH

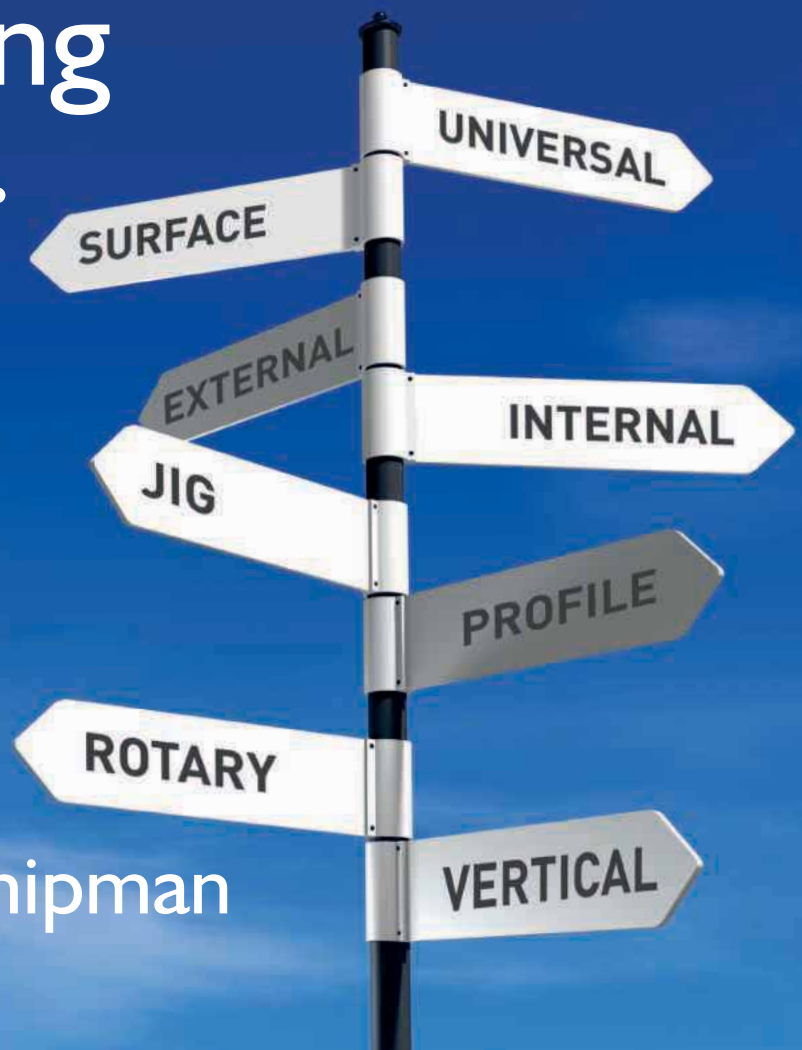
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Comprehensive display of high precision metal cutting and grinding technology from Hardinge

The latest Kellenberger 100 platform concept cylindrical grinding machine features alongside two Hardinge Super Precision turning and turn/grinding CNC centres on the Hardinge Inc. stand at the forthcoming AMB 2018 exhibition.

Since its introduction in 2017, the innovative Kellenberger 100 concept has been well received, fulfilling the objective of developing a high-performance, cost-effective cylindrical precision grinder. As well as adopting a highly flexible modular design, the machine makes use of technology from Kellenberger's Vista and Vita machine ranges, the Tschudin T25 and the Jones & Shipman Ultramat CNC and Ultragrind 1000, all tried and trusted machines in their respective sectors.



In terms of functionality, the new 100 concept delivers a range of configuration alternatives to meet the widest range of grinding applications. Modular construction based on a common platform is designed to reduce machine build time yet accommodate numerous 'standard' options with an excellent price/performance ratio for the end user.

Three important features distinguish the new 100 machine series:

Firstly, an innovative, collision-free, compact wheelhead solution. This is a new, compact wheelhead system with integral motor spindles and a reinforced casing for larger wheel diameters when internal grinding. There is a choice of 10 wheelhead variations to ensure the optimal machine configuration based on the components to be processed.

Secondly, the enhancement of performance parameters. A higher grinding wheel drive power increases productivity while the newly designed Z guideway produces higher profile precision from the C-axis, again enhancing precision when non-circular grinding.

Finally, the service-friendly machine concept. Kellenberger's service teams were involved in the design and optimisation of the machine. This impacts on faster maintenance and service operations and optimum accessibility of maintenance-intensive components is assured.

The Kellenberger machines feature the latest Fanuc 31i CNC controls with 19" touchscreen guidance system on an operator friendly, intuitive touchscreen panel. An option is the newly designed cycle programming or workpiece-related graphic programming.

A perfect finish in one operation

Hardinge Super Precision turning and turn/grinding machines have a reputation for holding the tightest tolerances when manufacturing hard to manufacture parts. The latest T-Series CNC lathes from Hardinge not only continue this long tradition but achieve new standards of precision and capability.

At AMB, two machines will be operational: the Hardinge Quest GT 27 SP turn/grind centre and the T42 SP turning centre.

The Hardinge Quest GT 27 SP is a combined turning and grinding centre, specially designed for high precision manufacturing of complex parts. It features a 10 HP, 8,000 rpm main spindle with 27 mm bar capacity. The GT 27 SP can also be equipped with a "Big-Bore" spindle to handle up to 42 mm bar capacity. The headstock assembly features heavily ribbed construction, allowing minimal heat retention and optimum part size control.



The machine can be equipped with up to four grinding spindles, making it ideal for producing high quality, high precision parts, depending on machine configuration. The grinding spindles can be 30,000, 50,000, 80,000 or 100,000 rpm, with surface finishes (turning) of 0.20 micron and exacting part roundness of 0.38 micron achievable. The lathe can produce continuous machining accuracy of three microns.

The Hardinge T 42 Super-Precision turning centre is ideally suited to productive and reliable manufacturing.



This machine delivers optimum precision and accuracy and is ideal for 2-axis high precision machining or complex multi-tasking operations that require a high level of super precision, delicate part handling and parts made complete in a single setup.

The T 42 SP features a 15 hp, 6,000 rpm A2-5 collet ready spindle with 42 mm bar capacity and a 16-station turret offers a half station index for up to 32 tools.

In production, a high level of precision/part surface finish is maintained at 0.15 micron, with part roundness at 25 micron and continuous part accuracy within 0.3 micron. Overall axis repeatability is 0.76 micron.

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Hall 5 Stand B80



Swiss Precision Gear Grinding

Cars, aircraft and industrial machinery all require high-accuracy gears for their transmissions. Worldwide, Reishauer gear grinding machines play a major role in the manufacturing process of grinding gears used in such transmissions. Demands placed on these transmissions include the reliable transfer of high torque and power density, low weight and minimal noise emissions. Reishauer precision ground gears ensure the demands placed on transmission gears are fully met.



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Gear Grinding Technology

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Halle 5/B55

Agathon innovation on show

Agathon continues to make huge advances in the grinding process. With specific regards to machining superhard materials a grinding process with adaptive infeed is now available, which runs on the unique 2D process force measurement. In addition, the HSK E25 clamping system allows autonomous handling of the ball nose end mills. Complementing the above features is a programmable 3D probe which, as an example, can locate the braced PCD tips.

Wide range of hardware and software options

The adaptive infeed ensures faster and even more stable grinding processes. It is now available on all Agathon grinding machines equipped with the current version 5 of the AGC+ programming software. Unlike with constant infeed, the normal force is specified and the infeed is adjusted adaptively in such a way that it is kept constant. This procedure guarantees that the grinding process remains at the optimum operating point, even if the material or tool shows qualitative variations.

Agathon users do not only get the actual values of the tangential force but also those of the extremely demanding normal force to be determined on their machines. Agathon is thus the only supplier of standard machines to offer such a technology to its customers, in high dynamics, good resolution and at an extremely attractive price. This technology can only be found on laboratory machines. Compared to the tangential force, the normal force makes much better statements about the process condition and how the infeed must be



adjusted and the narrower the process window of a grinding operation the more important the accurate adjustment of the infeed becomes.

Users of the adaptive infeed benefit in three ways: firstly, the machine can be set up more quickly with the normal force as main target value; secondly, the process time is shortened, because the user can grind with the optimum parameters for his application and does not have to calculate safety reserves for possible material or tool variations; the grinding process is simply more stable due to the constant removal rate. In the development phase, it has been shown that basically, all users benefit from the adaptive infeed. Machine operators, however, who do not have years or even decades of experience with high-tech grinding machines, will benefit most from this option. This means that such users save more time and money than users who have an extraordinary degree of dexterity for the grinding process.

Another option that increases flexibility for the user is the 3D measuring probe that Agathon provides for its Evo Combi and Evo Penta machines. The 3D measuring probe measures the clamped workpiece in X, Y and Z directions. This gives the user complete

freedom over where specific features of a workpiece are measured in the working area. For example, in the case of press-to-size blanks, certain characteristics of the workpiece are already created when the carbide is pressed, so that only a few grinding operations need to be performed. The 3D measuring probe is also a functional extension of the HSK clamping system. This is an alternative workpiece handling system for Agathon Evo Penta series grinding machines. An HSK mount can be used as an alternative to Agathon's B3 clamping system. With its DIN-ISO standardised E25 clamping cone, the HSK fixture forms a universal interface on the machine side on which a wide variety of workpieces can be mounted.

The latest software innovation from Agathon, Agathon LiveStatus, also gives the user room for action. This Cloud-based application transfers machine status and selected production data from Agathon machines to a customer's mobile device or computer. One of the benefits of the transparency achieved is safety. Jobs can be monitored at any location. This means that the user always knows, among other things, at what stage the individual jobs are at and when, for example, consumables need to be replaced. Should an event occur during the processing of a job, the user is informed immediately via the app or via the LiveStatus website. This makes the user much more flexible and allows him to handle several jobs at the same time. Thanks to Agathon LiveStatus, the user can produce more parts per time unit and work much more efficiently than without this option.

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JUNKER presents the JUPITER 200 S at AMB

With the JUPITER 200 S grinding machine, the evolution of the JUPITER 200, it will soon be possible to also manufacture products with flat shoulders and face ends, thanks to inclined plunge-cut grinding. This new machine version will be on display on the Erwin Junker stand at AMB.

The JUPITER 200 S from JUNKER offers a special process variant: in contrast to conventional plunge-cut grinding, with inclined plunge-cut grinding the wheelhead is inclined by 10°. This enables centreless grinding of flat shoulders or face ends and opens up the range of applications in areas such as precision machining and metalworking, the tool industry and contract grinding.

The grinding machine processes a wide range of materials from steel to carbide, all with excellent precision. Typical workpieces include rotors, piston parts and profile rollers. The JUPITER 200 S is based on the proven JUPITER concept, which has been used with great success for many years and is suitable for bearing parts, shafts and motor parts, for example. Measurement systems are fitted in the series. These ensure outstanding quality, even during extremely rapid production.

Centreless grinding makes it possible to achieve a high output volume with short cycle times. There are two types: through feed grinding and plunge-cut grinding.

With centreless through feed grinding, parts are fed through the grinding zone one after another in a line. This works for workpieces with a uniform diameter. In contrast, centreless plunge-cut grinding involves briefly fixing the workpieces and feeding them to the machine with a suitable loading device. Here, the wheel is given the negative profile of the desired workpiece contour. In this way, all diameters can be ground on the workpiece in a single plunge cut operation.

Extremely quick changeover

The tooling time is drastically reduced as the machines automatically calculate the positions of the grinding and regulating wheels. In addition, the grinding gap components (grinding wheel, regulating wheel and support rail) can be conveniently controlled via the operator panel. JUPITER machines always deliver high output, reliable processes and thus



The JUPITER 200 centreless cylindrical grinding machine from JUNKER delivers outstanding grinding quality. Depending on the application, corundum, CBN or diamond is used as an abrasive

consistent quality from start to finish. They also offer a very high level of accuracy. After all, many customers expect extremely precise concentricity, even for the smallest components.

The sophisticated design makes this possible: the machine parameters are perfectly matched to the rigidity of the grinding gap components. The CNC height adjustment of the support rail has two decisive benefits. Firstly, it ensures faster setup, as all three grinding gap components (grinding wheel, regulating wheel and support rail) can be controlled from the operator panel. Secondly, the workpiece axis remains on a level during the entire grinding process, which exerts a positive influence on workpiece quality during centreless grinding.

What is more, the experts at JUNKER adapt every machine to suit the customer's exact requirements. The optimum machine configuration is determined for each application and checked in a measuring station during grinding tests at the JUNKER technology centre. As a result, customers can achieve optimum results during production.

Filtration systems make the perfect addition

JUNKER Group member, LTA Lufttechnik GmbH, will also be exhibiting at the JUNKER booth. In addition to large filtration systems, the company also specialises in



With the JUPITER 200 S, centreless grinding can be carried out on a huge range of workpieces, from pipes to hydraulic pushers

compact filter systems and offers solutions that can extract aerosols and dust for machines and machining centres.

One of the products from this range, the electrostatic air filter, AC 3002 CIP, will be one of the highlights on display at AMB. This is a particularly ecological filter, as only regenerative filter elements which can be cleaned any optional number of times using an automatic flushing process and without the use of any chemical additives or diluted solutions are used. The key benefit is the reduction in maintenance and downtimes along with considerable cost savings.

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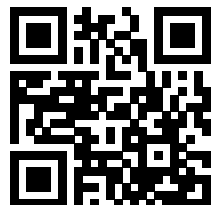
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Applause, Applause



Agathon LiveStatus

- Production and status data on your smartphone – in real time
- Visualisation of grinding jobs for more process security
- More freedom for the operator, creating greater efficiency



Klingelnberg makes its first appearance at AMB

The biennial AMB trade show will bring together metal cutting experts for the 19th time in Stuttgart. The importance of this event is continuously growing within the industry and the exhibition will therefore be significantly larger this year. For the first time ever, mechanical engineering company Klingelnberg will be one of them. The solutions provider will be presenting its innovative Closed Loop concept for cylindrical gears and therefore a pioneering Industry 4.0 solution.

With the opening of the new Paul Horn Hall (Hall 10), the total exhibition space available at AMB has increased to 120,000 m². Together with a special Digital Way show and the associated conference, the trade show is a unique platform of innovation for metalworking, demonstrating what can currently be achieved in terms of digitalisation in production.

It is therefore the ideal forum for Klingelnberg to present its latest innovations. Not only do these innovations reflect state-of-the-art developments but taken together they are a prime example of production in the Industry 4.0 age.

Höfler Speed Viper 180 with Closed Loop technology

The Höfler Speed Viper 180 cylindrical gear generating grinding machine is among this year's highlights in the field of cylindrical gear technology. With its Speed Viper platform, Klingelnberg is presenting itself as a pioneer with regard to Industry 4.0, and it will be demonstrating the cost savings and efficiency gains that are possible as soon as the potential of digitally-supported processes is fully exploited.



The new Speed Viper generation is designed for high productivity and robustness of the grinding process and therefore fulfils all of the requirements that

are needed in modern large-scale production: short set-up times, minimum cycle times, innovative software solutions, and digital process and quality control in a Closed Loop system.

Depending on the model, Speed Viper is designed for maximum workpiece diameters of 80, 180, and 300 mm. These match the standard component sizes of the automotive and commercial vehicle sectors and their suppliers, for whom the Speed Viper is mainly intended. They also perfectly meet the stringent productivity requirements of this industry. However, the series is also ideal for cylindrical gears in industrial transmissions and for robotic applications.

Gear Operator, a newly developed operating software program, focuses on a simple, innovative operating philosophy. This software, which guides staff step by step through the machine functions via a modern touch screen display, sees Klingelnberg setting a new standard with regard to machine operation and process stability.

Closed Loop for cylindrical gears, in line with Industry 4.0

In broadening the Closed Loop concept already established at Klingelnberg for bevel gears to include the world of cylindrical gears, the company is also linking machine tools to the measuring machine in this sector.

The Closed Loop for cylindrical gears is based on an open interface and automates machine corrections, and therefore sees the solutions provider take the next logical step towards digitalisation in gear production. Thanks to a number of associated applications and software, Klingelnberg's system enables central production control, resulting in a standardisation of the machining results obtained on various machines and even in various plants.

In order to demonstrate how Klingelnberg's digitalised solution concepts enable the Speed Viper and P 26 precision measuring centre to be used in real-life production in line with Industry 4.0 manufacturing, both machines will be



networked directly at AMB. Visitors to the Klingelnberg stand will be able to see the Closed Loop concept for cylindrical gears for themselves.

The show booth will also feature a digital identification system with Smart Tooling.

Precision measuring centre in a new design

Klingelnberg will also be presenting one of the measuring machines it has designed for future-proofed quality management of gearing as part of Industry 4.0 processes. The fully automatic CNC-controlled P 26 precision measuring centre is designed as a compact unit for the workpiece diameter range up to 260 mm. The machine and software concept has been optimised for the measurement of complex drive components using a technology that replaces up to six conventional measuring methods: gear measurement, general coordinate measurement, form and position measurement, roughness measurement, contour measurement and optical measurement.

With maximum measuring and reproduction accuracies guaranteed, the P series represents a widely used standard in the industry. The P 26 already features the new, ergonomically optimised Klingelnberg design.

Klingelnberg: Hall 5 Stand 5C80

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Winning solutions from AGS

Seven of Advanced Grinding Solutions principals are exhibiting at the forthcoming AMB show in Stuttgart: Bahmuller and Tschudin (**Hall 5 Stand 5B12**) Rollomatic (**Hall 5 Stand 5D72**) Magnetfinish (**Hall 8 Stand 8E64**) Gerber (**Hall 8 Stand 8D42**) Platit (**Hall 3 Stand 3C40**) and HandlingTech (**Hall 6 stand 6C31**).

Bahmuller produces internal and external cylindrical grinding machines for manufacturing very high precision components for the fuel injection and turbocharger industries. One of Bahmullers largest end-users is Delphi Technologies who produce class-leading diesel injector systems for heavy-duty truck applications at its advanced UK manufacturing centre in Stonehouse, Gloucestershire.



Bahmuller turbo charger twinner machine

Tschudin has chosen the AMB show for the worldwide premiere of its new 350 Cube and proline 600 centreless grinding machines. The new Tschudin Cube is thought to be the world's smallest centreless grinding machine with a footprint of just 150 x 150 x 150 cm and is designed to centreless grind small components from 1 mm to 20 mm in diameter for the automotive and medical industries such as needles, rollers and valves. The proLine 600 machine is the new giant within Tschudins range of machines and weighs some 22 tonnes.



Tschudin centreless grinding machine

Since starting work with Rollomatic last summer, AGS has reported major sales to cutting tool and medical component manufacturers in the UK and Eire as the Swiss manufacturer continues to enjoy record machine sales of its range of blank prep and 5- and 6-axis cutting tool grinding machines. The new NP3 plus machine is a firm favourite for cutting toolmakers needing to cylindrically grind multiple stepped diameters on cutting tool blanks prior to flute and end tooth grinding on machines such as Rollomatic's 6-axis grindsmart® 629xw. The NP3 machine is based on the method of peel grinding with the simultaneous grinding of both roughing



Rollomatic NP3 plus machine

and finishing wheels. Rollomatic has chosen AMB to demonstrate its latest technology as seen on its 830xw machine, that is the world's first tool grinding machine to utilise the combination of both hydrostatic slideway technology with linear motors. This allows cutting tool manufacturers to achieve mirror finishes on cutting tool flutes, create radius shape accuracy under 0.005 mm and perfect tool concentricity.

AGS currently has several Magnetfinish machines on order for the UK and recently bagged the biggest ever single order of over £1.2 m from a UK-based automotive parts manufacturer who will take delivery of

large robot based deburring machines early next year. The unique Magnetfinish process polishes the flutes on all types of HSS and Carbide rotary tools such as endmills, form cutters and drills, provides the perfect conditioning or "edge honing" of the cutting edges (micron rounding of the edge) and is also used to polish profiles on taps and coated cutters.

Gerber whose machines are also used by the cutting tool industry, will be using the AMB show to highlight the advantages that its brush deburring and profile generating machines can bring to punch tool makers. Gerber machines are used to define the cutting-edge preparation of punches, dies, indexable inserts, profile cutting plates, drills and milling cutters. With this technology not only can defined radii in the 0.01 mm range be produced, but also the roughness of the cutting-edge surfaces is improved by a factor of three and the surfaces are polished. This results in a significant increase in tool life and improved cutting performance.

Platit, whose machines are used for the coating of cutting tools of all kinds, will be demonstrating its latest cost-effective machines at AMB to show how small to medium sized cutting tool makers can profit by bringing the coating of their cutters in-house rather than passing the process to outside subcontractors. Platit machines ensure that the coating of tools is no "black art" and is a simple easy to handle process and a very important one for cutting tool manufacturers to control in-house.

Completing the AGS line-up at AMB will be HandlingTech, whose advanced loading solutions, that are custom designed for any machine tool, are enjoying great success as component manufacturers invest heavily in automation to improve efficiency. Most of the high-performance machines that AGS sells into the UK are automated and as each year passes it's clear that the need to automate increases further.

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Sharpening in the era of Industry 4.0

At EMO, VOLLMER will be presenting its new portfolio under the motto 'Shaping Success Together'. In addition to its grinding and eroding machines, VOLLMER will also present its digitalisation initiative, which enables the digital exchange of data between machines and opens the door to the world of Industry 4.0.

At the VOLLMER stand, trade fair visitors can see the VGrind 360 carbide tool grinding machine in action. VOLLMER will also demonstrate the VPulse 500 wire erosion machine, the QXD 250 disc erosion machine as well as various automation solutions.



When the international exhibition for metalworking opens its doors from 18 to 22 September, the appearance of the Swabian grinding and eroding specialist will also focus on an IoT concept (Internet of Things), with which VOLLMER has created a framework for new Industry 4.0 technologies. In line with a bottom-up strategy, VOLLMER will showcase its current IoT solutions, which make the exchange of data between sharpening machines and different Industry 4.0 platforms possible.

VOLLMER developed its IoT gateway for this purpose to visualise and process data from its machines. VOLLMER offers tool manufacturers and sharpening specialists a gradual and practical introduction to the topic of Industry 4.0.

Sharpening tools with the VGrind 360

The VGrind 360 grinding machine processes carbide tools such as drills, milling cutters or reamers in one set-up. The machine is available in two versions: One with two vertical spindles for grinding wheel packages and the other with one grinding wheel spindle and one high-frequency spindle (HF spindle) plus an automatic tool changer. The high-frequency spindle allows the grinding of special pocket areas for PCD

plates. In addition, the VGrind 360E is offered as an entry-level model, which is geared towards the specific requirements of service companies and smaller tool manufacturers.

Integrated sticking unit and automation

A wheel sticking unit is also available as a VGrind 360 option for the automatic opening of the abrasive coating. This means that grinding residues on the diamond-tipped grinding wheel surface can be removed to guarantee the sharpness of the grinding wheel for longer. The tool grinding machine also has the option to automatically change the grinding wheel sets as well as their coolant nozzles.

There is also the HC 4 automation solution for the VGrind 360. This comprises a chain magazine with 39 spaces for standardised HSK 63-A (hollow shank tapers) or it can also optionally hold up to 158 shank workpieces. Users can use the HP 160 pallet magazine to supply up to 900 workpieces for around-the-clock, unmanned machining. Alternately, the HPR 250 free-arm robot can be used to automatically manufacture carbide tools with various shaft diameters, resulting in three times as much capacity for tool manufacturers.



Precise machining of diamond tools

VOLLMER will also showcase the VPulse 500 wire erosion machine for the machining of PCD tools. With its eroding generator and



advanced technology, it can manufacture large quantities of high-quality PCD tools. Modern machine kinematics ensure high profile accuracy in both production and maintenance. With the VPulse 500 operating concept, the touch-screen allows operators to easily programme and control the tool for quick, error-free work.

The QXD 250 disc erosion machine can also be used to precisely machine a whole variety of PCD tools. Added programme functionality means that tool manufacturers can use the current QXD 250 to speed up their sharpening processes. With the HC 11 pallet circulation magazine, the erosion machine can be expanded with up to 64 workpiece positions. At AMB, VOLLMER will also be presenting new software updates and options to increase process reliability, precision and flexibility.

"We use AMB to exchange information and ideas with customers and partners and to work on perfecting the sharpening process for tools", states Dr Stefan Brand, CEO of the VOLLMER Group. "This year our concepts and technologies for Industry 4.0 and IoT take centre stage at the trade fair. We show how the quality and variety of rotary tools can be increased thanks to networked machines."

Vollmer UK Ltd

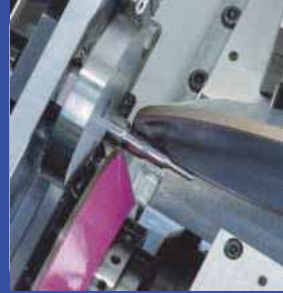
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Further innovation from Supfina at AMB

Through the continuous development of its product portfolio, not to mention its ongoing machine innovations and service offerings, Supfina is embracing a smarter digital production future. The company launched this effort years ago, when it began to use the Ethernet to record machine and operating data as well as explored the possibility of centrally controlling production planning for all its machines.

Among the company's early innovations was external workpiece and recipe management for its machines. For example, an automation system, by intranet or by a customer's robot, can provide workpiece recognition so that setup processes can run fully automatically and thus more efficiently.

In recent years, Supfina's innovation has focused on flat finishing. In 2016, the Wolfach-based company filled out its product portfolio by introducing its Spiro series of fine-grinding machines, thus becoming one of the first complete suppliers of double-disk grinding, flat-finishing, and fine-grinding solutions.

The Spiro series now consists of three machines that can economically process varying workpiece sizes. The Spiro F7, the first to be released, can fine-grind workpieces with diameters of 5 mm to 200 mm. It can also be purchased with an optional automated loading system. Its "little brother," the F5, was introduced in 2017 and can machine workpieces with diameters of 4 mm to 150 mm. Although it has a smaller footprint, the F5 can nevertheless achieve similarly impressive results. The largest Spiro machine, the F12 made its debut this year. This flagship machine is especially suitable for the high-precision machining of workpieces with diameters of 6 mm to 420 mm.

All the Spiro machines can achieve the narrowest workpiece tolerances, plane parallelism and precise surface quality, while at the same time reaching maximum efficiency and cost-effectiveness. Customised options allow the latter to be improved even further. For example, customers can choose optimal automation that coordinates the workpiece, batch size and process to reduce setup and cycle times.

Supfina believes that stronger information exchange between machine, production,



logistics and service provides further potential for optimisation and automation. In keeping with Industry 4.0, the company's Spiro machines can store all relevant machining data for the fine-grinding, "batch mode" process. In addition, various interfaces make real-time data retrieval possible.

Supfina also continually seeks to improve its customer service. The company offers 24/7 online support through its own VPN server or its own industrial VPN router, allowing Supfina to remotely access all control-relevant components. It is also possible to directly access a machine HMI's user interface. In addition, a remote camera system allows Supfina service personnel to view a machine and work area as well as communicate face-to-face with the machine operator. Thus, Supfina can guarantee optimal customer support for process optimisation as well as troubleshooting.

That innovation is part of Supfina's DNA is evident in the company's full embrace of digital-technology advancements. In the future, Supfina will use apps to integrate tablets and smartphones into a machine's diagnostic system, thus ensuring maximum user-friendliness and reduced downtime. The company also plans to use Augmented Reality to further increase efficiency and customer-friendly service.

Supfina Grieshaber has dedicated considerable resources to research and has many decades of superfinishing experience using stones and tapes. By applying this

expertise in perfecting upstream and downstream processes, it can provide versatile machines that exceed customers' expectations. Supfina's renowned superfinishing applications for a wide array of fields, such as automotive, OEM, anti-friction bearings, precision engineering, and medical technology, are supplemented by economical machining systems for precision abrasive finishing and tape-grinding operations.

For every surface that must be finished to near perfection, Supfina has the best professional solution. What's more, the company's flexible machine concept allows you to change workpieces or modify surface requirements quickly and easily, exactly meeting your production demands. Thus, you can respond rapidly to your customers' changing needs and consolidate your market position. All of this is backed by a premium after-sales service to ensure that you can always rely on the machines that it customises for you.

Marketing manager, Petra Kirschmann-Mich says: "For the first time ever, our AMB booth display is so exciting that we can't yet unveil it. But one thing is certain: The Supfina booth will surprise and amaze you."

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Walter and Ewag show the best in tool grinding, erosion and lasering, plus tool measurement

Walter Ewag UK, a member of the United Grinding Group, will be displaying a number of machines from the Walter Helitronic tool grinding/erosion and Walter Helicheck tool measurement machine range, as well as Ewag's Laser Line Precision insert production machine, at AMB.

Visitors to the event will, therefore, have the ideal opportunity to see for themselves the build quality of these machines and will also be able to investigate the numerous technology features available to help improve productivity and quality levels in terms of both tool and manufacturing and regrinding, as well as tool inspection and insert production using a laser.

From the Walter Helitronic range of multi-axis tool grinding/erosion and regrinders, on show will be the two-in-one Power Diamond 400 grinding/erosion machine with robot loader for the production of PCD as well as carbide tooling and the Power 400 tool grinder/regrinder with robot loader.



The Walter Helitronic Power Diamond 400 will be shown with a Robot Loader

Both machines can accommodate tools of 3 mm to 315 mm diameter and up to 380 mm long. In addition to having a grinding wheel/electrode changer (four-station as standard, eight-station optional) for increased automation and unmanned operation, both can utilise a range of robot loading solutions: Top Loader for up to 500 tools, Robot Loader for up to 7,500 tools or Robot Loader 25 which has a capacity for tools weighing 25 kg including grippers.



Walter Helicheck 3D

Walter's renowned Tool Studio 3 software will also be available with its integrated wizard technology for fast tool production simulation, parameter changes and machine operation, including an erosion function option for the fast and easy programming of 'what you see you can grind and erode'.

Complementing these will be the Walter Helicheck Plus tool measurement machine with robot loader and the Helicheck 3D.

The Helicheck 3D digitises tools and production parts to create three-dimensional model data that can be saved, processed, analysed and measured. The machine utilises a revolutionary new method of digitising to enable items to be scanned and digitised quickly and easily.

The 3D Tool Analyser software, specifically developed for the application, can lay horizontal, vertical and freely selectable cutting planes at any position on the 3D model. These are automatically analysed and the resulting parameters made available for use.

The capability to measure all important tool features has never been quicker or simpler than with Helicheck 3D and since measurements are carried out on virtual models, the process can be performed offline.

Complementing the machine is a software 3D 'matcher' to enable users to create a colour-coded comparison of two 3D models within the machine's graphical user interface. After the 'match' of both models, the operator instantly receives an evaluation of the quality of the products and any deviations from desired values.

The 5-axis Laser Line Precision will



Ewag's Laser Line Precision

represent Ewag's wide range. This is a cost-effective and highly accurate entry-level machine for processing all commercially available diamond cutting materials including CBN, PKD and CVC-D. The machine can accommodate rotationally symmetrical tools of up to 200 mm diameter and up to 250 mm long, as well as indexable inserts with inscribed diameters from 3 mm and circumscribed diameters up to 50 mm.

Laser Line Precision utilises modern short-pulse fibre-laser technology in the green wavelength range (532 Nm) for highly efficient and effective machining, with the resulting flue gas and vapourised material being suctioned away to a suction/filter system.

Incorporating the innovative and patented Laser Touch Machining process, the result is excellent surface quality, even on tools with complex or delicate geometries. Indeed, any type of cutting contour, clearance and three-dimensional chipbreaker geometry can be produced in a single clamping operation.

With a footprint of only 5 m², Laser Line Precision is the most compact and cost-efficient laser production centre available for super hard tools. An optional 6-axis robot offers the highest levels of flexibility during minimally manned, multi-shift operation.

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LACH DIAMANT innovations at AMB

The "Multi-Point" Hand Dresser

When it comes to dressing of grinding wheels, established manufacturer LACH DIAMANT is continuing to introduce patent-worthy new developments, such as drebojet-plus diamond dressing rolls or highly efficient diamond dressing plates like the Dia-Fliese-perfect.

This time, LACH DIAMANT points to a simple little machine, found in every tool shop and fitter's shop, the "tool and cutter grinder" fitted with one or two conventional grinding wheels.

The dressing is mostly done with a little steel wheel, well known for ages, if done at all, since the disadvantage of these "little wheels/rolls" is the cloud of dust developing during dry dressing. The solution, also for geometrically clean wheels, provides a multi-point hand dresser, developed by LACH DIAMANT.



A VH1 Diamond Multi-Point Hand Dresser shown dressing a grinding wheel on a tool and cutter grinder

The grinding wheel is dressed at diamond-like speed, without the mentioned unpleasant dust formation. This proven diamond tool is available in two versions: Type VH1 for the dressing of O.D. grinding wheels and type VH2 for cup grinding wheels, a must-have for every tool shop and fitter's shop.

The world premiere of contour-profiled diamond and CBN profile grinding wheels

The technology of contour-profiled-profile grinding wheels also heralds the comeback of metal binders for LACH diamond and CBN grinding wheels.

The resin bond grinding wheel needs several processing steps during the deep grinding of components made of carbide, high-alloyed steels or ceramics, such as aluminium oxide, magnesium oxide or else non-oxide ceramics, such as silicon nitride. The new metal bond »contour-profiled« profile grinding wheel now accomplishes these works in one single step with time and cost-savings.

Almost every profile type, concave or convex, is possible, even with the smallest tolerances of up to 0.005 mm.

Costs for abrasives and wheels could be reduced by a factor of 8, as one single profiled contour-profiled grinding wheel is sufficient for all so far necessary set of wheels. Tool life is now up to 25 times longer, for example for solid carbide thread inserts.

The contour-profiled wheels achieve up to 35 to 60 percent time savings through higher feed rates per workpiece.

Compared to other machining methods, the LACH DIAMANT technology guarantees an almost 100 percent repeat accuracy of the original profile. Profile deviations are also excluded during service.



Three in one - contour-profiled Diamond and CBN profile grinding wheels represents the new technology for drastic cost savings during serial production

CBN precision grinding pins and wheels for the internal cylindrical grinding of hardened steel

When internal cylindrical grinding of hardened steel HRC 55 or HSS, precision

grinding pins from 0.5 mm and internal grinding wheels from 10 mm in electro-plated bond G-MX 500 guarantee maximum abrasion and tool life. A new AMB brochure gives detailed information on all available, in-stock models with all diamond and CBN grain sizes.

LACH DIAMANT can look back on many years of experience with CBN/Borazon™, when in 1969 the world-first presentation of this abrasive proved its superiority to diamonds, especially with regard to temperature resistance.

Non-slip grinding / deburring with electro-plated diamond and CBN tools

Parallel to the increasing popularity of "lightweight" materials such as fibre composites, there is also an ever-increasing demand for machining tools that can improve performance and cost-efficiency.

PCD (polycrystalline cutting materials) have long since proven their superiority to carbides during the machining of aluminium, GRP, CFRP, green ceramics, graphite and other materials. On the other hand, electro-plated diamond and CBN tools have been around for almost fifty years.

Electro-plated diamond or CBN files and grinding pins are essential for tool and mould construction.

Companies that are machining graphite as well as manufacturers of carbides and ceramics appreciate electro-plated tools, especially because of the possibility to quickly and efficiently coat a large variety of different tool shapes, mounted on steel bodies, with either coarse or fine diamond grit.

LACH DIAMANT offers all users extensive know-how with regard to the optimal diamond grain size, depending on individual tasks and existing machine conditions.

The company offers a special service for all electro-plated diamond and CBN tools: re-coating of submitted steel bodies or worn-out electro-plated tools, also for tools of other manufacturers.

LACH DIAMANT
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Hall 3 Stand 3E23

Advanced ultra-fine filtration technology for optimally cleaned grinding oils

VOMAT at AMB

Only by using extremely clean grinding oils can high quality cutting tools be ground economically and reliably against increasingly tight tolerance requirements. To meet these requirements, filtration system manufacturer VOMAT provides compact, powerful and energy-efficient solutions for the metal processing industry. At AMB 2018 in Hannover, VOMAT will be showing examples for individually tailored concepts for the filtration of cooling lubricants.

VOMAT filtration systems are ideal for filtering oils and removing the ultra-fine particles that result from grinding, honing, lapping, eroding and other metalworking processes. The automatically controlled filter backwash process is activated only on demand and separates contaminated and clean oil 100 percent. Using a combination of frequency-controlled filter pumps and on demand filtration, the resulting energy consumption is extremely positive and much lower than competing units.

The special high-performance pre-coat filters ensure that clean oil meeting the

purity class of NAS 7 (3-5 µm) is available for the grinding process for long periods of time. VOMAT filtration systems are low-maintenance, compact and are available in several sizes ranging from stand-alone units for single machines to plant-wide central systems. Their modular concept, offering a plethora of cooling and disposal options along with the ability to handle mixed use of carbide and HSS, allows for customised systems which will suit everybody's needs.

Besides the compact stand-alone units in the FA series (70 to 1,200 litre flow rate/min), the new VOMAT vacuum belt filter UBF will certainly be a focus at the fair. With a filtration fineness of 3 to 25 µm, it is ideally suited for filtering oils and emulsions contaminated with steel, HSS, binders and grinding wheel particles.

According to VOMAT, the UBF filter requires about 70 percent less space while delivering 100 percent of the performance when compared to conventional systems offered in the market place.

VOMAT's sales manager Steffen Strobel states: "Efficient, space- and energy saving



filtration is becoming increasingly important. Choosing the right filtration system will have a positive impact on production costs. Thanks to VOMAT technology, a lot of money can be saved in production."

VOMAT
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At ANCA we provide a complete solution to our customers, designing and manufacturing almost all our technology in-house. As part of this we developed our own low-cost solution for tool loading. The 3-axes ANCA robot has a capacity of 380 tools and accommodates tool sizes up to Ø20mm (Ø3/4") x 150mm (6") long. The AR300 loader is contained within the compact FX5 Linear machine footprint, so there is no need for extra floorspace.

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AR300

ANCA
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Gear grinding and analytical measurement at AMB



KAPP NILES

With the KNe series, KAPP NILES offers users an inexpensive entry into precision machining in the field of gear grinding. Designed on a common platform, the KNe 3P profile grinding machine and the KNe 3G generating grinding machine are designed as solutions for the flexible production of small and medium lot sizes with a max. tip diameter of 320 mm.

The integrated measuring device allows to measure and to evaluate gear qualities against specifications. This function is used both for the optimisation of the setup process and for the alignment of the toothing with optimised measurement switch (KNe3P in particular).

The Sinumerik 840D sl control system is used on a 19" touch screen. The innovative, operator-friendly KNgrind user interface allows a machine-oriented and an intuitive parameterization of the machining task.

An outstanding feature of the KNe 3G grinding machine is the tool drive. It

combines high speeds of up to 6,700 min-1 for a constant cutting speed, even with a slimmer worm, with high stability. Thanks to the absence of a counter-bearing and an integrated automatic HSK interface to the toolholder, the worm change can be carried out in the shortest possible time. The alignment-free level indicator on the tool axis rounds up the optimised setup design. The retractable dresser offers all relevant dressing procedures from the form-bound roll for higher or recurring lots up to topological dressing for prototypes and small lot batches.

At AMB, KAPP NILES will also be presenting the KNM 2X, an analytical measuring machine for the high-precision measurement of gears, gear tools and rotationally symmetrical workpieces of up to 300 mm. KAPP NILES Metrology is already known as the manufacturer of the largest gear measuring machines installed in the world. With this new addition, it has expanded its portfolio to include a compact series for large series producers and manufacturers of frequently changing parts spectrums.

The KNM 2X combines high-precision mechanics and cutting-edge drive and control systems technology in a single measuring machine with outstanding

characteristics. All the guides and the granite base plate feature extremely long-term stability and an identically low expansion coefficient. Air bearings with dry running properties guarantee perfect and wear-free guides with no short-wave errors. Air springs under the base plate provide reliable protection from shocks and vibrations, so no special foundation is required.

With its ironless linear motors and round table torque motor, this machine boasts ultimate positional accuracy and trajectory control. The newly developed KNM C5 controller determines the optimal drive parameters for each workpiece and clamping device, ensuring consistently optimum measuring dynamics. Despite its compact design, the machine offers wide ranges of movement, ensuring a tangential rolling motion to the base circle. Another great feature is the option of using different Renishaw scanning probe systems depending on the application.

One of the top highlights of the KNM 2X is the "smart" counter holder. Thanks to a motorised mechanism that lowers it into the base plate, the counter holder provides an additional working area. The use of this newly designed "smart" quick change system makes it possible to retool



workpiece holders, lower points and calibrating balls within seconds and greatly reduces auxiliary times. The freely positionable switch cabinet allows for optimum setup, even when space is limited.



The machine is equipped with the full range of comprehensive analysis software packages, successfully operating on measuring machines around the world for decades. These can be accessed directly from the touch screen of the KNM 2X and can be adapted individually to the measuring tasks at hand.

KAPP NILES is a global market leader in grinding machines and tools for finishing of gears or profiles. Complementing highly-accurate metrology makes KAPP NILES the best partner for production solutions. Around 800 highly-specialised employees represent the innovative power and the expertise of the company which has grown for over 120 years.

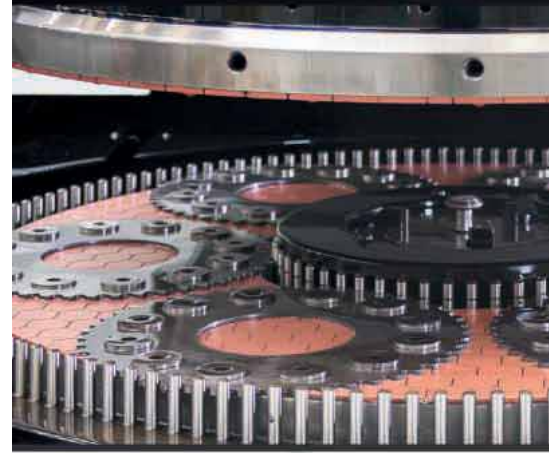
KAPP NILES is the technology partner for companies from the automotive, aviation and compressor industries, from drive engineering, robotics, energy and wind power, exploitation of raw materials and shipbuilding. Machines, tools and technological solutions from KAPP NILES precisely machine gears and profiles to a thousandth of a millimetre and up to a diameter of eight metres. Specialists optimise each system solution individually for the customer's requirements and provide support throughout its life-cycle.

Machines and tools from KAPP NILES guarantee both precision and cost-effectiveness for the manufacturing of sophisticated components. In eight locations, the know-how and quality of "Made in Germany" is present locally in all important markets. In this way, KAPP NILES enables its customers to set their concepts and products in precise motion, on land, on water and in the air.

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Crankshaft specialist

by Claudio Tacchella

AZ SpA, already known for the innovative grinding machines proposed for the aerospace sector, is becoming more and more established in automotive applications with cutting-edge technological solutions for crankshaft grinding. The new DU range represents the most recent success in solving the complete machining of crankshafts for high production industries.

The automotive industry is among the most attentive in terms of production technologies. The client's objectives are simple to describe in the demands they have to meet, i.e. quality, profitability, precision and reliability. The latter, in particular, is a critical factor given the production rates typical of the automotive sector in terms of parts produced and, of course, production costs.

Italian company AZ SpA of Thiene (VI), a manufacturer of large-sized special cylindrical grinding machines with over 40 years of experience in the sector, has always distinguished itself in tackling and solving technical issues, for example complex shape, proposing customised solutions to individual customer needs.

With more than 3,000 grinding machines delivered and operational in more than 80 countries worldwide, for the grinding of crankshafts from 600 mm up to 14 m in length, have accredited AZ the synonym "crankshafts specialists".

The numerous lines available in the catalogue, designated CGA, CGX and CG



The new DU grinding machine can be configured with one wheelhead or two wheelheads side by side

for the engine rebuilding sector and DB, CGP and DU for high production industries, satisfy every request from the automotive, energy, marine, locomotives, earth-moving and oil & gas sectors.

The new DU800 line, in particular, is becoming increasingly established in the automotive sector for the complete grinding of crankshafts for high production industries. The new DU grinding machine can be configured with one wheelhead or with two wheelheads side by side.

The design of the grinding machine is characterised by the overlapped and crossed arrangement of the main machining



The design of the machine is characterised by the overlapped and crossed arrangement of the main Z longitudinal and transversal X machining axes

axes, Z longitudinal and transversal X, which allows ample operating capacity with reduced dimensions on the ground.

Other features include: Max grinding length of 800 mm, diameter swing over table of the pieces up to 510 mm and max weight between centres of 80 kg.

The axes are driven by linear motors for straight movements with positioning accuracy of ± 0.0005 mm and torque for angular movements with positioning accuracy of $\pm 0.005^\circ$.

The base of the machine has been designed with FEM analysis and consists of a composital structure that reduces the elasticity coefficient to a third, guaranteeing an exceptional absorption of vibrations, great rigidity and high dynamic performance.



The new DU range comprises crankshaft grinding machines for high volume production

The base is designed to be connected to a sophisticated control and heating system by means of pipes integrated into the concrete that ensures thermal variations of less than 1°C on the whole machine base.

The fixed workpiece table is made of thermally stabilised cast-iron monoblock and allows the correct and easy positioning of the workpiece clamping and support units as self-centring hydraulic automatic steady rests.

The workhead features pressurised electrospindle, hydraulic self-centring with three self-compensating jaws chuck system and automatic hydraulic tailstock with AZ system of constant axial pressure and piece cylindricity correction.

The DU line has the capability to grind main journals, crank pins and flanges in one setup. Eccentric grinding of the crankshaft takes place by orbital tracking of the crank pin. In the execution with two grinding carriage units, the wheelheads move independently and act simultaneously and synchronously on the piece generatrix.

The wheelhead is equipped with an electrospindle with a motor power of 24.2 kW, grinding wheel spindle torque up to 66 Nm, grinding wheel with a diameter of 610 mm in CBN or 760 mm with corundum grinding wheel and operate with a peripheral speed of 125 m/s.

The wheelhead unit is also equipped with an in-process measuring system with a fork that follows and continuously measures the orbital movement of the pin during



Workhead with pressurised electrospindle, hydraulic self-centring with three self-compensating jaws chuck system and self-centring hydraulic automatic steady rests

grinding. A special 3D touch probe, positioned on the wheelhead front, easily allows the longitudinal setup of the piece and the angular phasing of the same.

The in-process measurement systems with the shape control achieves final precision up to 1 µm.

The grinding process includes functions to give to the operator few automatic and safe working cycle: GAP control, Dressing control, CRASH control and SHAPE control to detect shape error in the grinding process and can make the necessary

correction. This gives to the machine the possibility to reach unbelievable performance on accuracy. It is not necessary to unload the workpiece to measuring shape errors.

In addition, Wikicam is a monitoring system that allows to control remotely some parameters of the CNC machine. There is also a built-in live video streaming solution to monitor what the machine is doing in real-time. The connection to the builder's headquarters is made by a high-strength secure encryption algorithm, using a VPN.

The machine can be equipped with an anthropomorphic or cartesian robot for the loading and unloading of workpieces.

To sum up, the grinding machines produced by AZ use the most advanced mechatronic solutions. Measurement systems, motors, drives, as well as machine mechanisms and applied CNCs, are selected from some of the best brands in the world. The design creativity of AZ allows the creation of product lines, like the new DU, to take their place among the most sophisticated on the market today.

In September, AZ SpA will exhibit at the international fairs Automechanika in Frankfurt and IMTS in Chicago.

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Eccentric grinding of the crankshaft takes place by orbital tracking of the crank pin. An in-process measuring system with a fork follows and continuously measures the orbital movement of the pin during grinding

Kemet adds FPI to range

The perfect non-destructive-test (NDT) solution for inspection of components, Liquid Penetrant Testing, or Fluorescent Penetrant Inspection (FPI), is commonly used in the aerospace and medical industries. Precision surface finishing leader, Kemet, now offers FPI systems with advanced process control that ensures repeatability, process safety and traceability of each batch within the set parameters.

Designed and built by renowned ultrasonic cleaning machine manufacturers, FinnSonic Oy, the systems meet the ASTM E1417 FPI standard common to both the aerospace and medical industries. Kemet offers a range of standard systems as well as the flexibility to combine automated and manual operation to provide streamlined, maintainable NDT inspection, with integrated waste water handling and extraction systems as options, to generate cost savings on process chemicals, labour and energy consumption.

Finnsonic has supplied fully automated systems for airframe components, turbine blades and medical implants as well as smaller manual systems for less critical parts. An intelligent combination of automation and manual handling can reduce labour requirements, while an adjustable layout can provide a small footprint. As with Finnsonic's cleaning machines, these FPI systems are durable, safe, ergonomic and user-friendly.

A variety of systems are available, from flexible manual roll track spray lines with a small footprint, to fully automated roll conveyor immersion lines for high capacity, mass production with dipping penetrant application, "Dust Storm" developer

chamber and integrated pre and post wash. Further options include material handling and batch traceability via a data log, fully automated penetrant and developer spray, basket rotation, basket trolleys and automatic loading/unloading conveyors.

These FPI systems complement Kemet's existing Ultrasonic Cleaning programme which incorporates a broad range of aqueous cleaning solutions to suit all types of components and budgets.

The programmes start with the Kemet benchtop range of ultrasonic cleaning tanks, from 3 - 45 litres. These high-quality stainless-steel units feature boost and sweep modes as standard functions, and their easy-to-use controls include setting of time and temperature with dry run protection and automatic switch off after 12 hours of operation.

The Mi range are individual floor standing general purpose tanks ideal for simple wash



and rinse applications, but all with seven day timers so you can prepare the tanks before the start of a shift without wasting time



waiting for fluids to reach the correct temperature.

The Versa Genius range is a modular system that can be specified as a single tank solution up to a multistage fully automated and enclosed precision cleaning machine requiring no operator input from start to finish. The Genius generators automatically adapt to the conditions within the tanks to maximise cleaning performance.

The Corus range is predominantly designed around common injection mould tool sizes and the heavy-duty construction

and chain hoist option mean they are ready made for heavily contaminated moulds of all sizes.

Established in 1938, Kemet International Ltd is at the forefront of precision lapping and polishing technology, using diamond compound and diamond slurry, which are manufactured in house to ISO 9001:2008 quality standards. The company offers innovative solutions to operations which demand precision finish and close tolerance. Kemet's highly specialised and accurate lapping machines can machine a wide variety of materials for numerous applications.

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Cleaning parts in the aviation industry

One of Boeing's smallest airliners, the 737, is made up of 367,000 parts. These parts serve to deliver a safe and comfortable flying experience to passengers, and many play a pivotal role in keeping the plane airborne. The demands from the aviation industry take two forms: one consists of regulations and the other consists of the manufacturer's specifications for products that will work safely with its aircraft. Maintenance engineers should consider both sets of demands when choosing the cleaning agent and the cleaning equipment.

There are two regulations that are particularly relevant: EU 1321/2014, which looks at the airworthiness of aircraft and EC 216/2008, which brings together the common rules in the field of civil aviation.

These rules stipulate that when aircrafts and their parts are cleaned, the maintenance programme must contain maintenance tasks and intervals, especially those that have been specified as mandatory in the instructions for continuing airworthiness.

Different cleaners can react differently to

different grades of aluminium, steel, silicones, plastics and rubber seals, causing wear, etching, or corrosion to the material, something that could potential render an aircraft non-airworthy.

As well as the type of cleaner, the method of cleaning is also critical. Manual hand cleaning, using stiff-bristled brushes can leave microscopic scratches, forcing contaminants deeper inside the component, reducing its lifespan and causing a potential risk to airworthiness.

This is not ideal when you have a high volume of parts to clean. Aircraft maintenance checks are usually carried out at set intervals, and follow a staged process from A-D. At each stage, the aircraft will be towed into a hangar to be cleaned and serviced.

Maintenance engineers are responsible for a variety of tasks such as disassembling the wing section to clean the actuator that controls the flaps, cleaning brakes, engine parts, seats or landing gears, to more complex tasks such as overhauling a Rolls-Royce turbojet engine.



NCH Europe has developed a range of solvent and water-based degreasers that work with aviation approved chemistries.

However, having a good cleaning agent is worthless if engineers cannot clean parts effectively. NCH Europe has therefore introduced a full range of parts cleaning equipment including everything from a basic sink-on-drum manual hydrocarbon cleaner to fully automatic water-based machines that use high pressure jets to get the cleaning agent into even the most difficult-to-reach areas. At all times the equipment and cleaning agents are meeting the requirements and regulations of the aviation industry.

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A Quality Glow

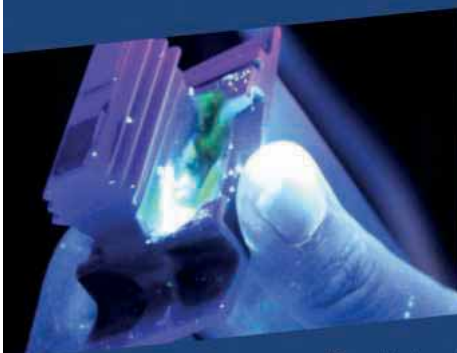
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Increased grinding length a key factor

Curtis Machine Tools continues to enjoy global success with its range of VECTOR production grinding machines and is celebrating the sale of its 100th Vector grinding machine into Cummins, USA for production of diesel injection components

With more than 40 years' experience in producing engineered grinding solutions for high volume production environments, Curtis Machine Tools is celebrating the sale of their 100th Vector grinding machine.

A market survey in 2005 showed that over 90 percent of all grinding applications had a grinding length of less than 75 mm, with the key market being high precision fuel injection components and turbochargers. CMT reacted to this survey and developed the Curtis Vector range with a grinding length of 100 mm maximum and integrated 3-axis loading system which is designed for high volume cylindrical grinding (typically 250,000 to 1,000,000+ parts per year).

The first VECTOR™ grinders were sold in 2006 to a customer in India grinding diesel injection components. From this point, the Vector has seen continuous development, enabling CMT to offer a multitude of options in workpiece presentation and holding. This, combined with process refinements in respect to grit types, grinding fluids and machine parameters, has given the VECTOR a truly market leading set of performance characteristics.

The key to optimising cycle times on high volume grinding machines is to reduce the 'dead time' to a minimum. The VECTOR TWIN is the advanced machine in the range having two work spindles mounted in an indexing drum, allowing loading and grinding operations to be carried out concurrently giving cycle time reductions of up to 50 percent.



This photograph shows the working area of the VECTOR TWIN with its main features

Fixed grinding guard (door open). When the door is closed, the grinding area is sealed and all coolant and debris contained. The coolant is piped through the bottom of the guard and mist is removed either by an



integrated extractor for conventional grinding. For high-speed grinding a separate unit having a higher capacity is used.

Grinding wheel mounted on cross slides allowing grinding to take place by moving the wheel to the left and dressing by moving to the right.

Dressing unit behind the grinding wheel, either fixed, rotary disc or diamond roll

The left-hand wall of the fixed guard is a divider plate between the two work spindles. These are mounted in a drum that can be rotated through 1,800 to index the spindles between the grinding and loading positions.

The splash guard, shown above the grinding wheel, rotates round the wheel so that, when the wheel is retracted for loading, the splash guard covers the front of the wheel stopping any coolant released by the wheel being thrown past the divider plate as the workhead indexes.

Grinding takes place on the spindle within the dirty area (right hand as shown) while loading takes place on the clean area (left hand spindle).

Grinding and loading therefore take place

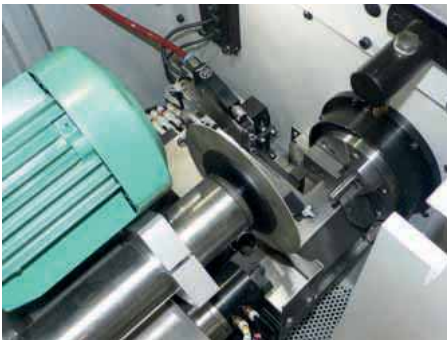
at the same time. The index time for the workhead drum is 1.2 seconds, giving a spark to spark time of less than two seconds.

In addition, secondary operations can be carried out on the component in the loading position such as brush deburr, post process diameter gauging, pre-process length positioning, washing, laser marking etc.

Because the coolant and grinding debris are totally contained within the fixed grinding guard, the part pick / place locations can be close to the work spindle. Loading system can be integrated into the machine without any risk that the loader slides will become contaminated. This makes for short robot movements and allows the machine to have a very small footprint of only 1200 mm wide including the loading system and pallet storage for the components.

The fixed guard also makes all machines in the VECTOR range suitable for high speed superabrasive grinding wheels, as the wheel and high-pressure coolant are fully enclosed.

The majority of VECTOR TWIN machines built to date have been supplied to automotive component suppliers, either for turbo charger or fuel injection applications.



Standard VECTOR variants

Basic – the core machine, with conventional work holding and Cartesian robot workpiece handling. The Basic variant has a wide application range and the greatest potential for future re-tooling on other components or applications.

Concentric – a centreless grinding variant incorporating a steel control wheel, work rest blade and 'concentric' pressure roller. Typically used for secondary operations on parts having a cylindrical body. Loading can be performed via a hopper or vibratory feeder.

Twin – the VECTOR TWIN incorporates an indexing twin-spindle workhead, allowing loading and some secondary operations to be performed concurrently with the grinding process. This gives advantages when the grinding times are short and minimises the spark to spark time.

GFS – a barfeed complete with feed unit and cut-off enables parts to be ground from solid rod. Unloading can be by gravity or robot. This variant is advantageous when parts to be ground are less than 5 mm in diameter.

Polygon – the polygon variant uses a special

workhead with a programmable 'B' axis, allowing simultaneous axis interpolations facilitating the generation of forms, either cylindrical off axis or to a defined geometric profile.

All the VECTOR machines in the range share the same grinding platform, with a long radial stroke and a short axial stroke, for single and multi-plunge grinding or peel grinding of short profiles.

The grinding wheel guard houses the workpiece and rear dresser, incorporating a shutter for loading access. Grinding fluid and debris is retained within the machine.

A variety of work locating and driving solutions are available, and the machine can be configured for straight or angled approach with optional in-process gauging.

The machine functionality incorporates as standard a 3-axis cartesian robot and a transitional parts storage area. Parts can be buffered in pallets using drawers or transferred in and out using linear systems. Primary and secondary processes, such as pre and post gauging, orientation, deburring, washing etc. are all possible additions.

The layout enables good integration possibilities into the wider manufacturing environment, whether using manual transfer of pallets or linked linear transfer systems.



Benefits to the user

Grinding times are similar to other modern grinding machines using state-of-the-art technology. The target for the VECTOR TWIN is to reduce loading 'dead' times to a minimum.

The typical loading time for a machine with one work spindle is between five and ten seconds. A conventionally loaded machine producing 500,000 parts / year could spend over 1,000 hours per year loading and unloading workpieces - a zero value-added function. The VECTOR TWIN with 1.2 second load time would cut this by more than 80 percent.

The simplistic equation above becomes very relevant where the cycle time, determined by the overall manufacturing process, can be achieved using one VECTOR as opposed to two single-spindle machines. With the continuing advances in grinding technology and reduction in cutting times, the loading time is an increasing proportion of the process cost.

In addition to the lower unit costs consequent to the productivity improvement, the VECTOR boasts low running costs because maintenance is easier and infrequently required. The small footprint means that the overhead cost is also very significantly less than a conventional machine.

As all the coolant and grinding debris is contained within the sealed guard there is less contamination of the main working parts of both the machine and the loading system.

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Advanced Engineering 2018 celebrates 10 years with a bigger, better show and with more industries covered

**ADVANCED
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31 Oct & 1 Nov 2018, NEC, Birmingham

Building on the success of the 2017 exhibition, where attendance increased by 15 percent on the previous year, visitors stayed on average just under three hours at the show, many looking for new products and services.

The other show zones are: Aerospace Engineering, Composites Engineering, Automotive Engineering, Performance Metals and, building on its successful 2017 launch, Connected Manufacturing. In addition, the Enabling Innovation showcase is being repeated this year. It provides an opportunity for 50 start-ups and researchers to showcase the next generation of exciting new technologies.

Like the previous show, the exhibition will be held in Halls 2, 3 and 3A of the NEC, Birmingham, though now there are two entrances to the show, making navigation of the exhibition space easier.

Last year the show attracted some of the industry's biggest names including Airbus, Boeing, Jaguar Land Rover, Hexcel, and Dassault Systèmes, who did business across the supply chain, with visitors from a range of engineering sectors, including automation, design and text engineering, process control and machining.

The two-day open conference will have a raft of high profile speakers and topics. Visitors will see variety of cutting edge technology and materials from exhibitors as well as show floor features.

Alison Willis, industrial divisional director at Easyfairs, enthused: "Happy 10th birthday to the Advanced Engineering Show. We have hit double figures and are expecting a record response from visitors and exhibitors this year.

"The new Nuclear Engineering zone will tap into the technical excellence of this high growth sector, addressing nuclear energy new-build, operation and supply chain. This has huge importance for the country's energy security and provides a great



opportunity for companies to join a new and dynamic supply chain."

A unique opportunity for UK's small engineering firms to shine

Advanced Engineering 2018, the UK's largest annual gathering of OEMs and engineering supply chain professionals, is throwing down the welcome mat for UK's small engineering firms and subcontractors.

New for this year, the show is excited to be supporting these UK contractors by introducing a dedicated area on its show floor, the UK Contract Manufacturing zone.

UK subcontractors are facing growing competition from overseas and there is therefore more than ever a need for the UK market to have the best platform to showcase these businesses. This has prompted Advanced Engineering to support British industry with this dedicated and focused area.

Alison Willis, industrial divisional director at Easyfairs, organiser of the show, says: "Britain's small engineering companies are the backbone of the country's manufacturing capability, a capability which is renowned around the world for its technical expertise and fantastic customer service.

"As Advanced Engineering celebrates its 10th year, we are looking forward to welcoming thousands of engineers from small and large companies, who will see first-hand the latest developments in the industry."

Advanced Engineering 2018, which takes place on the 31st October and 1st November at the NEC Birmingham, connects the entire supply chain of the UK's advanced engineering industry, with R&D, design, test, production and procurement from large and small companies, through to top tier industry players in a two-day free to attend exhibition and high-level conference.

The show brings together over 700 firms, as well as more than 15,000 engineers, procurement managers and senior decision makers from large and small companies, all looking to source, specify and invest in the most up-to-date products and explore the latest industry innovations.

Advanced Engineering 2018 includes six co-located zones under one roof: Aero Engineering, Composites Engineering, Automotive Engineering, Performance Metals Engineering, Connected Manufacturing and, new for 2018, Nuclear Engineering and UK Contract Manufacturing.

For more information about Advanced Engineering 2018, or to register for your free ticket to the 10th anniversary show, contact:

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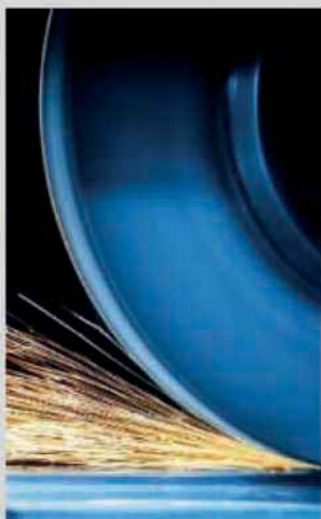
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First Klingelnberg Höfler Viper 500K gear grinding machine installed in UK

Precision Technologies International Ltd recently installed the latest specification Klingelnberg Höfler CNC external / internal gear grinding machine at its Tamworth, Staffordshire HQ. Already a world leader in the supply of precision ground gears, the advanced Klingelnberg Höfler Viper 500K, will further expand Precision Technologies' gear grinding capacity. In addition, the new external / internal gear grinding machine, the first of its kind sold in the UK, will provide a wide range of additional capabilities, including the ability to produce the most complex of gear geometries to the highest of standards.

Precision Technologies has enjoyed an unbroken period of growth since it started life in the 1960s. The fledging businesses' specialist tool-making skills ensured that from the company's inception it was kept busy serving the needs of the West Midlands' automotive market. In 1987, the now much expanded business added master gear and spline gauge production. Then, in 1990 a fully accredited UKAS laboratory was installed.

The ability to offer a wide range of high-precision, complex production services with short lead times allowed Precision Technologies to enter the aerospace market

in the early 1990's. Soon after, encouraged by the company's growing reputation, Precision Technologies was contacted by one of the UK's leading Formula 1 engine manufacturers and was tasked with producing high-precision timing gears. Today the business is a major supplier to F1 and also serves several other auto-sport classes. In 2001, Precision Technologies moved into the oil and gas business by supplying specialist thread gauges.

Precision Technologies' strategy of manufacturing high-specification precision ground gears and other challenging accurate components for many of the world's most demanding industrial sectors has enabled it to earn a global reputation. Having been acquired by its current management team in 2015, a strategic plan was devised that has resulted in further impressive levels of growth. As significant increases in output and the imminent prospect of two major automotive gear manufacturing contracts would have placed a considerable strain on the company's current manufacturing capacity, a search was recently undertaken for an advanced CNC gear grinding machine.

Precision Technologies' technical sales director, Colin Palin explains: "Over several decades, we have continually developed our range of high-precision capabilities, expanded our component size envelope and increased our productive capacity. To support our development, we have invested in a wide range of specialist manufacturing plant and inspection aids for use by our skilled workers. These continuous advancements have allowed us to enter, and become trusted suppliers to the medical, aerospace, oil and gas, automotive and motorsport component markets.

Many of the highly accurate power transmission components we supply to these sectors are used in high-profile, demanding applications where dimensional and metallurgical compliance is essential. Our reputation for supplying premium quality components on-time and at the right price means that demand for our services continues to rise.

"In order to expand our capacity, meet both current and anticipated demand and to



further increase our in-house capabilities, we recently investigated the available high-end, external / internal gear and spline grinding machines. Having judged several suitable machines against our demanding wish list, we came to the conclusion that the Klingelberg Höfler Viper 500K CNC external/internal gear grinding machine met, and in many ways exceeded, our expectations. The help of Mark Maurice, the owner of UK Klingelberg Höfler agent, Micronz was invaluable when specifying the machine and ensuring trouble-free installation and operator training.

“Thanks to Klingelberg Höfler’s logical operating system, our staff quickly became skilled in the machine’s use. Our new external / internal gear and spline grinding machine is now producing the required high quantities of premium-quality ground gears with complex geometries that are used in automotive and autosport applications and in other equally challenging areas.”

Throughout the world, leading gear manufacturers ensure that they remain on the leading edge with the use of Klingelberg Höfler gear grinding machines. Klingelberg Höfler technology does more than just enable users to manufacture cylindrical gears economically and with high precision. All machines have been designed to work together as an interconnected system family, enabling pre-machining and finishing of even the most complex gears.

Klingelberg Höfler machines are developed with real-world applications in mind and satisfy a multitude of industry requirements. Customers include contract gear and gearbox manufacturers involved in the aerospace, automotive, mining,

construction, industrial gearbox and wind power industries.

The Klingelberg Höfler VIPER 500 K gear grinding machine, as purchased by Precision Technologies, is designed to accommodate component diameters of up to 500 mm. The machine features multiple-wheel technology and is suitable for the efficient production of small to medium-sized batches.

The ingenious configuration of Klingelberg Höfler VIPER 500 machines allows users to change the grinding technology by quickly swapping-out the grinding wheel, the grinding wheel flank and the dressing wheel. An optional internal gear grinding arm allows retooling and conversion from external to internal gearing work. In addition, the Klingelberg Höfler VIPER 500’s innovative axis arrangement allows optimised 5-axis machining in the shortest possible grinding time. This is a major contributing factor in the machine’s renowned flexibility and ability to consistently produce high-precision, quality work. The innovative design also facilitates easy cleaning and higher performance capabilities while saving energy.

The machine’s advanced gear grinding hardware is only half of the story. The company’s Gear-Pro operating software guarantees the convenient machining of even the most complex of topographies and ensures maximum manufacturing efficiency. The software provides impressive productivity gains by the delivery of advanced machining strategies and process sequences. Convenient software modules for best-fit, high-speed, adaptive grinding have been developed. In addition, a flexible

module allows highly efficient wheel dressing.

The comprehensive software offers a wide range of useful facilities. Job Engineering / Pre-analysis allows exact process time calculations to be made with original machine data. In addition, 3D analysis of the planned process steps, related to working range and possible interference contours, is provided, as is predictive tool wear pre-analysis.

The easy-to-use software delivers geometric production simulation with 3D analysis of the simulated flank topography and the calculation and export of optimised tool profiles. It also offers simple navigation through clearly structured interface areas and well-organised Microsoft Windows®-like data management. Intuitive data input is via a clear graphical display, while easily understandable operator guidance is provided by means of an automatically generated list of process steps. Thanks to numerous context-sensitive wizards, including wizards for a range of tried-and tested process variants, the software allows the trouble-free input of even the most complex of flank topographies and profile forms.

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Bespoke grinding solution provides productivity boost at DePe Gears

Providing a specialist design, manufacture and refurbishment service for gears, couplings and gearboxes, Stoke-on-Trent based DePe Gear Company UK has developed its business through a combination of skills and investment the latest in manufacturing technology. With a capability to grind gears up to 1,250 mm diameter and cut gears up to 2,500 mm, the company has built a strong customer base across a diverse industry range that includes rail, energy, aerospace, steel processing, mining and quarrying. Its latest investment in a Robbi Omicron CNC6015 universal grinding machine from RK International Machine Tools is part of a drive for greater versatility and productivity, that will allow its growth to continue.

With its focus on one-off to low volume production, typically 50-off, DePe Gears requires its production facility to provide efficient and flexible capacity. When it came to internal and external grinding, it had become reliant upon dedicated manual machines that didn't provide the efficient flow of work required. The challenge for DePe Gears, and director Nigel Parker, was to find a universal grinder that met all of their criteria: "We needed a machine with sufficient swing and weight carrying capacity for the work that we undertake, along with it having a single internal grinding head, and two external heads. Every supplier we contacted fell short of what we need, with the best meeting about 50 percent of our needs. At this point we hadn't spoken to RK International, but one of the suppliers that had declined to quote suggested that they may be able to help," says Nigel Parker.

Discussions quickly progressed and, using the Robbi Omicron CNC6015 Universal grinder as the base machine for the project, RK International Machine Tools and Italy-based Robbi set about creating a bespoke machine that would fulfil 90 percent of DePe Gears' requirements. The basic specification of the Robbi Omicron 6015 includes a maximum grinding length of 1,600 mm, capability to hold up to 1,200 kg between centres and up to 300 mm centre height of the centres.

The changes made to suit DePe's requirements included a purpose-built



The Robbi Omicron CNC6015 universal grinding machine from RK International Machine Tools is part of a drive for greater versatility and productivity at DePe Gears



500 Nm workhead with a specific bearing configuration using Gamet bearings that gave a weight capacity of 300 kg 150 mm from the spindle nose. To handle the weight and size of DePe Gears' components a special quill was manufactured, with centre height increased to 350 mm.

"Most customers have a requirement for 90 percent external grinding and 10 percent internal," says RK International Machine Tools director, Dick Aldrich. "At DePe Gears that was closer to a 40/60 ratio and to meet the challenges posed by this, along with the wide variance in bore sizes to be ground, we used a direct drive 21 kW, 30,000 revs/min internal grinding spindle. Added to this, we installed power sensors, as the spindle speeds and bore sizes meant that sound sensors alone would not be sufficient to monitor wheel contact."



Other adaptations to the machine at DePe Gears included the fitting of linear scales and incremental linear encoders to all axes, adding a secondary, right-hand, external grinding wheel, automatic wheel balancing and gap control with in-cycle dressing, Renishaw probing and a 2.5-degree index facility with the fitting of a Hirth coupling.

"The ease of which we could work with RK International made the whole process straightforward and we now have a machine that has replaced two older, dedicated machines and brought greater efficiency to our manufacturing process," says Nigel Parker. "Having the Robbi Omicron machine has allowed us to free up not only manpower and labour hours but also floorspace that we can utilise for further investment in our production processes."

This ongoing investment, which adds to

tools covering turning, milling gear cutting and gear grinding at DePe Gears, will see it further develop its markets through improved capacity, which in turn leads to keeping manufacturing costs under control while delivering improved and consistent quality with reduced lead times for customers.

The physical attributes of the Robbi Omicron machine were not the only elements that were adapted for DePe Gears as, while CNC has played a major part in DePe Gears production when it comes to turning, milling and gear form production, internal and external grinding has always been a manual process. This has generated a huge amount of human knowledge and experience over the years. The arrival of the Robbi Omicron CNC6015 created an opportunity to tap into this knowledge and generate further benefits for DePe Gears. Once again, working with RK International Machine Tools has started a process of digitising that knowledge by undertaking an interactive and ongoing process of developing the control software used by the Siemens 840D sl control system. The standard parameters are being amended to suit specific requirements of DePe Gears,

transferring the depth of knowledge of material types and grinding processes, all of which is being done remotely.

“Working with RK International in this way is allowing us to transfer our manual skills and knowledge to CNC. The changes being made to the software will eliminate any potential problems that could arise from operators interpreting processes differently. In short, by eliminating manual input we will generate improved consistency in terms of product quality.”

The combination of RK International Machine Tools’ experience, along with its long-term relationship with Robbi, has delivered a solution to DePe Gears’ capacity issues in terms of internal and external grinding. According to Dick Aldrich, the secret was communication: “We had never had the opportunity to work with DePe Gears before, so we were new to them as they were to us, but by developing a strong relationship we have had positive three-way communications between ourselves, Robbi and DePe Gears. This has smoothed out any issues and allowed us to deliver to their



specifications a machine that is adding to their impressive capabilities. This, coupled with the ongoing software developments, are positive aspects that have paid off in different ways. For example, shortly after installation, DePe allowed us to use the machine for a demonstration for another customer, which is an indication of how closely we can work together and the strength of the business relationship.”

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The versatile world of grinding with corundum

The Zema Numerika cylindrical grinding machine from JUNKER

Large quantities, precise geometries and a wide range of parts: the automotive industry in particular has high demands when it comes to production. With the Zema Numerika corundum-grinding machine, the JUNKER Group is offering a versatile solution. From drive shafts to journals, it reliably machines a wide range of workpieces.

The name Zema stands for machine concepts and special solutions for grinding with corundum. Thus, the world market leader in CBN high-speed grinding machines is now also offering efficient solutions for conventional grinding. Customers worldwide will also benefit from JUNKER's various solutions.

The Zema Numerika meets all the requirements for series production of a wide variety of workpieces: with its extensive range and high productivity, it has also impressed one of the leading manufacturers of drive technology. Since 2017, the Numerika has been in use at the branch office in Alsace, where the drive technology specialist manufactures pinion shafts.

At a customer in France, the workpieces vary in length from 34 to 128 mm, with diameters between 9 and 30 mm. As production changeover is taking place at least three times per day, short setup times were therefore one of the customer's main requirements. The Numerika G 800 Plus masters this in next to no time, thanks in part



With the Zema Numerika, the JUNKER Group is offering a corundum-grinding machine that is outstanding value for money and delivers precise grinding results

to the user-friendly CNC control system, where several types of a workpiece family can be stored, allowing a quick changeover from one workpiece to another in production.

The Numerika also boasts extraordinarily short cycle times, as it can grind pinion shafts in a single plunge cut operation. This is made possible by the extra-large grinding packages, which are exclusive to Zema. The Numerika reduces the downtimes while

increasing the customer's productivity to around 1,000 parts per day.

The Zema Numerika impressed the specialist in drive technology right from the start: with short cycle times, high productivity and reliability, it takes on a demanding role in the factory. The versatile corundum-grinding machine replaces two previously used machines for the customer.

At a crankshaft manufacturer in Brazil, the Numerika G 800 Plus also proves to be a



The Zema Numerika corundum grinding machine impresses with an extensive range of workpieces and exceptionally short cycle times

reliable line machine when used together with the JUCRANK 6S. Two machines from Zema and two from JUNKER are used to manufacture crankshafts for one of the world's largest automotive manufacturers. Flanges and journals are ground with corundum while main and pin bearings are machined using CBN.

A combination of a corundum and CBN grinding machine from a single source brings advantages and the machines' technology and control systems are perfectly matched. A quantity of around 150,000 per year in three-shift operation calls for high productivity from both machines.

Three different crankshafts with lengths ranging from 335 to 435 mm are machined. The automotive manufacturer also requires flexibility and each machine must be able to process each of the crankshaft types on offer. Thus, both machine types are designed to produce crankshafts with lengths between 300 and 570 mm.

This perfect combination of Zema and JUNKER working together on a line won over the global player. The customer is now planning to expand production to up to 280,000 crankshafts per year, using Numerika and Jucrank machines. The German-Brazilian duo is now demonstrating its strengths here in prototype production.

For a drive shaft manufacturer in Mexico, endurance, robustness and effectiveness are just a few of the factors that have contributed to the success of the Zema Numerika. After all, high-tech features are



A combination of a corundum and CBN grinding machine from a single source brings advantages: all machines from the JUNKER Group are perfectly matched in terms of technology and control system

not always required. One of the global suppliers to the automotive industry has opted for the robust corundum-grinding machine primarily because it is easy to operate.

This customer manufactures drive shafts on vehicle axles at its plant in Mexico. A warp-resistant machine bed, hydrostatic guides and grinding spindles on roller or hydrostatic bearings form the basis for perfect grinding results. The customer was particularly attracted by the fact that, thanks to an exceptionally short delivery time, the Numerika was quickly ready for use, which is

why they went on to install two further Zema machines. With the cylindrical grinding machine, the JUNKER Group is offering a unique solution, which provides excellent value for the money. The Zema Numerika impresses on many fronts. One thing above all sets the corundum-grinding machine apart is its excellent adaptability. This applies to both the Numerika as well as the other machines from the JUNKER Group. They are all easy to integrate into existing production lines and are equipped with a uniform, intuitive user interface. What is more, they cover all grinding processes and an extensive range of workpieces.

As a partner for precision, the JUNKER Group can specifically adapt each machine to meet customer requirements and provide solutions, as needed. In doing so, JUNKER adheres to the highest standards of precision, both in terms of perfect grinding results and the individual configuration of the machines.

At this year's IMTS in Chicago (September 10th-15th), the JUNKER Group will be at booth 236839 (North Building) to present world-class grinding machines from JUNKER and ZEMA together with the latest in air filtration technology from LTA.

Erwin Junker Maschinenfabrik GmbH
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Together with the Jucrank 6S CBN high-speed grinding machine, the Numerika machines crankshafts. Here the journal is being ground

Delivering precision for rotor grinding in China

Thanks to the technologies of Holroyd Precision, a major industrial group in Northern China will soon embark on the production of its own range of air ends, helical rotors and screw compressors. In an order secured this month and valued in excess of £1.4 million, Rochdale-based Holroyd Precision is to supply one of its advanced helical rotor and thread grinding machines to the organisation. The machine, a Holroyd TG 350E, will be delivered in early 2019 and will be used by the customer to precision-grind helical components of up to 350 mm in diameter and 1,795 mm in length.

"We are delighted to have secured this significant order," comments Holroyd regional sales director, Steven Benn. "Although for commercially sensitive reasons, we cannot name the customer, it is particularly rewarding to know that in their quest to achieve the highest levels of precision in rotor manufacture, they recognised the uncompromising levels of accuracy that our technologies offer.

"As we are members of the Manchester-China Forum," he continues, "securing this significant order also underpins our ongoing drive to strengthen ties between the city region and China."

TG Series: setting the industry standard

Holroyd's TG Series of multi-purpose grinding machines has long set the standard for high levels of accuracy and efficient stock removal. The TG range starts with the TG 50E, a machine designed to precision grind components of up to 50 mm in diameter and 610 mm long, with models offering stepped increases in capability up to the production of helical components measuring 350 mm in diameter and 2,020 mm long.

Equally suited to prototyping, batch and



The Holroyd TG 350E rotor grinding machine

volume production, TG Series machines are designed primarily for the finish grinding of helical screw components such as worm screws and rotors after they have been milled to a rough or semi-finished state. TG models offer production rates and accuracies to suit precise manufacturing strategies. Fully automated on-machine probing provides closed loop feedback of corrections to the dresser wheel and does not require a high level of operator skill.

PTG: the first name in precision

Incorporating the brands of Holroyd and Holroyd Precision Rotors, PTG has established itself at the forefront of high-precision machine tool design, build and supply for specialised applications. The Holroyd range includes advanced machine tools for production of complex helical components such as compressor rotors, pump screws and high-accuracy gears, as well as machine tools for friction stir welding

advanced alloys used in transport applications.

With production facilities in the UK, USA and China, Holroyd Precision Rotors manufactures the special purpose, ultra-precision helical components used in a wide range of industries, including refrigeration, air conditioning, gas and vacuum pumping, industrial air handling, aerospace, medical equipment, motion control, power transmission, power generation, oil & gas, fluid transfer and high-end automotive. PTG also provides advanced technical consulting services.

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Master Abrasives installs eco 200 at Border Ballistics

Following the sale at MACH 2018, Master Abrasives has installed the Micromatic eco 200 grinding machine in Border Ballistics Technologies (BBT) facilities based in Scotland.

Paul Batson, Master Abrasives' managing director comments: "Geoffrey from BBT was one of the hundreds of visitors we welcomed onto our stand to view the eco 200 grinding machine. We were using the MACH show as a platform for the full range of machinery and grinding products we now offer, and making this sale was one of the highlights for us."

Geoffrey Kolbe, managing director of BBT, has been in the non-military gun trade for over 25 years and established the company in 2015 to fill a gap in the UK market. The company is a manufacturer of high performance gunsmith tooling such as chamber reamers, headspace gauges and other specialist tooling for gunsmiths, all of which are produced to the high standards required with superior quality finishes and high accuracy.

He explains the reason for the purchase: "In line with market demand we needed to increase our production output. To overcome this issue, we established that by utilising our tool and cutter grinder more intelligently we could maximise output. We identified that by taking the basic blank preparation operations off this sophisticated production machine, productivity would increase with the introduction of a manual/semi-automatic hydraulic cylindrical grinding machine. The Micromatic ECO 200 machine supplied by Master Abrasives proved to be the ideal machine for this purpose and the price was very reasonable too."

"The production of special purpose bespoke stepped reamers and head space gauges in tool steel demands very tight tolerances on specific dimensional features such as outer diameter, angles and faces. The ECO 200 manual/semi-automatic hydraulic machine fulfilled our requirements perfectly. Its introduction into production will improve our manufacturing lead times and also contribute to lower production costs."

The new machine at BBT has a 400 mm grinding capacity between centres and an additional internal grinding spindle. The wheel head nitride hardened steel spindle runs in high precision multipoint hydrodynamic bearings which gives very high rigidity and excellent damping.

Geoffrey Kolbe continues, "Master Abrasives provided a very professional service from start to finish. The machine was delivered as promised on time and was up and running within a couple of days. Operator training was given on the functionality of the machines operation and components were produced to our exacting standards."

Master Abrasives applications engineer, Martin Stevens assisted with the installation: "We encourage those interested in a new grinding machine to get in touch and arrange a visit to our grinding and finishing showroom. We can show you Micromatic grinding machines' capabilities in action as well as other items we offer including our demonstration tape superfinishing device, measuring equipment and abrasives."



Technician Dave Grice at the installation of Border Ballistics eco 200 machine

Master Abrasives continues to offer its customer base a complete solution to their grinding and polishing requirements.

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Machining centre for heavy-duty service in milling and jig grinding

Highly precise multi-purpose machine for the tool shop

Feintool is a specialist for fine stamping and forming of precision sheet metal parts for various industrial applications with a world-wide reputation. The top performances its customers require can only be achieved if the entire process chain from the press through to the tool, the consumables and the periphery is carefully designed and optimised from one source. Key elements for success are the very precisely manufactured stamping and forming tools, which are developed and manufactured by a team of experienced professionals in the Feintool Technology Center in Lyss, Switzerland. They are manufactured using high-performance HSC machining centres made by Rödgers, which are equally suitable for HSC milling as well as for jig grinding, even when the materials reach hardness levels of up to 66 HRC.

“Our specialty is the fine stamping and forming of sheet metal”, says Christof Wüthrich, head of control station/ element production at the department for tool development at Feintool Technologies AG in Lyss. Fine stamping is a world apart from conventional stamping operations.

The key difference comes to light when one examines the accuracy and quality of the produced components. During normal stamping operations, the punch forces the metal through the opening of a die whose clearance is noticeably larger than the punch and further increases with depth. Hence the sheet is only partially cut through, while the rest of its cross-section will be merely torn apart. The edges are therefore rough, uneven and their angle deviates from the ideal 90°. The difference between sheared and torn areas can often already be discerned with the naked eye. In addition to wide dimensional tolerances, the planarity of the parts is often impaired.

Such stampings are therefore unsuited for manufacturing many of the highly complex, ready-to-install multifunctional parts that are nowadays required by many high-tech customers from the automotive sector through to the mechanical engineering or precision mechanics industries.

In contrast to this, fine stamping achieves



The Rödgers RHP 500 machining centre installed in the Feintool shop proves itself for HSC milling as well as for jig grinding jobs involving ultra-hard materials with up to 66 HRC

clean cuts at right angles due to extremely tight tolerances of the cutting gap and a special clamping technology of the material performed using a v-shaped protrusion of the locking plate closely following the contours of the part. The process is characterised by outstanding accuracies and uniform edges of the stampings. The high dimensional precision and flatness of the parts prevents the necessity for costly finishing treatments. The parts can usually be directly processed in downstream operations such as embossing or cold forming. The elimination of intermediate processing steps allows for significant cost savings when compared to conventional production methods.

Precision machines and tools

“This requires presses and tools that are specifically designed for the high requirements of the process,” adds Christian Iseli, expert for machining of hardened materials in the Feintool Technology Center. This is true for all essential aspects of the complete system from the accuracy of the press movement



when actuating the punching tool to the extremely narrow clearances of the cutting and forming tools that are often down to just 5 µm. Another aspect is achieving the highest possible productivity to offset the augmented investment costs. This in turn calls for a single-source holistic approach to the design and optimisation of the process chain from machine, tooling system, materials technology through to component design.

In this way, Feintool constrains its activities to exclusively developing customised solutions, whose components are realised completely on their own responsibility, to the inclusion of the necessary peripheral systems and also

provides for comprehensive consulting, engineering and training. To ensure the required efficiency, the presses run at high speed, reaching between a few dozen and up to 200 strokes per minute depending on the size of the parts and the complexity of the task. Such high productivity levels can only be achieved with tools ensuring the required accuracy of the parts under high stress and over long operation periods. These key components are thus designed and produced in-house by a special department with a workforce of 40-50 employees.

Turning and grinding hard materials with the same machine

"Given the complexity of many geometries and the high accuracy requirements we have to meet, we often have applications where it makes sense to use both hard milling and jig grinding in order to achieve optimum efficiency", explains Christof Iseli. For such tasks, it is desirable to perform both jobs on the same machine and in the same setup. Decisive advantages are, on one hand, gains in accuracy because misalignments due to re-clamping inaccuracies cannot occur and, on the other hand, the elimination of time expenditures for the re-calibration after re-clamping.

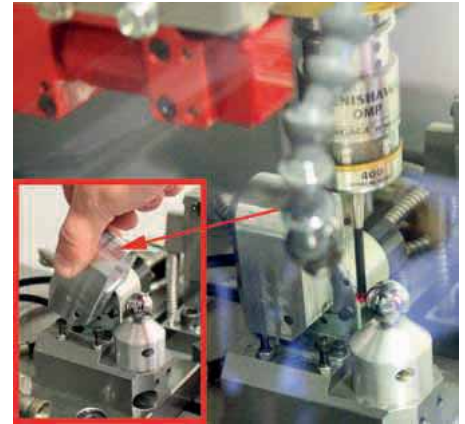
Therefore, after thoroughly reviewing adequate systems available on the market, the company opted for a 3-axis machining center Rödgers RHP with hydrostatic guideways, the reason for this choice being that the system was able to excel at both types of operation. With the grinding

machines of a Swiss manufacturer currently used in the shop, additional milling operations could also be performed, but performance and rigidity of the spindle did not meet the expectations. The same applied to the dynamics of the axis movements.

In clear contrast, the Rödgers machining centre fulfilled all expectations both in terms of material removal rates as well as with respect to the achievable machining accuracy and surface quality. A further advantage was reduced workspace requirements, since only one machine had to be installed. A further important aspect was the freedom of choice between milling and grinding operations. For certain tasks, this offered the opportunity to freely opt for the significantly more economic milling instead of the time-consuming grinding operations.

Specific advantages of Rödgers technology

Rödgers HSC machining centres are designed for the highest accuracy requirements combined with high metal removal rates even when having to machine hard materials. They feature extremely dynamic frictionless linear direct drives and high-precision measurement and control systems equipped with high-precision scales enabling for positioning steps of less than 50 Nm. In combination with a fast control system featuring a frequency of 32 kHz in all control loops, they show no hysteresis effect (stick-slip) at changes of direction: by interpolation of axes, this results in perfect circular movements. This applies to both

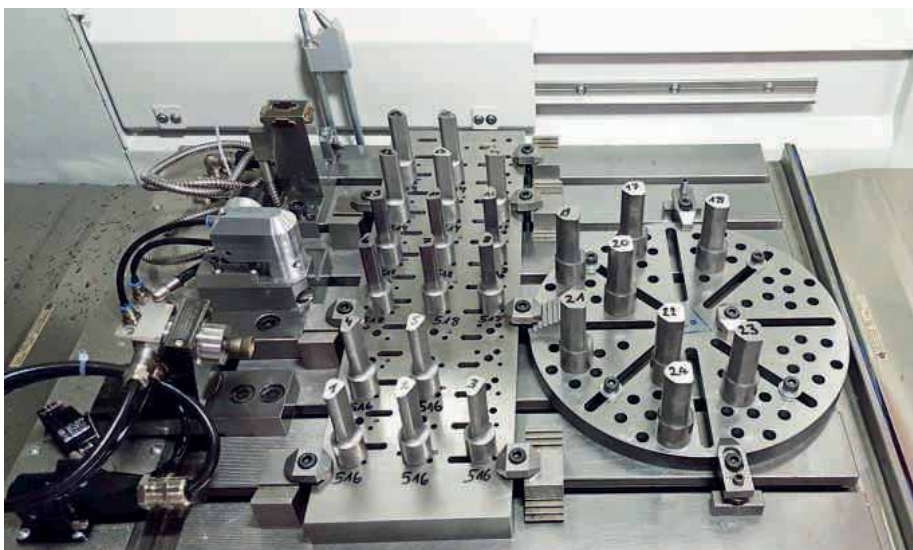


Prior to starting the measuring run, the automatic probe that has been clamped into the spindle is calibrated using the sphere whose protective cover has been automatically lifted for the operation

hydrostatic and recirculating roller guidance systems, albeit the former are characterized by superior dampening characteristics. In addition, the Z-axis is equipped with a frictionless counterbalance system in order to avoid any reversal marks in the Z direction.

In order to offer the highest thermal stability, the machines feature a sophisticated temperature management system. The cooling/heating agent circulating through all vital machine components is maintained within a temperature range of just ± 0.1 K. Another thing that sets Rödgers apart is a proprietary control system based on standard PC technology whose functionalities have been carefully tailored to meet the specific requirements of HSC- resp. high precision milling and jig grinding. Furthermore, Rödgers offers its customers control system updates that eliminate the risk of the system becoming outdated. The control software supports both helical and the fast hub grinding strategies. Further specialties include conical as well as 5-axis-grinding. Thanks to specific routines for special grinding strategies using pre-defined tool types and grinding parameters, the programming using a CAM system can be complemented by efficient and fast programming directly at the machine.

Rödgers GmbH
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www.roeders.de



A mix of numerous, partially differing stamps. Position and dimensions of each part are determined prior to starting the machining process. This allows long unmanned production runs and thus high profitability even without a handling system

Reishauer's twin-spindle gear grinding technology

With the introduction in 2003 of the RZ 150 continuous generating gear grinding machine, Reishauer set new standards regarding productivity in the high-volume production of cylindrical automotive gears. For the first time, this twin-spindle technology made it possible that gear grinding, the most accurate of all finishing processes, could replace gear shaving as the primary production process as it combines accuracy, reliability and low costs per piece.

Twin-Spindle continuous generating gear grinding machine

While the principle of this technology has remained the same to this day, it has undergone tremendous improvements. Today's machines, the RZ 60, RZ 160 und RZ 260, all share the same platform and the same twin-spindle design principle. The RZ 60, for example, is the fastest gear grinding machine today. This machine dominates the growing market segment of grinding planetary gears for automatic transmissions. In the manufacture of planetary pinions, large batches are the result of using three to five identical planetary pinions sets for every automatic transmission produced. In other types of gearboxes, such as manual or double-clutch transmissions, each component generally occurs only once in each gearbox. Therefore, when grinding pinions, the overriding priority is the reduction of the cycle times as these machines are often dedicated to a single type of workpiece, and would, as a rule, not be subject to frequent part changeovers.

The turret design features two identical work spindles. This twin arrangement eliminates the idle time between grinding cycles that are typical of machine tools with only one work spindle. While the machine grinds one workpiece, it simultaneously meshes the next workpiece into the correct grinding position. Each of the two work spindles has its own meshing sensor to save additional time in the meshing process. As soon one workpiece is ground, the turret swivels around by 180 degrees and the next part can be immediately ground. As the workpiece and the grinding worm mesh during the grinding cycle, higher surface speeds of the grinding worm translate into shorter cycle times and therefore into higher productivity. Reishauer's sophisticated electronic gearbox ensures high accuracy



micro and macro geometries of the gear parts. Surface speeds of up to 100 m/s reduce the contact time of the grinding wheel, and thus eliminate the risk of grinding burns.

The 160 mm wide grinding wheel produces a large number of parts between dressing cycles. This width, combined with multi-rip full profile rolls for fast dressing cycles, further reduces non-productive times. The very stiff machine structure allows aggressive grinding parameters without any adverse effects on workpiece quality. For example, these design features result in grinding times that can be as short as seven seconds for planetary pinion gears.

In conclusion, Reishauer twin spindle technology the ideal solution for the grinding of automotive gears: reliable and cost-effective at constant high-quality.

Today, the Reishauer Group is the solution supplier for the manufacture of gears. By bringing together competency covering products, processes and technology, it can ensure efficient and high-quality gear manufacturing across the whole process chain. For its customers, based on simple planning, start-up operation and running of the plant, this translates into the most efficient production line of gear manufacture.

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Tool team knows all the tricks when it comes to metal fabricating

Trick Tools' Bruce Van Sant and Brycen Smith began their metal engineering careers deep in the innards of racing cars, modifying, repairing and fabricating parts and machines ready to conquer all manner of road, dirt or race track across the USA. Bruce Van Sant worked typically on race cars, eventually opening his own auto shop, still operating 31 years later. Brycen Smith favoured the hot rods, working on them for over 12 years before joining Bruce to help tradespeople needing advice on the tools.

The pair have many years of experience in the automotive and engineering industry, fabricating in the shop, so much so that the team found itself referring its auto customers to the tools they like best. The referrals became so frequent, that the team began selling the tools, before eventually establishing Trick Tools, a supplier in high quality tube bending, fabricating and sheet metal machines.

For metal grinding, polishing and finishing, the team primarily uses polishers to bring back to life dirty and worn metal surfaces. They use multi-purpose machines with variable speed which can grind, polish

and finish 'all-in-one'. It was important the machine had a rotating long handle, which helps the team to rotate the machine any which direction, left or right handed. The team also likes 'quick-changing', with three applications made possible by three separate and changeable gum wheels. Lastly, a motor speed of between 900-2,500 is important to assist whichever wheel has been attached.

For surface belt grinding, the team uses large static belt grinding systems. The grinder consists of a large belt, partly enclosed with case, and supported by a stand. The team then either flip the lid of the box or use the end of the grinding machine to deliver various surface level grinding. What is particularly neat with the unit is that it protects the user with a well-designed spark box, and can also be attached to an extraction unit, the hose fitting into the box, and taking all excess material thrown up by the belt, into a box directly underneath, without affecting the team's access to the grinding belt.



FEIN remains one of Trick Tools' best suppliers and one of its 'highest quality' brands. Bruce Van Sant says: "We love using FEIN, including other machines like, mag / hand drills, or grinders. It is one of the first brands we turn our hands to in the shop, or that we refer to our customers".

FEIN Industrial Power Tools UK Ltd
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www.fein.com/en_uk/metal

Powerful, high-performance tools at an affordable price

Chicago Pneumatic has introduced a new series of industrial grinders and sanders to help users achieve a high-quality finish with minimal effort while keeping costs down. The new series of pneumatic tools is designed for use in high volume metal casting and fabrication environments. Combining high power with industrial durability, the CP3550 series is ideal for tasks like grinding, chamfering, weld preparation and cleaning, cutting, finishing and sanding; as well as other industrial MRO applications.

The CP3550 series of pneumatic grinders and sanders has been developed to help users achieve a high-quality finish with minimal effort every time. All tools in the range boast a powerful motor to ensure optimum surface preparation results in the shortest possible time. For example, the new angle grinders in this series boast a powerful 1.5 hp (1,100 W) governed motor, providing a high material removal rate and enabling users to reduce the time taken to complete their tasks. The new angle grinders are available in different abrasive

capacities: from 4" to 5" (100 mm to 125 mm), offering users the ability to select precisely the model that matches their preferred abrasive.

The breadth of choice, including straight and angle die grinders with short or extended reach, further ensures that the new CP3550 series offers users a comprehensive and powerful range of pneumatic tools.

Since 1901, the Chicago Pneumatic (CP) name has represented reliability and attention to customer needs, with construction, maintenance and production tools and compressors designed for specific industrial applications. Today, CP has a global reach, with local distributors around the world.

Its employees start every single day with a passion to research, develop, manufacture and deliver new products that are meant to meet your needs not only today, but tomorrow as well.

You can see the new CP3550 series in action at: <https://youtube.com/PhP5muog638?list=PL2D064BA4E8CFB072>



For more information and to learn about Chicago Pneumatic's innovative solutions for the industrial market, contact:

Chicago Pneumatic Tel: 01442 838999
www.cp.com

Norton Winter upgrades round tool grinding wheels

Norton Winter has launched an upgrade of its V-PRO wheels: Norton Winter V-PRIME. Offering the ultimate edge stability in CNC grinding of round tools, V-PRIME has been designed to increase productivity and improve part quality, saving manufacturers time and money.

The demands on modern tools for the gashing and clearance grinding of round tools are ever evolving. They now need to be highly flexible, while at the same time delivering improved efficiency and part quality. Wear resistance of standard resin bonds is limited while hybrid or metal bonds have good edge stability but are difficult to dress, leaving manufacturers without a satisfactory solution. However, Norton Winter has developed the new V-PRIME resin bond for all applications in which grinding tool edge stability is vital, providing manufacturers with an alternative that offers optimal performance while also achieving cost savings.

V-PRIME combines the extreme edge stability of a hybrid or metal bond with the free grinding behaviour of standard resin bonds and the 'grindability' of dressing or profiling from standard resin bonds to deliver a superior option in gashing and clearance grinding of round tools. The V-PRIME wheels achieve a significant increase in productivity thanks to higher feed rates leading to reduced cycle times, less downtime through longer wheel life and simplified wheel preparation, as well as substantially lower overall process costs.

In addition, free grinding behaviour was optimised during development to increase stability, reducing sub-surface damage and helping to meet higher part quality needs. Grinding wheel preparation is much more user-friendly, which reduces downtime



through simpler and faster off-line dressing. The wheel life is therefore substantially improved with workpiece load lowered through reduced grinding forces compared to other wear-resistant bond systems, delivering further benefits.

Lutz Gaida, director Product Management Superabrasives, Europe, comments: "Our upgraded tools, Norton Winter V-PRIME, are set to revolutionise the industry. They deliver optimised performance at a better price-performance ratio, allowing manufacturers to maintain constant wheel geometry for as long as possible, without the need for correction, enabling increased output and improved quality. The new V-PRIME can be easily implemented without any machine or process adjustments, offering immediate improvements."

Norton Winter V-PRIME tools are available in all common shapes and sizes for resin bonds. Fully customised tools can also be developed for specific requirements.

Norton Winter AEON high-precision electroplated grinding wheel

Saint-Gobain Abrasives' Norton Winter AEON is the latest innovation in electroplated grinding wheels for high precision applications requiring flexible design solutions in the automotive market. Produced with one usable abrasive layer, the diamond or CBN grit particles are fixed on to the core surface by an electrochemical process of nickel deposition which provides high grit retention levels. With this technology, Norton Winter AEON delivers excellent accuracy and the

highest profile stability throughout the exceptionally long wheel life.

Conventional electroplated tools wear faster on highly loaded sections, which can mean frequent changeovers or even damage to the core. However, Norton Winter AEON technology improves the wear resistance of the abrasive layer in areas where the highest loads are expected through its unique layer design, leading to more uniform, and reduced, wear over the entire profile. In addition, the layered technology significantly reduces core damage allowing wheels to be quickly and easily re-plated without mechanically reworking the core, resulting in an increased total tool lifetime. Combine this with the extremely precise steel core and manufacturers can achieve the tightest profile tolerances in their operations in a reliable and repeatable manner.



Norton Winter AEON delivers the best possible option at every step of design and manufacturing. Each grinding wheel is highly customised to individual customer needs to achieve best in class performance, with a 50 percent increase in efficiency, lifetime and re-plating. Thanks to the electroplated wheels, once the wheels are worn, the core can be re-plated with new CBN or diamond grain in a continuous re-plating cycle. This ensures that the wheel core can be reused several times, offering a cost-effective solution in the production cycle of automotive and gear box manufacturing industries.

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A new age of super-thin cut-off wheels is dawning

The beginning of the Tyrolution – TYROLIT's market launch of completely modified and considerably improved range of super-thins

With its newly developed range, in the forthcoming Tyrolution, the inventor of the super-thin cut-off wheel will further increase its quality leadership in this specific market. The entire spectrum of all Premium, Standard and Basic quality lines, in all diameters and specifications, has been revolutionised. The performance of all 73 products available on the market has been improved by up to 60 percent. The new super-thin cut-off wheels are available for machining steel, stainless steel, non-ferrous metals and stone.

Tyrolution sets the benchmark in all classes

For end users, the Tyrolution will provide numerous tried and tested products with a new face, clear performance advantages, and countless improvements. Vibrations have been reduced, considerably enhancing both comfort and safety in handling the wheel. Special sound insulation makes sure that noise is vastly reduced during work. At the same time, cutting dust could be decreased by around 30 percent, leading to enhanced working comfort.

The high chemical purity of the cut-off wheels for stainless steel ensures effective machining of this type of material. This prevents negative influences on the workpiece, such as corrosion or pitting corrosion. Moreover, an improved surface finish eliminates the need for time-consuming finishing work, such as cleaning and deburring. This can sometimes considerably cut work times, ultimately delivering noticeable improvements in productivity and cost efficiency.

For the cutting of non-ferrous metals (e.g. aluminium, copper, brass), TYROLIT has



developed a special production method that increases the cutting speed during work. The use of new specifications prevents the clogging and dulling of the cut-off wheel, which used to be a common result of material abrasion. This dramatically shortens cutting times and makes machining the workpieces much more efficient.

TYROLIT Heavy Metal Tour 2018

For the first time, TYROLIT is presenting grinding, cutting and finishing products in its own bespoke Show Truck. The Show Truck is 'on tour' through Europe and lands in the UK on 15th October. The Heavy Metal

Tour allows TYROLIT to take all of the experience and technology from its headquarters in Austria directly to its accounts premises

The Show Truck with 65 m² of exhibition space has an integrated grinding cabin where experienced application engineers can carry out live product demonstrations. Visitors to the truck will also have the opportunity to test new products for themselves and even participate in cutting/grinding competitions.

However, the Show Truck offers much more than product demonstrations. Visitors can also participate in bespoke training



sessions, see the full range of marketing material, POS and merchandising units, as well as well as watch new product movies. The Heavy Metal Tour is unique in its ability to cater to the dealers' requirements. If training is what you want, that is what they will bring.

After a successful day, 'on tour' visitors can relax in a private integrated bar area or take a snack on the large roof terrace. Feedback from Europe has been extremely positive leaving a great lasting impression with their customers.

Everyone visiting the truck will also have the opportunity to enter a competition to win a trip to Tenerife, staying at the Hard Rock Café hotel. Flights and accommodation for two people is included in this great prize.

For more information or to book the truck for your premises, use the following link: <https://www.tyrolit.at/en/divisions/industrial-trade/heavy-metal-tour.html>

The TYROLIT Group counts among the international market leaders in grinding, cut-off, sawing, drilling and dressing tools and as a supplier of tool and machine systems for the construction industry.



TYROLIT is synonymous with innovative spirit, top-quality products and outstanding service. That is why industries around the world rely on the extensive expertise of this family company from Tyrol.

TYROLIT develops customised tools for individual problems. Local contacts and a global team ensure outstanding service is provided in all areas: from the on-site planning process to the actual project implementation, customers benefit from

TYROLIT's extensive expertise. The TYROLIT training centre tops off the range of services offered.

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Get more information about TYROLIT:
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Continued grinding success with Krebs & Riedel

Coventry-based Advanced Grinding Solutions (AGS) has announced continued sales growth for its range of specialist grinding wheels provided by its chosen abrasives partner Krebs & Riedel. Since being appointed as the sole distributor for the Krebs & Riedel range of grinding wheels in 2009, sales growth in the UK has been continuous and now exceeds £300,000 a year.

Advanced Grinding Solutions sells various high-end grinding machines such as the Tschudin centreless grinding machines and Bahmuller cylindrical grinding machines that were being imported into the country with Krebs & Riedel wheels and this subsequently lead to the two companies deciding to work together to further promote the grinding wheels here in the UK.

Founded in 1895, Krebs & Riedel has been manufacturing high quality standard, diamond and CBN abrasives for over 100 years and can count leading UK engineering companies such as Delphi Technologies amongst its ever-growing customer base. AGS holds around £50,000 worth of CBN wheels in stock for Delphi, offering them a same day/next day delivery on special pre-profiled grinding wheels for its Bahmuller cylindrical grinding machines, also represented by AGS here in the UK.

Krebs is constantly introducing new types of wheels with improved grain structures and novel bonding systems that enhance grinding wheel quality and optimise performance.

One area where Krebs & Riedel excels in is the supply of wheels for gear and thread grinding applications and special wheels are available to suit machines manufactured for example by Gleason-Pfauter, Oerlikon, Kapp-Niles, Hofler, Maag, Samputensili and Reishauer. Advanced Grinding Solutions now supplies Krebs wheels to several top UK gear manufacturing companies who are able



to call off specially profiled wheels for gear production on fast deliveries. Under agreement, Krebs can keep customer's blank wheels in stock and upon order will profile these to suit and then supply within just two or three days.

Another niche area that Krebs & Riedel has been active in is the supply of smaller diameter CBN wheels for jig grinding machines as used on Hauser or Moore machines. Often end users don't wish to purchase large quantities of wheels and Krebs is able to supply high precision jig grinding wheels in batches as low as five pieces. Diamond and CBN wheels that have been manufactured by Krebs and Riedel for more than 20 years are available from 3 mm to over 900 mm in diameter with peripheral grinding speeds of up to 160 m/s.

Krebs & Riedel has also launched a brand-new range of carbon fibre bodied grinding wheels called HI-COMP; a new wheel body variant for CBN and diamond abrasives. The high proportion of carbon fibre used to form the Krebs Hi Comp wheel hubs guarantees maximum strength with minimum weight. Depending on the process requirement different sizes are used and this ensures optimal and customised solutions to meet end users' specific requirements. Having been under development for over two years, the HI-COMP wheel bodies are up to 75 percent lighter than comparable steel-based ones. This not only guarantees easy handling for engineers during installation but also dramatically decreases the load on the grinding spindle during grinding.

HI-COMP wheels also provide much better vibration damping characteristics compared with conventional steel grinding wheel bodies. This is useful not only for interrupted cut grinding but for standard cylindrical grinding as well. The grinding process due to the changed conditions of contact combined with the abrasive behaviour of the Hi Comp body's superior harmonics is vastly improved and results in improved surface quality on the ground component. Compared with standard steel hubbed grinding wheels, having exactly the same grade and type of CBN or diamond abrasive, finer surface finishes in the region of a 20 percent improvement are readily seen.

This allows, for example, for users to either accept the immediate improvement in ground surface quality or otherwise look to using a rougher grade of wheel that will give faster stock removal and therefore faster cycle times but to retain the finishes originally being achieved; that or of course a combination of both.

While the initial cost of purchasing carbon fibre hubbed wheels is higher than standard steel-based ones, the cost difference is very quickly recouped due to achieving faster grinding times and improved quality and so the wheels quickly pay for themselves. It should also of course be understood that Krebs wheels are always able to be sent back for re-coating/refurbishing and therefore after the initial purchase the carbon fibre hub can be used numerous times before it eventually requires to be replaced.



The damping effect of the carbon fibre stops a large proportion of the vibrations from the grinding machine and its spindle from reaching the cutting edge of the grinding wheel and the overall damping effect is up to 5 times better than if using a similar grade of wheel but with a conventional steel or aluminium body. Tests have also indicated that end users of the Krebs Hi-Comp wheels are also seeing vastly improved wheel lifetime because the wheels require to be dressed far less often with savings of 20-30 percent plus being made possible depending upon stock removal rates and wheel speeds etc. As Krebs carbon fibre hubbed wheels are considerably lighter allows grinding at far greater cutting speeds without the risk of overloading expensive grinding spindles. This, combined with the damping characteristics, allow substantially faster grinding times to be achieved.

Chris Boraston, managing director at Advanced Grinding Solutions, comments: "When selling very high precision grinding machines that cost from £250,000 to well over £1,000,000 then it's clearly important that only the very best grinding wheels are used and indeed these are the only way in

which we can fulfil and exceed our customer's expectations.

"Such has been the success that we have had here in the UK with Krebs, we now hold over £80,000 worth of wheels in stock here for same day/next day delivery to our UK customers and this stock holding is growing as more and more engineering companies discover the advantages in improved part quality and in cost savings that Krebs wheels brings to them.

Customers wishing to improve their

grinding processes are invited to contact AGS who can arrange for free of charge test wheels to be made available to prove out the superior quality and efficiency that is achieved when choosing the latest wheel technology from Krebs & Riedel.

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Maximum transparency when honing

Machine controller for honing with convenient graphic support

Honing with micrometre accuracy – that's what KADIA Produktion GmbH does. The Nürtingen-based company therefore equips its honing machines with components that represent everything that is technically feasible when it comes to precision and performance. In addition to the honing spindles with linear drives, high-precision measurement technology and reliable automation systems, this also includes the flexible machine controller HMC100.

Honing is a complex machining operation, with almost always two or more processes in succession, from pre-honing to finish-honing. The individual removal of material is monitored by measurements, sometimes to a tenth of a micrometre. This is a challenge for the machine controller. It must be able to map all honing procedures and individual processes. An optimised honing controller specifically designed for this purpose has for a long time not been available on the market.

Machine manufacturers usually resorted or do still resort to a standard solution with the corresponding adaptations. An unsatisfactory situation, especially if, as at KADIA, the focus is on high-precision honing. Specialists at Nürtingen therefore



The HMC100 control panel that has received the IF and Red Dot Design Awards, offers an oil-resistant and scratch-resistant 19" touchscreen. Numerical input is via a pop-up keypad



Operating the honing machine

decided to develop a controller themselves: the HMC100 (Honing Machine Control 100).

"Above all, we wanted a Human Machine Interface (HMI) that optimally presents the manifold processes during honing," says Henning Klein, managing director at KADIA, "All machine functions and all current working states and process qualities should be shown graphically. In short, we wanted a controller that offers the best possible transparency and ease of operation."

The hardware should also meet this requirement. The controller design engineers therefore opted for a control panel with a 19" touchscreen, a handy size for graphic presentations. In addition to this, the panel is suitable for all industrial purposes, i.e. oil-resistant, scratch-resistant and can be used while wearing gloves. Inside, there is also a powerful Intel-Core-i5 processor and a reliable SSD hard drive. The number of push buttons for external components was deliberately limited to the essential functions. The panel therefore looks tidy and user-friendly. Texts and numerical values can be entered via a pop-up keypad.

Graphics show more than columns of figures

The software relays all that is happening on the machine onto the screen via self-explanatory symbols. KADIA experts

developed a unique picture language here. Machine operators, tool setters and service engineers played their part too. User navigation was also important to them and nested navigation structures and long click sequences were also avoided.

The operation of the machine essentially focuses on two levels. "The HMC100 is a key element of our Smart Dynamic honing technology. The motto of this concept is 'less complexity, more efficiency'," says Henning Klein. "The HMC100 implements this consistently by offering an intuitive operation of the machine. In doing so, we believe that we've set a new standard." Even the less experienced operator can get to know his system more quickly, and operating errors are reduced to a minimum. As a result, there are less machine downtimes, thus greater efficiency.

Independent experts confirm that the HMC100 has successfully created a coherent interface between man and machine. The control panel was awarded two of the most important design prizes: the IF Design Award and the Red Dot Design Award. Both awards go way beyond the optical aspects. They also rate the ergonomics, innovation content and benefits of a technical product.

According to KADIA, roughly a hundred of these high-end controllers are now being used around the world. "As the

requirements of our users continue to increase, we will also continue to enhance the range of functions of the HMC100," emphasises Henning Klein.

Two interesting functional extensions were added last year: a statistics module and a scan function for the entire bore. The statistics module provides the database for process analyses, in order to for instance promote continuous improvement processes (CIP). The module for example records the diameter values of several hundred workpieces on a control card. A histogram renders a numerical and graphical overview on the frequency distribution. The operator can then run a statistical process control. Any weak points in the process are immediately obvious.

New standards for quality assurance

The scan function for bores lifts quality assurance to an unprecedented level. With the pneumatic gauge probe, it is possible to record a multitude of diameter values per measuring path so that the controller can then display a continuous measurement value chart. By way of comparison, according to the previous standard, it is standard practice to use three to five



E line Eco honing machine with the HMC100. KADIA now supplies every honing machine with the high-end controller

gauging levels. "Scanning the entire bore achieves a significantly higher level of reliability of the measurement. This is a world first, of which we are particularly proud," summarises Henning Klein."

A specialist in honing and deburring for more than 50 years

KADIA Produktion GmbH + Co develops

and manufactures honing and deburring machines and tools.

The cornerstone of the successful company history of KADIA GmbH + Co. was laid in the founding year, 1959. KADIA started its business by manufacturing honing tools.

It wasn't long until in 1969 the first honing machine was developed at KADIA and the company started to expand. In 1981, the company then manufactured the first deburring machine.

Contract manufacturing has also been added to the portfolio. The company focuses on bores within the size range of 1 to approximately 60 mm. The main customers are from the automotive supplier industry, hydraulics industry, aviation and aerospace, tooling and machine construction. A central product area are honing solutions for injection systems for gasoline and diesel engines.

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Honing business is booming for Engis UK in automotive sector

There is no “Brexit gloom and doom” at Engis UK, which is seeing honing business boom. This is particularly true in the automotive sector, with existing customers buying additional machines and new customers moving to Engis single-pass technology to improve bore roundness, concentricity and finish, achieve extremely tight tolerances, reliably and consistently, all at a lower cost per part.

The single-pass bore finishing process was originally developed to improve the bore quality of cast iron components and for many years it was thought that its use would be limited. However, Engis Corporation, realising its potential and developed the process and tooling to a point where almost any application, in almost any material became possible. The process is now capable of finishing most blind bores and through-bores as well as offering finishes including dual diameter, seat, extended bore length and cross-hatch patterns.

In contrast with conventional honing, where the tool or part is reciprocated multiple times while the abrasive portion of the tool is gradually expanded then contracted during each cycle, the single-pass honing/bore finishing process involves a series of pre-set diamond coated tools passing through a bore with a single in-and-out stroke movement while the tool, part, or both are rotating.

The number of tools used varies depending on the amount of stock to be removed, surface finish requirement, geometrical requirements, and material make up. Generally, each tool is set progressively larger in diameter, in ever-reducing increments, while the size of the diamond particles is also reduced. This allows tools with larger diamond particles that remove relatively large amounts of material and tools with smaller diamond particles that have finer surface finish capabilities to be used progressively for maximum efficiency.

Another difference is in the abrasive bond of the tool. With the single-pass process, a single layer of diamond is permanently plated onto the tool with approximately 50 percent of each diamond particle protruding from the bond. This has two benefits: firstly, greater diamond exposure



allows for faster cutting/stock removal rates; secondly, because the only wear that occurs on the plated tool comes from the diamond, tool size can be held for extremely long periods of time without adjustment.

The key to the single-pass process is to allow the diamond tooling to follow the existing centreline of the bore to be finished with as little pressure as possible. This is normally carried out by allowing the tool, part, or both to float. Depending on a range of variables bore geometry to better than 0.2 μm is possible. Since all the diamond tools are set to specific sizes and do not require expansion during each cycle, the single-pass process is able to achieve unsurpassed size control in production (1 μm with near perfect repeatability). These results are very predictable and repeatable, so the process is perfectly suited to Statistical Process Control.

Another benefit of the process is in reduced production costs. The diamond portion of the tooling wears very slowly which allows tool life to exceed 100,000 parts in many applications. With an average of four single-pass tools in a setup, the perishable tool cost is usually under £0.01 per finished part. The long life of the tooling

also contributes to a reduction in down time due to tool change. Cycle times vary but in general most systems can produce from 120 to 600 pieces per hour. The simple nature of the process eliminates the need for highly skilled operators. In fact, with appropriate automation one operator could oversee multiple systems finishing thousands of parts per hour.

Single-pass bore finishing is suitable for use in a wide variety of industries, including automotive, hydraulic, advanced ceramic, compressor, aerospace, firearms, and medical, and not only in high volume environments. In fact, one of Engis customers has just purchased a second SPM as a development machine.

Engis (UK) Ltd is part of the Engis Corporation, a worldwide organisation established in 1938, which manufactures and markets superabrasive finishing systems for operations that demand precision surface polishing and close tolerance requirements.

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Sunnen and BTA Heller create unique drill-to-finish bore solution

With the acquisition of the premier deep hole tooling and systems manufacturer, Sunnen provides single-source bore creation and finishing solutions, unique to the industry

Sunnen Products Company's acquisition of BTA Heller Incorporated has created a unique solution for shops looking for complete bore drilling-to-finishing capabilities. Sunnen, the world's largest vertically integrated manufacturer of honing systems for precision bore sizing and finishing, adds BTA's deep hole tooling and systems for primary hole generation as the companies build on natural synergies to offer single-source bore creation and finishing solutions. These new solutions will be on display at IMTS booths 237400 (Sunnen Products Company) and 432216 (BTA Heller).

"Our companies complement each other very well," says Chris Miltenberger, president and COO of Sunnen Products Company. "No other deep hole/BTA company has Sunnen's global presence for customer, technical and post-sale support. The transfer of knowledge between the two companies will create a unique value proposition and Sunnen's financial stability, together with its strong sales and service network will deliver this expertise to our customers."

Sunnen's core technical competencies include automated and manual honing systems, custom system development and integration, abrasives, tooling, cutting fluids and gauging. The acquisition expands Sunnen's industry leading honing expertise to include tooling for initial hole creation and other complementary bore sizing and finishing processes such as trepanning, counterboring and form boring.

The BTA Heller product mix includes accessories for those processes including pressure heads, vibration dampeners and boring bars.

Sunnen recently introduced the new SHD series skiving and roller burnishing system with tooling engineered and supplied by BTA Heller. Sunnen will also be entering the market with a deep hole drilling and boring machine with tooling engineered and supplied by BTA Heller.

"We have developed various tools and systems for creating intricate internal profiled deep hole drilling from 0.5 in. to 36 in. diameter," explains Mark Sollich, director of Sunnen's BTA Heller division. "To combine forces with Sunnen and its bore geometry expertise creates a company that cannot be found anywhere else in our industry. No one company can provide a total bore solution from the creation of the primary hole to the final bore finish specifications like we can."



As Sunnen enters the skiving/roller burnishing sector, it brings its unique approach of providing support to customers also using non-Sunnen equipment, a key advantage to shops using a variety of machine types and/or manufacturers for bore creation and finishing.

"We are able to take an unbiased approach to achieving high-quality bores," says Chris Miltenberger. "We offer solutions based on drilling, honing, skiving, roller burnishing, trepanning, or any combination of those. With our increased product lines and capabilities, however holes need to be made, we can make them."

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KWM Weisshaar puts its faith in boeck's deburring tools

A 50 percent saving in the machining time, strong edge rounding, long service life, good performance

Elements for interior fittings and air conditioners for railway technology, ceiling elements for operating theatres, sheet guide plates and storage air systems for printing machines – the question of how complex components can be made from simple sheets of metal is the specialty of KWM Karl Weisshaar Ing. GmbH. In order to machine the sheets precisely and economically, the Mosbach-based company puts its faith in state-of-the-art, automated machinery. Here, high-quality tools for deburring and rounding edges are provided by boeck GmbH from Leipheim.

From the engineering to sheet metal machining, the joining and welding technology to the assembly and logistics, everything comes from a single source, KWM Karl Weisshaar Ing. GmbH is an expert in the field of metal and sheet metal machining throughout the entire process chain. The all-rounder and problem solver in the sheet metal sector with a team of almost 500 employees is a recognised partner of many industries, such as the printing press, automotive, food industry, rail vehicle or



Partners for more efficient processes (from left): Marc Böck, managing director of boeck GmbH, Hans Schuster, Master of Laser Technology and CNC Punching Technology at KWM Weisshaar, and Jürgen Braun, Foreman in the Grinding and Deburring section at KWM Weisshaar

general engineering sectors as well as the areas of cleanroom and medical technology. Every year, the company processes more than 5,000 tonnes of sheet metal from steel, stainless steel and aluminium to form what are in some cases highly complex components. It goes without saying that, in addition to efficient processes, top quality takes top priority.

Quality tools for sheet metal experts

Deburring and edge rounding are important steps in the process chain at KWM in view of the high demands placed on the production of the various components. They ideally prepare the laser-cut metal sheets for further processing. Among other things, the Mosbach-based company uses an automated FLADDER GYRO/300 deburring machine to this end. When employing this grinding technique, six grinding spindles rotate in opposite directions in pairs, simultaneously oscillating across the workpiece.

"Thanks to this combination, the workpiece is machined continuously and evenly from alternating positions, almost without causing any damage to the surface. This enables a clean deburring and rounding of sheet metal parts - but only when you use the right tools", states Hans Schuster, a master of laser technology and CNC punching technology at KWM Karl Weisshaar Ing. GmbH. "We have been using high quality deburring tools from boeck GmbH for some time – and not just for our FLADDER deburring machine."

The innovative company from Leipheim is managed by engineers Marc and Jochen Böck. The brothers and their team of experts develop and produce tailor-made tool solutions for sheet metal deburring, ranging from slag removal and rough grinding through deburring, edge-rounding and oxide removal to surface finishing. "We manufacture our tools on machines we develop ourselves with a high degree of automation. Thanks to the structured high-performance processes, we are not only able to guarantee the highest quality, but also quickly deliver tailor-made solutions at the same time. Almost all orders are shipped the same day", states Marc Böck Dipl.-Ing. (FH) Dipl.-Kfm. (FH), managing director of boeck GmbH.

Improved edge rounding while simultaneously reducing process times

Specifically for use on FLADDER deburring machines, in addition to other machine types, boeck has a variety of tools in its



KWM Weisshaar uses the deburring roller 400 x 250 x 200mm from boeck on the FLADDER deburring machine, thus saving 50 percent of the machining time

portfolio. On the FLADDER machine, KWM Weisshaar uses the deburring rollers with a diameter of 400 mm, a width of 250 mm and a receiving bore of 200 mm, thus achieving the best results in this way. Hans Schuster explains: "The deburring rollers provide very good levels of performance, while offering optimum value for money. We thus achieve a much-improved level of edge rounding than with the tools previously used."

Jürgen Braun, foreman in the grinding and deburring section at KWM Karl Weisshaar Ing. GmbH, is also enthusiastic: "In the past, we had to run the metal sheets through our FLADDER deburring machine four times to ensure sufficient levels of edge rounding. Now we only have to do it twice. This saves on 50 percent of our machining time."

But what is so special about the deburring rollers? The individual abrasive cloth flaps are cut in a contactless manner via lasers. As a result, there are no grain losses in the abrasive cloth, as is the case with punching, for example. boeck deburring rollers have a very high abrasive cloth content. In addition, the flaps are arranged in the grinding or deburring direction and can be worn down to the core diameter. This results in long service life. At the same time, the deburring rollers are very light, despite the high abrasive fabric density. "This simplifies the handling when changing tools," adds Jürgen Braun.

An additional quality characteristic is that the deburring rollers are made of one piece without segmentation and therefore very sturdy. For smooth running, they are also balanced to the balance quality of G6,3.

Different versions for different requirements

Depending on the workpiece range and the desired result, the user can choose between different types of abrasive cloth at boeck. Hans Schuster continues: "The standard 'Brown Edition' version is perfect for our requirements. The all-rounder is suitable for all types of sheet metal. This allows us to machine the workpieces that change according to the job, without having to change the tools."

In addition, boeck offers even more different versions. For example, edges on components made of aluminium and plastic are ideally rounded with the "Grey Edition". Customers requiring a very high removal rate or a marked level of edge rounding should resort to the "Purple Edition".



Due to the arrangement of the flaps in the grinding or deburring direction, KWM achieves an improved level of edge rounding than with the tools previously used



The individual abrasive cloth flaps are cut in a contactless manner via lasers. This results in no grain losses in the abrasive fabric



Despite the higher abrasive fabric content, boeck's deburring rollers are very light. This reduces the bearing loads in the machine

All variants are available with different, slit patterns specially developed by boeck for different requirements. A higher level of contact pressure and a longer service life can be achieved depending on the slit used. Boeck also has the right solution for edge rounding of small cut outs and holes in the event that the flaps are not supposed to appear to be quite as aggressive at the start.

A partner for innovation

KWM Weisshaar is open to new technologies to achieve ever greater time, quality and cost benefits for the customer. Thus, a very special partnership has developed between the two companies: "KWM Weisshaar and not least Hans Schuster and Jürgen Braun have always been interested in new products. With its very large, modern machinery for grinding and deburring, the company is able to put our abrasives to the acid test before they are

used. At KWM, we receive constructive feedback within a very short space of time," states Marc Böck.

Hans Schuster also views boeck as more than just a simple tool supplier: "The company is instead an innovative development partner to make our grinding, deburring and oxide removal processes even more efficient. We also like to test boeck's innovative product ideas in terms of their suitability for everyday use and have already had many positive experiences with it."

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ARKU InfoDays 2018: Smart and networked

Recent InfoDays event focuses on reliable production processes and a major birthday

Faster, more efficient and more reliable: today's production standards are more demanding than ever before. The metalworking industry faces the same challenges. This is why ARKU, as a leading provider of leveling and deburring technology, relies on automated processes. The goal is reliable, perfectly functioning processes. From the 11th to the 15th of June 2018, the company demonstrated how, at its HQ in Baden-Baden, Germany. At the Leveling + Deburring InfoDays, visitors experience how robotics and leveling systems harmonise.

This year, visitors of the ARKU InfoDays could look forward to an extensive program. The event focused on a new solution for optimising sheetmetal working: in live demonstrations, ARKU showed the FlatMaster® 88 200 precision leveler with the FlatJack® flatness testing system, together with an upstream pick-and-place robot.

This move toward automated production with reliable processes represents a logical step for ARKU. This year, the company also celebrates its 90th anniversary.

"Whether leveling machines, coil



Reliable processes: The robot handles the loading procedure, reducing the physical demands on the operator who can focus on operating the system. A safety fence separates the machines and the operator, guaranteeing the operator's safety. (The safety fence has been edited out of this image to provide a clearer view)

applications, deburring machines or robotics, we have been addressing the challenges facing the industry for nine

decades", emphasises Albert Reiss, managing partner at ARKU. "Automation is simply one further aspect. We are certain that we have set the right course for a successful future."

Utilising the modern EasyEye® camera technology, the self-learning robot "recognises" parts with different thicknesses and materials. It lifts panels weighing up to 100 kg onto the leveler's supply (remove) roller conveyor. The robot is also suitable for removing the parts. This also reduces the physical demands on the operators.

"We have been automating our processes for years," continues Albert Reiss. "This is the key for process reliability and high-quality parts. Our contract processing customers also profit from the automation: stable processes produce panels with reliably (remove) high quality."

Deburring machines can also be equipped with the robot.

The new FlatJack flatness testing system ARKU presents a new variant of the FlatJack in combination with the FlatMaster. The flatness testing system is now also available for levelers with an opening width of 2,000 mm. The FlatJack control system has been integrated into the control system of



In good hands: magnets on the gripper arm ensure that parts made of different materials and with different thicknesses are reliably loaded onto the infeed conveyor. A safety fence separates the machines and the operator, guaranteeing the operator's safety. (The safety fence has been edited out of this image to provide a clearer view)

the FlatMaster 88 200. Consequently, both machines can be controlled via a single operator panel. This eliminates the need for operators to move back and forth between control panels.

In addition to the live demonstrations, ARKU also presented individual machines such as the EdgeBreaker® 2000 and 4000 deburring and rounding machines for thicker panels, the FlatMaster 55 precision leveler and the EcoMaster® parts levelers in action. Visitors also had the opportunity to level and deburr their own parts on our machines.

Founded in 1928, ARKU is a world leader in roller levelers and press feeding technology, with the world's most extensive range of high-capacity and precision levelers and with more than 50 years' expertise in the field. The company also offers innovative deburring and edge rounding technology.

With its headquarters in Baden-Baden, Germany and ISO-certified facilities in Kunshan (China) and Cincinnati (USA), the business operates in almost 30 countries worldwide. The product range comprises precision levelers, deburring and edge rounding machines for parts, cut-to-length



The FlatJack flatness control system measures the leveled parts with a precision in the tenths of a centimetre range

and slitting lines, press feeding units and press feeding lines and coil preparation lines for roll formers. ARKU provides engineering expertise to many manufacturing industries, including automotive, railroad equipment, shipbuilding, construction and furniture, as well as laser job shops and others.

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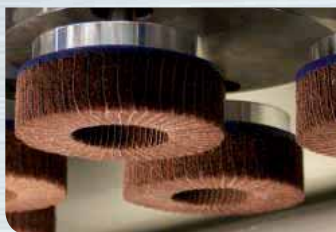
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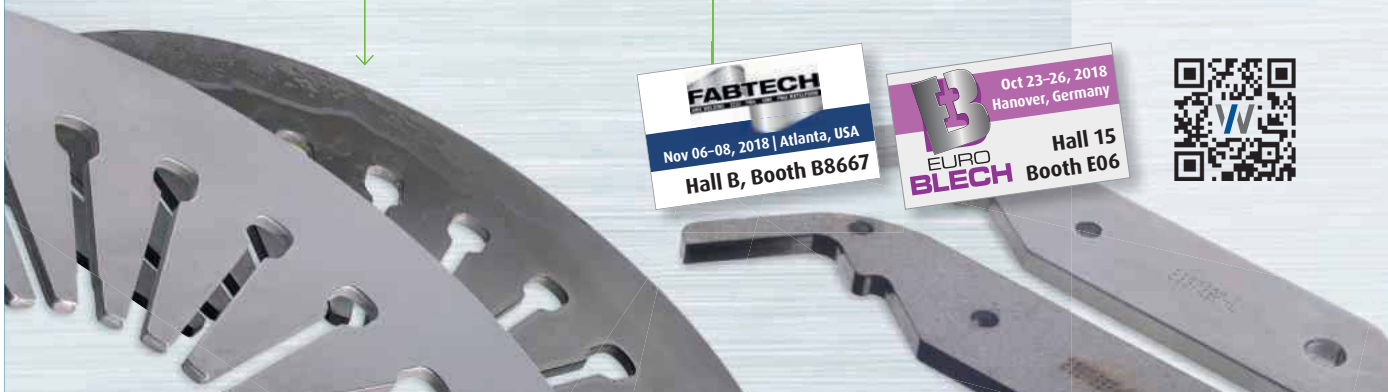
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Sanding with passion

Heesemann sanding machines are well-known worldwide for their excellent sanding results, reliable mechanical engineering, economic mode of operation and efficient service. The machines are assembled individually for the fields of application for solid wood, veneer and lacquer using well adapted machine solutions out of a flexible modular system. In addition to wood composites, the company also provide solutions for processing metal and synthetic material.

profilROUNDER is the first fully modular machine concept that meets all ATEX requirements for dry processing of all metals. It has been designed for dry mixed processing of steel, stainless steel, aluminium, titanium and copper sheets.

The completely modular design of the machine offers highest flexibility with minimum space requirements. Contact rollers, brush rollers, disc brushes and the well-known Fladder unit can be combined without constraints. Even after installation, the base machine can be easily expanded to up to eight units by docking additional units onto the existing base machine.

The order of each module can be changed retroactively without major mechanical and electrical rework, in order to meet the flexibility requirements of today's and future production environments, using the plug-and-play concept. Any future production sequence can therefore be met by profilROUNDER.

profilROUNDER combines simple design, glass bead blasted stainless steel and anthracite-coloured floor-to-ceiling windows. It is intended for the mixed processing of stainless steel, aluminium, titanium and copper sheets. A number of different applications are possible on the one machine, for example, slag removal, edge rounding, oxide removal, deburring, surface sanding and glazing. The profilROUNDER is virtually maintenance-free, while any service work has been reduced and simplified. The quick-changeover concept for the replacement of transport belts has been reduced to a few minutes, with the conveyor belt being removed sideways from the vacuum table. With this new feature, the accumulation of burr and the adherence of dust inside the table have been reduced, virtually eliminating the possibility of a fire, a hazard common to dry sanding machines. Fleece rollers and the alignment of the contact rollers in the machine maximise the lifetime of the abrasives. The fleece rollers are equipped with an automatic dressing device for increased service life and to maintain surface quality. A worn surface roller can be removed inside the machine, making maintenance of



the dressing device as minimal as possible. Redressing can be repeated several times, drastically increasing the lifetime of the fleece roller. Customers can choose which units they want to combine, for example, disc brush units, sanders, brush rollers, nylon brushes etc. The maximum material thickness that can be processed is around 160 mm. The profilROUNDER is controlled by a 15.6" touch panel displaying up to eight units. The user interface can be adapted automatically to any extension to the machine.

The highest-precision surface treatment

For more than 80 years, Heesemann produces sanding machines for industry and handcraft. During this time some essential and trend-setting innovations were made, which still endure. Heesemann has consistently provided new impulses and expedited sanding technology. Today, it still focuses on fulfilling its role as the innovation leader in sanding technology.

The history of sanding

Without Karl Heesemann, the founder of the company, the history of sanding in Germany would be unthinkable. In 1933, under the worst political and economic circumstances imaginable, the 24-year old engineer decided to improve and market the already established but still young sliding table belt sanding technology. Hisenthusiastic solutions quickly found their first buyers.

The first appearance on the Leipzig trade fair in 1937, the most important industrial trade fair back then, resulted in nationwide contacts and even more customers.

When World War II broke out in 1939, the production of wood processing machines was prohibited until 1947.

Soon afterwards, with fresh verve and new ideas, the young entrepreneur started improving the surface treatment technology. Sometimes very basic technologies and trend-setting innovations came into being for surfaces as well as for profiles and edges, technologies which are still being used today. Karl Heeseman was the motor, the motivator, the developer and the designing engineer who kept it all going. He was still involved in the company's activities until he was more than 90 years old. He died in February 2002, but his spirit of innovation lives on in the company today.

Karl Heesemann
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Deburring, grinding and polishing on one machine

FICEP UK is the exclusive UK agent for Costa, a world-leading manufacturer of automatic metal deburring and surface finishing machines.

These high-quality machines have an unrivalled reputation for reliability and performance for the deburring of plasma/oxi fuel /laser cut parts, the grinding of all flat, ferrous and non-ferrous metal parts to a desired quote and the polishing of large metal surfaces to provide the finest finishing available with a complete absence of chatter marks.

When a mix of materials or a different finish is required, Costa machines incorporate a unique patented LOCK system, which provides total flexibility, reduced downtime between changeover of brushes and easier maintenance.



Depending on the edge radius required, vertical or orbital type brushes can be used, either individually or in multiple groups to ensure the required finish is achieved on the top or the top and bottom sides of the component in one pass.

Parts up to more than 400 mm thick and more than 3,000 mm wide can be processed and the polishing systems have a feeding speed of up to 50 m/min. It makes these machines the ideal solution for removal of slag, burrs and oxide even when the parts are warped or uneven.

When polishing wide stainless-steel sheets, the quality of the surface finish remains consistent until belt life end as the machines automatically compensate for wear of the belts. This is possible thanks to the machine's inbuilt PLC which extends the life of the consumables which further reduces processing costs.

All machines in the Costa range exceed CE and OSHA approval, with noise reduction systems and special devices to protect operators as well as preventing parts from getting damaged. Not only do the machines eliminate dangerous and time-consuming manual grinding work they also massively increase productivity and reduce production costs.

Costa is now setting the new benchmark for automatic deburring machines - available exclusively from FICEP UK.

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Timesavers machine does just that for Dutton Engineering

The installation of a Timesavers 42-1350-WRb deburring, edge rounding and finishing machine by Ellesco at Dutton Engineering is delivering significant cycle time reductions, along with improved and consistent quality when it comes to deburring and graining punched, lasered and waterjet cut parts.

Dutton Engineering, based in Sandy, Bedfordshire, is a specialist sheet metal subcontractor. The focus of its 40 years has been stainless steel sheet. With customers in the food processing, medical and architectural sectors, among others, attention to detail, premium finish and quality products are essential to maintaining good customer satisfaction. With a turnover of £3 million and employing 40 people, the company prides itself on the quality of its work; most of which is visible in the finished product.

Andrew Read, managing director of Dutton Engineering, says: "We pride ourselves on the quality and on-time delivery promises that we keep and, with our production focused mainly around high-value stainless steel, the parts we produce must reflect the materials inherent value in both visual and handling terms. For this reason, we place foremost focus on deburring and graining."

The company aims to be more than just a 'supplier of parts'. It encourages customers to visit its premises so that relationships can be built in order to draw on the expertise available at Dutton Engineering. Whether they just need sheet processing capacity or, a full design for manufacture solution.

To support its customers, Dutton Engineering has a comprehensive capacity list including punching, laser, waterjet, bending and forming, as well as milling and turning capabilities. The company uses two other Timesavers machines, which the company has had for several years. These are only used for surface graining and finishing operations. When a new contract demanded guaranteed consistent burr free parts, which contained multiple slots, the decision to purchase the Timesavers 42-1350-WRb was straightforward. With its combination of wide abrasive belt head and an eight brush rotary head, this 42 series



machine combines both deburr and graining operations in a single pass. The inclusion of a vacuum table also adds greater versatility as the machine is capable of processing parts ranging from 1,350 mm wide sheet up to 4,500 mm long, down to parts measuring just 50 mm by 50 mm and up to 150 mm thick.

Andrew Read says: "The advantage we are getting with the Timesavers machine is the ability to generate a consistent edge on components, which is something we now use as part of our sales proposition to customers. When compared with deburring manually, not only have we gained in terms of quality but also time, with processing times being reduced typically by 75 percent

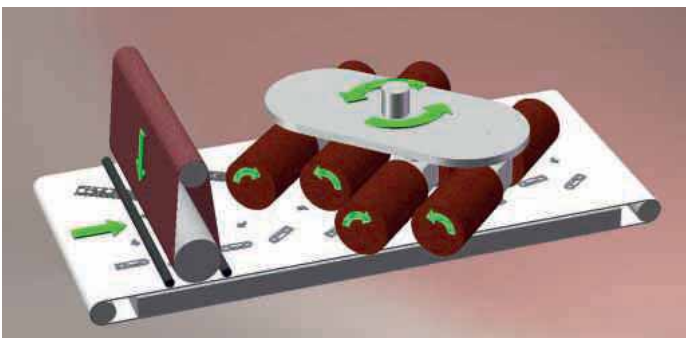
for deburring parts. This is a major bonus as removing any burrs is important for us, especially with the work we do for customers in the food processing sector, where there is the need to eliminate any risk of personal injury or contamination."

The ease-of-use of the Timesavers 42-1350-WRb is also a big plus for Andrew Read, as the size of the machine table means that multiple parts can be processed simultaneously, and only requires an operator to feed/remove parts, allowing Dutton Engineering's highly skilled polishers, who used to be involved in manual deburring, free to do the work they are best suited to.

Andrew Read adds: "With just 30 minutes

training, we were up and running and, once the machine is set, that's it, there is nothing more to it. With the addition of the rotary brushes for deburring the new machine provides much greater flexibility in terms of production, with key benefits being the ability to process punched and lasered parts as well as those that have been cut using our waterjet machine, which may not have burrs, but do have sharp edges to them that need to be rounded off, whether on external or internal edges, such as holes and slots. Due to the importance of the finished product in visual terms we can also deburr sheet that still has its protective plastic coating applied."

In addition to deburring, the Timesavers 42-1350-WRb machine also creates consistent edge radii, a process made simple by the easy-to-use control system allowing the machine to be set in minutes with minimal training. The Timesavers 42 series machines can be configured in multiple ways to suit specific customer



applications with customers able to choose machines built with multiple abrasive belts or combinations of abrasive belt and rotary or stationary brushes. Machine widths can be 1,000, 1,350 or 1,550 mm, with table speeds ranging from 0.2 to 10 m/min. The machine's functions are controlled from the strategically positioned control panel which also includes a graphic interface to show details of the parameters that have been set. All of this makes the Timesavers 42 series ideal for removing burrs from parts that can be presented flat to the machine, whether they have been lasered or punched or to remove sharp edges from water jet cut parts. A wide range of materials can be processed, including stainless steel, mild steel, aluminium, and copper.

Vincent Simonis, managing director of Ellesco, concludes: "It is always particularly satisfying when a customer returns for additional machines and it is further reassuring when the reasons that influence their decisions are the quality and performance of the product and the levels of service that we provide. We have worked with Timesavers for over 40 years, so we have been party to the invention of this technology. We know the designers, and we particularly know the capabilities of the machines inside out. This means we can quickly assess a customer's requirements and ensure they have the right solution for their particular needs. Any decision on investing in new machinery that the customer makes remains with them for a long period of time, so it has to be the right decision. Our role is to ensure that any investment in Timesavers equipment helps them to future proof their business."

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Turbo-Finish technology can extend turbine life by preventing crack propagation with isotropic surfaces

By Dr Michael Massarsky, Turbo-Finish Corporation

Turbo-Finish and premature fatigue failure prevention and life extension

Turbo-Finish's unique ability to produce isotropic surfaces on rotating parts can make them much less susceptible to problems associated with crack propagation. Additionally, the elimination of stress risers, and the generation of round edges are used to help extend component life.

Disks and other rotating parts can all benefit from this surface and edge conditioning. Highly finished surfaces also tend to pick up less residual contaminants from operations and smooth isotropic surfaces generate less turbulent air flow across their surfaces. Additionally, the Turbo-Finish process imparts beneficial compressive residual stress. As critical features of the part are processed simultaneously, it can produce a stress equilibrium throughout the entire part.

One of the signature advantages of the process is that it is capable of producing peening like metal surface improvement effects, whilst simultaneously developing isotropic surfaces and deburring and edge-contouring sharp-edged features. This combination of surface effects can help extend part life on components by mitigating crack propagation and blend in the positively skewed surface profiles that result from conventional grinding or machining.

High intensity conditioning effect

Surface finish effects are generated by the high peripheral speed of rotating parts and the large number and intensity of abrasive particle to part surface contacts or impacts in a given unit of time (200-500 per mm² /sec.) These factors make this equipment capable of generating one of the highest rates of metal removal to be found in any type of free abrasive surface finishing operation today.

Another very important functional aspect of Turbo-Finish technology is its ability to develop needed surface finishes in a low temperature operation, in contrast with conventional wheel and belt grinding methods, with no phase or structural



changes in the surface layer of the metal. A further feature of the process is that it produces a more random pattern of surface tracks than the linear abrasive methods such as wheel grinding or belt grinding. The non-linear finish pattern that results often enhances the surface in such a way as to make it much more receptive as a bonding substrate for subsequent coating and even plating operations.

Metal surface improvement and peening

Turbo-Finish processes have strong application on certain types of parts, which have critical metal surface improvement requirements of a functional nature. Significant metal improvement has been realised in processes developed with both abrasive and non-abrasive media material. Because of intense abrasive particle contact with exposed features, it has been observed that residual compressive stresses of up to 58-87 ksi can be created. Tests performed on rotating parts for the aerospace industry that were processed with this method demonstrated a 40-100 percent increase in metal fatigue resistance when tested under working conditions and when compared with parts which had been deburred and edge finished with less sophisticated manual treatment protocols.

Dry finishing and the environment

Another important consideration in evaluating current mass finishing processes is their wet waste effluent stream, the treatment cost of which often approaches the cost of the actual deburring or surface conditioning operations themselves. Industry has long had strong incentive to

seek out mass finishing methods that could achieve surface finish objectives in a dry abrasive operation. In contrast with other current methods, Turbo-Finish operations are completely dry and produce surface effects rapidly, in single part operations, while protecting precious water resources and the environment. Some parts lend themselves to multiple spindle or multiple fixture operations when single part processing is not an important quality control objective.

Turbo-Finish is a leading developer and supplier of advanced innovative dry finishing technology, for deburring, polishing, surface finishing and edge conditioning. Turbo-Finish is also a major provider of engineered finishing solutions for challenging surface finish applications in the automotive, aerospace, and industrial component manufacturing industries worldwide. The company maintains a process laboratory facility to provide manufacturing related research and development services to assist companies in meeting their edge and surface conditioning requirements. It provides these technologies to industry in the form of finishing equipment that can be tailored to specific finishing applications.

For more information on this research program and sample process service contact:

Turbo-Finish Corporation
Tel: 001 917 518 8205
Email: michael@turbofinish.com
www.turbofinish.com

A powerful all-rounder

The new 80,000 rpm micro motor system from PFERD is a true problem solver. Comprehensive accessories and perfectly attuned tools also make it a versatile all-rounder.

With the new micro motor system MIM STG3S 3/800, PFERD has unveiled a unique solution for material finishing. It can be used in tool- and mould-making applications, to name just two examples. With its range of 80,000 - 1,000 rpm, the micro motor not only covers a very wide rotational speed range, but also constitutes a versatile alternative to air grinders. The costly setup and laborious maintenance of compressed-air generation systems and networks can be omitted entirely. One single tool drive system replaces numerous individual air-powered machines.



Speed-adjustable, powerful and profitable between 80,000 and 1,000 rpm: the new MIM STG3S 3/800 from PFERD

The control unit can be operated by hand or by using a foot switch. The respective motor handpieces can be connected to two switchable sockets as needed.

Four freely programmable storage slots per connected handpiece enable individually pre-set rotational speeds to be selected quickly and precisely.

With its powerful rating of 350 W (consumption, output between 180 and 120 W depending on the handpiece used), the micro motor MIM STG3S 3/800 enables short processing times while offering high economic efficiency.

PFERDVALUE recommends the micro motor handpiece MIM HAS 3/800 SP3 for labour-saving, comfortable work. Furthermore, using the handpiece saves energy and time.

PFERD supplies a special handpiece intended for use at a rotational speed of 80,000 rpm. The MIM HAS 3/800 SP3 is distinguished by its high performance stability and concentric accuracy. It features a low-maintenance brushless motor and a start interlock for when no tools are mounted. The quick-clamping system functions keylessly and with maximum clamping force. Compared to air grinders, the HAS 3/800 SP3 micro motor handpiece is extremely energy-efficient and considerably quieter.

PFERD offers a comprehensive range of accessories that complement the MIM STG3S 3/800. Alongside a Vario switch and an on/off foot switch, a range of different handpieces is available, either straight or angled at 45° or 90°.

The package is rounded off by the comprehensive range of tools for tool- and mould-making. This comprises burrs, grinding and mounted points, fine-grinding and polishing tools, diamond and CBN tools, cut-off wheels and industrial brushes.

PFERD Ltd Tel: 01484 866149

Email: gary.pacitti@pferd.com www.pferd.com

How to gain that all important competitive edge and a superior surface finish



Costa offers one of the widest ranges of machines for the rapid and efficient deburring, grinding and polishing of ferrous and non-ferrous metal parts, sheets and coils.

Uniform grinding pressure is applied to the inside and outside contours of the components to deliver the highest standards of finish required for parts up to a thickness of 120 mm.

These technologically advanced machines will also compensate for surface height variations of up to 6 mm and abrasive brush rollers are available for edge rounding to comply with CE standards.

Costa consistently sets the benchmark for deburring and surface finishing machines - offering users a faster payback, higher productivity, lower labour costs with reduced abrasive consumption.



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For further details of these high performance machines call - FICEP on 01924 223530 or e-mail info@ficep.co.uk

Perfect surfaces as a reflection of precision technology

In Switzerland, the service sector is growing, while commercial/industrial shops are holding their own. High-precision metalworking plays a sizable role in this sector, but what good would precision be without the finish produced by a state-of-the-art surface treatment going far beyond mechanical grinding and polishing?

Surface treatment technologies

Mechanical machining of workpieces by milling, turning, grinding, drilling, etc., results in burrs and wire edges, which strongly impede the functionality and safe handling of the workpieces. Moreover, the mechanically treated or untreated surface is often in a condition that does not meet reliability, functionality, or appearance criteria.

There are numerous mechanical processes available for machining of workpieces: from filing through grinding, brushing, polishing, and vibratory finishing all the way to sandblasting and water blasting. Thermal processes such as thermal deburring (explosive deburring) are also used.

Deburring and polishing

For parts with high demands on surface precision and quality, chemical and electrochemical deburring processes that can yield optimal results by acting on the atomic structure of the surface are available. Through the two subtractive processes of electropolishing and chemical deburring and polishing, both deburring and smoothing or polishing of the surface occur as a function of the part geometry and the material.

Both processes are wet-chemical processes, which are used in the appropriate environments, for example electroplating. This means that the workpieces are treated through immersion in the medium. The choice of process depends not only on the material composition of the workpiece but also on its geometry. The two processes can be used with both rack and barrel technologies. Pumping of the electrolytes through pipes and drilled holes is also employed.

The workpieces must be oil- and grease-free as well as free of any oxide contaminants prior to the actual treatment. This means that upstream degreasing, usually vapour degreasing, and, if necessary,

pickling are performed. Subsequent wet-in-wet coating of the workpieces is possible.

Advantages of chemical deburring and electropolishing

The processes do not induce any mechanical or thermal stresses in the workpieces. They exhibit either no failure or a very low failure rate. They enable burrs, even in inaccessible places, to be removed and surfaces to be polished in a single process. Damaged edge zones can also be removed and the properties of the base material restored. Surfaces are effectively smoothed by reduction, while the improved tribological properties lead to less wear. Crack nuclei produced by stamping are reduced in number or eliminated; the adhesion of electroplated layers is improved. Polished surfaces can be cleaned much better, which leads in practice to particle-free and to large extent germ-free devices. Especially in stainless steel, a passivated surface with high corrosion resistance develops. Both processes can be used for targeted treatment of single items as well as for large quantities, for example bulk materials. A suitably designed system is required in each case.

Limitations of the processes

Limitations are placed on the processes by unsuitable materials, large burrs, and excessively tight dimensional tolerances. Through suitable material selection, a correctly selected mechanical machining process and, if necessary, inclusion of correct overdimensioning before electropolishing or chemical deburring and polishing, optimal results can be obtained, even in difficult cases.

Chemical deburring and polishing

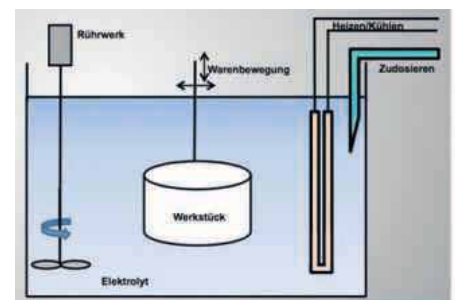
For chemical deburring and polishing, an acid-resistant immersion bath equipped with an effective agitator for bath circulation is needed. Temperature control is accomplished via a thermostat connected to a heater/chiller. The workpieces are secured on an acid-resistant rack, which is immersed and moved manually or automatically, depending on requirements. Metering of the chemicals can also be done manually or automatically; a level monitor ensures that overfilling does not occur.

Chemical deburring is an electroless

process. It is hence especially suitable for treatment of workpieces with complicated geometries and internal burrs.

The process starts immediately when the workpiece is immersed in an electrolyte adapted to the workpiece material. It can be controlled via the bath dwell time, activity, or temperature to ensure continuously reproducible results.

The FerroChem and ChemoLux chemical deburring and polishing processes are suited specifically to materials such as



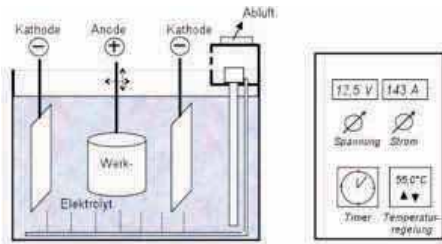
Schematic representation of the process of chemical deburring and polishing

carbon steel (up to 1.1 percent carbon possible, ideally up to 0.5 percent), copper alloys, aluminum, titanium, magnesium, and other special alloys. Suitable parts can be treated at low cost as bulk materials in the barrel or, if necessary due to the geometry, suspended on racks and undergo removal of fine burrs, wire edges, and swarf as well as surface polishing. The removal and hence the deburring are improved by strong flow around the part with the corresponding turbulence at the edges. A specific electrolyte should be used for each material type.

Electropolishing

Electropolishing takes place in an acid-resistant bath with temperature control and fume extraction. Workpieces to be treated are immersed, mounted on a rack, immersed in the electrolyte, and connected to the anode of the DC source. This takes place between two cathodes, whereby a distance of 10–20 cm is maintained between the anode and the cathodes. For the polishing process, a low-voltage direct current is used (typically 4–12 V), with the polishing time is usually controlled via a timer.

Electropolishing is a non-contact



Schematic representation of the electropolishing process

wet-chemical process that is especially suitable for treatment of workpieces with moderately complicated geometries and mainly external burrs. The workpiece is immersed in an electrolyte that has been adapted to the material to be treated. However, the process only starts when the DC source is switched on. The process is controlled by the dwell time, current density, and temperature so that reproducible results are consistently achieved.

The ElpoLux electropolishing process is ideal for materials such as stainless steel, carbon steel, copper, aluminum, titanium, Cr-Co and magnesium alloys, plus other special alloys. Depending on their geometries, the workpieces can be treated on racks or in special electropolishing barrels, whereby good contact of the workpiece as the anode must be guaranteed. The treated parts exhibit shiny, deburred, and, in the case of stainless steel,

passivated and corrosion-resistant surfaces. For complicated workpiece shapes, a better result can be obtained with the help of purposefully placed additional cathodes. A specific electrolyte should be used for each material type.

Upkeep of the systems

Use of deburring and polishing processes demands a high system reliability and regular maintenance to yield consistently first-class results. For all systems, periodic cleaning is indispensable, as is replacement of the circulating water and suitable treatment of the wastewater. Determination of metal content and analysis of various other parameters in plant and/or ElpoChem's analysis laboratory are performed for the purposes of quality assurance.

In the case of chemical deburring, the operator determines the activity on-site using simple, robust analytical methods, while for electropolishing, the density and possibly the conductivity are determined.

Regular observation of the systems and checking of the measurements and quality of the treated workpieces also help to ensure the quality. If any nonconformities arise, suitable measures must be taken immediately. Targeted management of material supply and timely reordering facilitate the effective and economical use of the systems.



Hip endmill made of stainless steel electropolished with ElpoLux process

Advantages and disadvantages of the processes

Chemical deburring and polishing is a process that can be used without much background knowledge, even for workpieces with complex shapes. However, the process is not suitable for all materials, for example stainless steel alloys.

With electropolishing, burr-free, shiny surfaces are achieved, especially in stainless steel as well as in titanium, aluminum, and copper alloys, with sparing use of electrolytes. Very complexly shaped workpieces are less suitable. Use of electropolishing is more challenging for complicated part geometries with respect to contacting and positioning of the part in the electropolishing bath. Optimal results can only be achieved given the appropriate experience and careful observation of the processes.

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OTEC finish for Lamy fountain pen nibs

Customised process flow for elegant design and optimum functionality

Lamy stands for much more than writing instruments of the highest quality; it also defines a globally recognised brand concept. The Lamy plant in Heidelberg has been manufacturing high-quality and unique writing instruments since 1966. Alongside elegant design and outstanding quality, one of the main elements of the company's strategy is production in Germany. OTEC was able to develop an individual process to grind and polish the surface areas of Lamy's nibs to achieve a perfect finish.



Customised process flow for elegant design and optimum functionality

In 2017 alone, over nine million steel and gold nibs were produced at the plant in Heidelberg. From the design to the finished nibs, everything has to be just right to ensure a perfect writing instrument. The surface processing of the nibs is therefore an integral part of the manufacturing process and guarantees both a high-quality look and better function. The nibs are covered in

burrs and scoring from the preceding processes. The burrs can be removed and the nibs polished in a multi-stage procedure.

Customised surface finishing for high-shine nibs

Lamy uses the OTEC CF disc finishing machine series for surface processing. In this highly effective mass finishing process, the parts are placed in an open container filled with a rotating grinding or polishing granulate. The rotary disc on the base of the container induces the rotation of the medium. The gap size between the base of the container and the container wall can be reduced to zero. This unique sliding gap system means that even small and delicate workpieces, such as those found in the Lamy fountain pens, are reliably smoothed, deburred and polished. The system prevents the workpieces from becoming bent or jammed.

CF series disc finishing machines

In the first step of the multi-stage process, the nibs are roughly ground with ceramic grinding bodies in a wet process. Here, a water and compound mixture is continually supplied and extracted to flush out worn particles. This leads to nibs with a clean and corrosion-free surface. A plastic grinding granulate is used to hone and remove any remaining ghost lines. In the last step, the nibs are polished to a gloss in a dry process



CF series of disc finishing machines

using walnut granules. It is only through this that they meet the high quality requirements of the Lamy brand and become an unmistakable and stylish product.

Alongside the nibs, the disc finishing machine from OTEC also works on cartridge tips and clips for the writing instruments. The advantages lie mainly in the speed, reliability and process safety of the procedure. Only the highest component and material quality can guarantee a long service life and smooth machine operation.

Lamy values these qualities too. The company is impressed with the quality of the disc finishing machines. With the help of OTEC's mass finishing technology, it has been able to optimise surface processing in nib production. In close collaboration with OTEC, Lamy developed a customised process flow individually tailored to its requirements.

As a reliable partner, OTEC is also available for questions and other matters concerning the product long after it has been purchased. In its cooperation with OTEC, Lamy particularly values their partner's reliability and fast communication.

OTEC is a medium-sized manufacturer of drag-, disc- and stream-finishing machines. Founded in 1996 by Helmut Gegenheimer, the company has become a market leader through new machining concepts and a range of patented processes.

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Customised surface finishing for high-shine nibs

Gentle finishing of extremely hard surfaces

Walther Trowal presents new machine at IMTS

Overlapping rotational workpiece movement is the basis for even, all-around surface finishes. At this year's IMTS in Chicago, Walther Trowal is introducing the new M-TMD 6M drag finisher for treating high-value components that require a first-class surface quality. The new drag machines will place a mirror polish on the hardest materials, even on ceramic components. With these machines the costs for polishing can be reduced to a fraction of the costs for manual surface grinding and polishing. Even more importantly, they ensure absolutely repeatable high-quality finishing results within an extremely narrow tolerance band.

Walther Trowal developed these new machines specifically for treating high-value components requiring extremely careful handling for the complete finishing process, for example, for finishing the surface of turbine blades, impellers for turbo chargers, precision components for pumps and compressors as well as for orthopaedic implants.

The new M-series drag machines incorporate a carousel with multiple rotating workstations. In turn, each workstation is equipped with spindle heads containing several spindle drives onto which the workpieces are attached with special fixtures. In addition, these machines also contain a stationary work bowl filled with grinding or polishing media. As the workpieces are "dragged" through the stationary media mass, the simultaneous rotational workpiece movement by carousel, workstations and spindles creates different overlapping patterns, which ensure an even and intensive coverage of the complete workpiece surface.



The M-TMD 4 drag finisher is equipped with four workstations and can process 12 parts in one single batch, while the M-TMD 6 with six work stations allows batch sizes of up to 18 pieces.

A drag finishing success story

One example for the successful use of the new drag finishers is a process, specifically developed by Walther Trowal, for polishing of knee femorals made from a chromium-nickel alloy, which are covered with a ceramic coating applied with a special vapour deposit method. To date these parts had to be finished manually in time consuming multiple steps with the risk of high quality fluctuations.

After pre-grinding, the ceramic coating is polished in the new M-TMD drag finisher with a polishing medium specifically developed for this application. Although the ceramic coating is extremely hard, the drag finisher produces a very smooth, shiny and highly wear resistant finish from the initially rough surface condition. The new coating extends the fatigue life of the implants from about 20 up to 30 years.

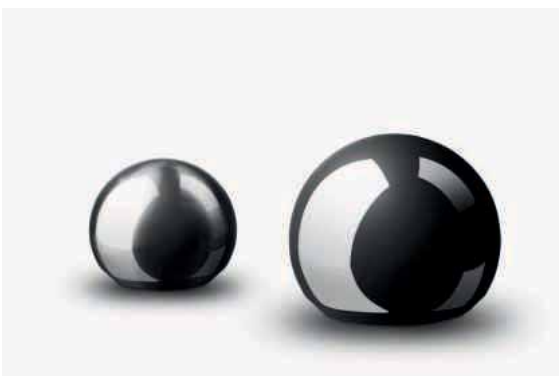
In developing this process, Walther Trowal took an entirely new approach. Instead of using relatively soft polishing materials the company is adding an

extremely hard substance to the polishing medium, namely diamond powder.

Christoph Cruse, director of sales at Walther Trowal, explains: "Soft materials can be polished relatively easily. But the manual polishing of extremely hard coatings has been extremely difficult, especially because an even surface finish is essential for the functionality of the component. In the case of vapor deposit coating, with a layer thickness of just a few microns, it is essential not to remove too much of the coating material from the part surface. With the M-TMD drag finishing technology and the new polishing media we have resolved this difficulty: The finish is absolutely even on the entire surface area of the implants."

The new M-TMD systems allow one additional rotational movement, namely that of the spindles mounted to the workstations. The multi-spindle heads on the workstations can be also be angled allowing the adaptation of the media coverage on the workpiece surface to different workpiece geometries. All process steps, from cut-down, over surface smoothing to the final polishing, take place in the same machine, without having to remove the workpieces from the spindles.

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Techni-Grind capitalises on Walter's Vision for continual productivity improvement

Techni-Grind (Preston), a leading supplier of precision tool regrinding services to the aerospace industry, has installed its sixth Walter high specification CNC tool and cutter grinder to increase capacity levels, in the shape of a Helitronic Vision 400L with integrated robot handling and wheel changer.

The new machine not only extends the length of tooling that can be processed to 420 mm long, but its automated handling and wheel changing capability will also, according to Techni-Grind's manager Michael Bell: "further extend our ability to confidently run the Vision 400L unmanned and in a lights-out mode, thus further increasing our productivity levels".

Capable of processing tools up to 315 mm diameter, 420 mm long and weighing up to 50 kgs, the Vision 400L has travels in X, Y and Z axes of 500 mm, 350 mm and 700 mm respectively. Rapid traverse rates are up to 50 m/min and the machine boasts linear and radial resolutions of 0.0001 mm and 0.0001 deg, respectively.

Grinding wheels up to 254 mm diameter can be accommodated within the eight-station wheel changer, and grinding spindle speed is up to 10,500 revs/min.

The Vision 400L joins the company's existing portfolio of Walter tool grinders and tool measuring machines that have been progressively installed, i.e. a Classic Power, a Power, a Power Regrinder and two Helitronic Visions (one with robot loading), plus a Helicheck Basic tool measuring machine.

Now, with the new machine meaning that two of the company's Visions are equipped with robot loader and pallet-held tools, these automation devices "are key to our often non-stop 24-hour running which, of course, contributes greatly to the production efficiencies we attain," says managing director David Higham. "We have continually committed to the Walter brand with no regrets whatsoever."

Formed in 1991, Techni-Grind has enjoyed steady growth by providing a comprehensive regrinding service to the North West's buoyant aerospace industry.

The ISO 9002-accredited company is an approved, and has been for the past 20 plus



years, Tier One supplier to BAE Systems, whose site at nearby Salmesbury is visited daily by Techni-Grind to ensure a planned programme of regrinds is maintained. The company also services sites at Brough and Barrow-in-Furness as part of BAE's Supplier Excellence Programme.

In 2014, BAE recognised Techni-Grind's outstanding contribution to this cost-saving initiative by including the company in a team that achieved a silver award in BAE Systems' Global 2014 Chairman's Award for Innovation competition.

The award is made annually to BAE Systems' employees and partners throughout the world who have shown 'outstanding behaviour, innovation or determination' to improve efficiency and drive down costs.

"This success is in no small way attributable to the Walter tool manufacturing technologies," says David Higham, who adds that the cost reductions for BAE are being made on the regrinding of a range of rotary tools. "We are continually and consistently processing batches of tooling, HSS and carbide end mills and slot drills included, to very high and guaranteed standards for BAE Systems.

"The ongoing process is made even more challenging due to the highly technical nature of the tools, typically incorporating features like cam relief clearances, unequal



A typical example of the work of Techni-Grind (Preston) which has installed a Walter Helitronic Vision 400L with integrated robot handling and wheel changer to increase productivity levels

index of flutes and constantly varying core diameters. The machining of these complex geometries is overcome by the expert programming technology of our Walter tool grinders.

"We fully utilise the machines' Tool Studio software, in particular in conjunction with the Helicheck Basic tool measuring machine which we use to pre-measure each tool before regrinding to ensure we produce perfectly blended radii without any reductions on shank diameter."

Tool Studio is an easy-to-use software that also allows operators to quickly and easily create tool machining and movement sequences by, for example, harnessing Wizard functionality to add all appropriate machining parameters then to utilise 3D-simulation to check and, if necessary, optimise grinding operations.

The Vision 400L features the latest issue (version 3) of Tool Studio and, says Michael Bell, "our operators' familiarity with this easy-to-use yet powerful software was again

a key factor in our continual investment in Walter machines”.

Techni-Grind’s machines are focused on regrounding a range of HSS and carbide end mills, slot drills, form cutters, reamers and conventional flute drills. All operate during standard working hours plus throughout a night shift four times a week.

Until the installation of the Vision 400L, the 17-employee company, which includes two apprentices, would typically process cutters up to 65 mm diameter and up to 300 mm long. Now, however, the Vision 400L has allowed tool processing dimensions to be extended.

“We are known for our quality service, competitive prices and on-time delivery,” David Higham concludes. “The industry is forever changing but through continual improvement via, for example, capital investment, we aim to be the number one choice for our customers, both now and in the future.”

A new answer for high-precision grinding of indexable inserts

Ewag’s Profile Line, a new 5-axis grinding centre that sets new standards in the high precision machining of indexable carbide

inserts, is now available in the UK from Walter Ewag UK, a member of the United Grinding Group.

Developed jointly by Ewag AG with sister company Walter Maschinenbau GmbH and incorporating Ewag’s world-leading software and tooling expertise, which includes Ewag’s Smart chuck, a host of additional innovative features are provided on a machine with a rapid traverse rate of 15 m/min and with X, Y and Z axis travels of 330 mm, 200 mm, 470 mm, respectively. Features include: integrated six-station wheel changer; the use of customer-specific pallets; vision system for part recognition; innovative ProGrind and Helitronic Tool Studio software.

The six-station robot changer for grinding wheel sets and coolant supply manifolds ensures optimum wheel selection, thereby maximising the machining volume for sintered blanks.

Another outstanding feature for autonomous multi-shift operation is the use of an integrated 6-axis FANUC robot cell, where customer-specific pallets can be held, while a high-resolution CCD-HD vision system is available for loading/unloading using magnetic grippers. Cleaning,

re-clamping and centring stations can also be integrated and adapted to customer-specific demands.

In addition, Profile Line for the first time combines Ewag’s renowned ProGrind software with Walter’s market-leading Helitronic Tool Studio software in the user-friendly FANUC CNC system for the fast and effective 3D simulation of production routines.

The result is a dramatic expansion in the range of applications that can be performed on a wide variety of interchangeable inserts. Even the most complex insert geometries, such as those used for drilling or milling applications, can be ground in one setup with resulting benefits in both precision and productivity.

Ewag’s Profile Line sets new standards in the high-precision machining of indexable carbide inserts.

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Rollomatic presents a reworked classic of cylindrical grinding technology

ShapeSmart NP3+ offers cost-effective entry into unattended production

Tool precision depends directly on the production accuracy of the blanks used. There is a new addition to the market to create complex geometries with exact concentricity and dimensional accuracy: the cylindrical grinding machine ShapeSmart® NP3+ from Rollomatic. Thanks to its modular structure, the machine can be easily adapted to any requirement and any budget.

The market demands ever greater flexibility, smaller batch sizes and increased efficiency in production. Manufacturers meet this demand with high-precision tools as an important performance factor.

"But only those who enter the race with perfectly prepared blanks have any chance of a pole position in the formula one of precision heavy weights. High carbide quality is one factor, but only grinding on modern cylindrical grinding machines provides a great basis for high-precision milling tools, drilling tools or punching tools," says Damien Wunderlin, head of marketing and sales at Rollomatic SA in Le Landeron, Switzerland. "We've therefore expanded one of our classics from an ergonomic and technical perspective with the result being the ShapeSmart NP3+, a powerful yet cost effective cylindrical grinding machine."

A lot of technology in a new array

Available with three or four axes, the ShapeSmart NP3+ covers the usual requirements for a high-precision cylindrical grinding machine in the grinding range from 0.025 to 25.0 mm diameter. It works in accordance with the peel grinding principle and can perform roughing and finishing processes simultaneously.

Rollomatic originally invented this technology and again facilitates never-before-achieved power in cylindrical grinding coupled with microprecision. This is how the workpiece guide system guarantees concentricity in the μm range. Even extreme lengths/diameters, for example for deep-hole drills or other special applications, are no problem for the NP3+ up to 400 x D.



For high-precision blank preparation, Rollomatic offers the new cylindrical grinding machine ShapeSmart NP3+ with simultaneous rough and finish grinding

More automation for greater efficiency

Users demand ultra-high precision. The Swiss company achieves this by continually optimising the machine design and adapting the individual components in an ideal manner. In comparison to the popular predecessor model, the NP3, a few details have once again been enhanced. For example, Rollomatic uses a FANUC panel with 15-inch display and integrated PC for the machine control.

Damien Wunderlin comments: "Thanks to the new panel control and PC integrated, we were able to further enhance user-friendliness for the operator. In addition, the new panel control and PC makes it possible to integrate the in-process measuring gaging system so that the ShapeSmart NP3+ maintains even narrow tolerances as any potential deviations will be corrected automatically. This guarantees users optimum reproducibility and mirror finish surfaces in unattended operation, even for complex tool geometries."

The pick and place tool loader enables everything from small to large batches to be ground unattended, as it can manage up to 1,360 workpieces up to 300 mm long. With Job Manager, ten different tool profiles can be programmed and produced automatically. Thanks to the integrated flipper station, both ends of the workpiece can also be ground up to a length of 200 mm. The setting of the grinding wheel positions can be easily and automatically done with the gap control system. A 3D touch probe facilitates the localisation of the



The automatic loading device also facilitates unattended operation



Thanks to the in-process measuring gaging system, the ShapeSmart NP3+ maintains even narrow tolerances as any potential deviations will be corrected automatically. This guarantees users optimum reproducibility and mirror finish surfaces in unattended operation, even for complex tool geometries

tool end position that can be used, for instance, as second operation to peel grind undercuts on ground endmills. Steps, cones and radii can thus be processed completely in one single chucking.

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Leading Turkish tool maker Turcar builds a smart factory

Turcar is investing in ANCA's automation solutions to efficiently grind superior tools twenty-four hours a day, seven days a week. Its latest investment, the company's second MX7 Linear is grinding superior tools twenty-four hours a day, seven days a week. Tarık Öztürk, production manager at Turcar says: "Turkey is experiencing phenomenal growth and it is important to keep a close eye on trends so that you can take advantage of the opportunities. The aerospace, automotive defence and engineering industries are booming and I am happy that we have managed to grow with these markets."

Turcar is a family business founded in 2005. In addition to solid carbide cutting tools, it offers solid carbide inserts, tool cutters and toolholders and is the first Turkish company of its kind to offer a full range of services to its customers.

Tarık Öztürk continues: "Over the years, we have changed our strategy to service the market and until 2013 we mainly produced special tools. The regrinding of cutting tools is still a very important area in our company, but at that time we realised that there is a growing interest in standard products. Our customers also wanted to purchase Turcar products in series, which led us to invest in mass production.

"In addition to our cutting tools, we have



begun to offer tool holders and holders, which we have been a successful range for us. We have more than 6,500 products and being the first and only Turkish company to offer such a broad product range has shaped our reputation as a leading Turkish tool maker."

"Modern production technology is key to our success and why we have been able to successfully service these growing markets. As the leading tool manufacturer in Turkey, we use the latest technology to ensure we are producing tools of the highest quality."

Turcar's MX7 Linear includes the linear motor feature. With this technology, Turcar is setting new standards in high-precision cutting tools. The addition of a RoboMate loader means that the MX7 is the right machine to process large orders quickly and efficiently. In fact, Turcar has reported that their two MX7's are now running

twenty-four hours a day, seven days a week.

Modern solid carbide drills have very high tolerance requirements. For serial production of solid carbide drills, Turcar equipped its new MX-7 with iView and a P-axis. With this investment, it is producing tools more economically than ever.

iView is a measuring system which measures the ground tool in its original clamping inside the grinding machine. An image of the ground tool is taken by the iView camera then compares the ideal overlay shape, which is generated by the iView software. The grinding cycle is then automatically compensated. The P-axis allows you to automatically reposition the tailstock for different length tools without manual intervention.

Tarık Öztürk continues: "Just as important as the technology is the knowledge and motivation of your employees. We are very proud that our employees are specialists and are skilled in both regrinding or grinding of highly complex cutting tools. This way no matter what the request we can deliver an effective solution for our customers.

"The RoboMate automatic tools loader has helped our employees focus more time on product development and research. That's why we also chose the RoboMate loader for our second machine. With the help of the LaserPlus option, the process is very stable, the measurement is done automatically, then compensated if necessary, thus we have extremely low waste."

The RoboMate Loader is a standard automation system for use on the ANCA tool grinders. The automatic loader increases capacity and reduces training with its commonality across several ANCA machines. This means new staff can be trained faster and existing staff can use the automation system on several ANCA machines after being taught one product. Specialist knowledge loss due to employee absence can then become less of an issue.

He continues: "There are a lot of advantages of the RoboMate. The biggest advantage is that instead of a machine standing idle, automation means production can be significantly increased. Process



accuracy is another advantage of this technology and the accurate surface finish is why our customers choose to work with us.

“We attach great importance to the accuracy of the grinding geometry and all our tools are measured and recorded using state-of-the-art machines. This data is then recorded and processed in our enterprise planning software. With these developments we are moving towards operating as a smart factory which has numerous benefits.”

“With the installation of the REDAX production and machine monitoring software, we have expanded the possibilities of data analysis more than ever. Thanks to this excellent software, we can track our production planning more accurately. It means we can track the current status and activity of our machines and use the data to plan our production processes. For example, based on the CP and CPK values and the spindle temperature values, we can intervene quickly and prevent possible errors during production.”

“We are keeping a close eye on ANCA’s ongoing product developments. Their content updates across social networks gives me insight into what is coming next or



how to get the best out of our machines which enables us to take on new projects,” he concludes.

ANCA is a leading manufacturer of CNC grinding machines. It was founded in 1974 in Melbourne, Australia, where the company still has its global headquarters. ANCA has offices in the UK, Germany, China, Thailand, India, Japan, Brazil and the USA as well as a comprehensive network of representatives and agents worldwide. ANCA CNC grinders are used for manufacturing.

ANCA CNC grinders are used for manufacturing precision cutting tools and

components across a diverse range of competitive industries including cutting tool manufacture, automotive, aerospace, electronics and medical.

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Japanese toolmaker relies on VOLLMER sharpening technology

Japanese manufacturer Heiwa Sangyo produces mould tools and critical components for the aerospace, space and rail industry sectors. Heiwa Sangyo internally manufactures carbide cutting tools such as end mills, drills and reamers to machine its mould tools. For the manufacture and the sharpening of the cutting tools, the company relies on the VGrind grinding machine from VOLLMER.

VOLLMER, the specialist for grinding and eroding machines, equipped its VGrind with automation solutions so that Heiwa Sangyo could grind and sharpen its carbide tools unmanned and around the clock.

"We produce mould tools for our customers that play a key role in the shaping and casting of metal components for the manufacturing industry", states managing director Dr -Ing. Yasuhiro Yao of Heiwa Sangyo Co. Ltd. "For machining the moulds, we use cutting tools that we grind and re-sharpen with the VOLLMER VGrind grinding machine, automated and around the clock."

Whether it is an engine block, turbine or thread, Heiwa Sangyo manufactures such components with precise machining. Whether customers require structural parts or engine components for planes, parts for high-speed trains or rocket parts, Heiwa Sangyo specialises in the simultaneous multi-axis machining of complex components and mould tools.

The company employs around 180 staff and has been active in the international metalworking industry for over 50 years. With headquarters in Tokyo, the company also has three production sites in Funabashi, Ichikawa and Komagane. Heiwa Sangyo has established itself as an important business partner in heavy industry and can count well-known companies such as General Electric and Rolls-Royce among its list of international customers.

In order to produce and re-sharpen its tools, the company decided on the VGrind tool grinding machine from VOLLMER. The VGrind realises multi-level machining via two vertical spindles. As a result, Heiwa Sangyo can manufacture its cutting tools precisely, individually and in large quantities. Thanks to the automation with a



Dr Stefan Brand CEO of the Vollmer Group

pallet magazine, the machine can be operated around the clock and unmanned.

"The VGrind not only makes possible accurate production, but also many possibilities such as circular and cone grinding. An advantage that no other competitor has today," states Dr -Ing. Yasuhiro Yao. "If one attempts to manufacture a ball cutter with a cone, the cone has to be machined first on a circular grinding machine essentially using two grinding machines. The VGrind from VOLLMER does all this in one step."

Another reason for choosing the VGrind was that the Swabian sharpening specialist has its own subsidiary in Japan. This allows VOLLMER to provide local support to Heiwa Sangyo, whether it is maintenance, repairs or training. The use of automated VOLLMER machines enables Heiwa Sangyo to secure the future of the company as a family-run business. With high-quality technology such as the VGrind, the company can offer added value and a uniqueness which also makes Japan efficient and successful as a production site.

"As a medium-sized company, Heiwa Sangyo has established itself as a reliable partner in global industries such as aerospace and continually invests in expanding its expertise and skills," states Dr Stefan Brand, CEO of the VOLLMER Group. "We do our utmost to ensure that smaller companies also obtain a competitive edge with our sharpening technology, which in turn makes them fit for the future."

With its comprehensive range of machinery, the VOLLMER Group, which has sites in Germany, Austria, Great Britain, France, Italy, Poland, Spain, Sweden, the USA, Brazil, Japan, China, South Korea, India and Russia, enjoys global success as a tool machining specialist in terms of both production and service. The technological leader's range of products contains the most advanced grinding, eroding and machine tools for rotary tools and circular saws in the woodworking and metalworking industries.

In offering this, VOLLMER relies heavily on the company's tradition and its strengths: local contacts for efficient communication channels, quick decisions and rapid action by a family-run company. The VOLLMER Group currently employs approximately 800 workers worldwide, with around 550 of these at the main headquarters in Biberach alone, including more than 50 trainees. The company invests around eight to ten percent of its turnover in the research and development of new technologies and products. As a provider of technology and services, the VOLLMER Group is a reliable partner to its customers.

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NUM launches major new release of NUMROTO tool grinding software

NUM has launched a major new release of its renowned NUMROTO tool grinding software. Offering numerous additional features and enhancements, Version 4.0 of the software is designed to increase the productivity of precision machine tools without the need for additional hardware.

The ball nose and corner radius tools in NUMROTO now allow programming of a helix step on end mills. For the first time, it is now possible to program different helix angles for the end of the radius and the beginning of the cylindrical parts.



NUMROTO Draw, the software's drawing and documentation tool, automatically processes the geometry data used for grinding a tool to generate a basic drawing. Many NUMROTO users choose to provide this drawing, together with the finished, ground tool to their customers, to show standards compliance.

The latest software release significantly extends this capability by automatically displaying the geometry of the grinding wheels and grinding wheel packages needed to make the tool in the drawing. Also, all the important dimensions are automatically added to the grinding wheels. The time-saving benefits of this approach are considerable: a grinding wheel assembly drawing can be printed out for the machine operator to help speed setup without having to involve the design department, which is especially beneficial for companies handling numerous small production runs.

The 3D simulation facilities of NUMROTO Version 4.0 have also been further enhanced. Coolant holes in the 3D blank are displayed automatically, and users can now add DXF comparison profiles. There is a new measurement mode which provides comparator functionality and the programmed feed rate can be displayed during the 3D simulation.

A new feature that is especially likely to appeal to users of high-end machine tools is support for adaptive grinding. By continuously monitoring the dynamic performance of the grinding spindle, the software enables the feed rate to be optimised automatically, without the need to install any additional hardware. This offers a very cost-effective means of increasing the productivity of certain grinding processes.

First launched in 1987, NUMROTO software has become the preferred choice for many of the world's leading manufacturers of machines for the production and re-sharpening of tools such as end-mills, drills, step drills, form cutters and many others.

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Don't hide your origins



Bild: www.vogtsbauernhof.org

Fully automatic grinding machine with 10 CNC axes

Tools and rotary burrs in the 0.5–8.0 mm range for the industrial and dental and medical sectors can be ground fully automatically on the new K 366 CNC grinding machine from Kirner. The integrated loading system takes up to 2,000 workpieces. The 6-axis kinematic system with dominant swiveling axes is globally unique and makes the K 366 CNC the technological forerunner in high-speed grinding. Together with the sophisticated grinding software by Kirner, it ensures reliable, efficient and economic grinding processes.

Kirner – precision is a point of principle.



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Ultra-fine filtration in tool production

The decision for the right filtration system for grinding carbide (CB) and high-speed steels (HSS) has developed into an important quality and added value factor in the production of cutting tools. VOMAT, the filtration system specialist from Treuen/Germany, supplies compact and very capable machines with its FA series. The systems can be configured with add-on or optional modules to customer-specific high-performance filters.

VOMAT FA series systems separate and clean oil 100 percent. While back-flushing the filter cartridges, the PLC controller ensures that clean oil in quality NAS 7 (3-5 µm) is still sufficiently at the point of grinding. Features such as demand-driven filtering and back-flushing help ensure that the cooling lubricants have a significantly longer service life with maximum purity. This reduces maintenance and machine downtimes, among other things.

Steffen Strobel, technical sales manager at VOMAT states: "VOMAT systems are available as stand-alone machines, as well as modular systems tailored to individual special needs with central and decentralised functions. Thanks to various add-on components such as internal, external or drive cooling, patented sludge collection systems, additional tanks and machine supply pumps, VOMAT can adapt the filter



New is the energy-saving KWS 250 chiller with integrated circulation pump and compact Eaton controls. It has a cooling capacity of 250 kW for brine operation. The control accuracy is +/-1.0 K



With a number of additional components and options, such as machine supply pumps, VOMAT systems can be easily adapted and optimised to customer-specific requirements

systems precisely to customer-specific production needs and conditions."

Customised for specific production needs

A good example is the mixed processing of High Speed Steel (HSS) and Carbide (CB). Thanks to a special pre-filter, the HSS swarf up to approx. 50 µm are filtered out. This is necessary not clog the second stage pre-coat filter medium prematurely. The second filtration stage removes particles in size up to 3 to 5 µm.

If a tool manufacturer operates machines that require very large oil volumes, have buffer tanks with lifting pumps or are connected to the filtration system via a very long, branched pipe networks, VOMAT provides additional tanks and integrates them, as well as machine supply pumps in the required capacity to fit the respective system configuration.

In addition to high-performance filtration systems, accurate cooling is a core element

in modern filtration technology. Cooling systems must be powerful and controllable in fine increments. Depending on the requirements, VOMAT offers different systems. The smaller VOMAT systems, including the very popular FA 120 to FA 240 series, have an optional slide-in cooling unit. This allows for easy serviceability on site. The condenser on these units is mounted in the hinged hood of the machine allowing for a very compact footprint. The control accuracy is +/- 0.2 K, while cooling capacity is 9 to 13 kW. If cooling of the axis drives, spindles and motors is required, modular units can be connected to the filter system. In addition, there are add-on units with condenser for external cooling or cold water-powered solutions with an external water circuit.

The new VOMAT KWS 250 is a modular and expandable chiller with an integrated frequency-controlled coolant circulation pump and Eaton compact controls. The

cooling capacity is 250 kW for brine operation and it has a control accuracy of +/-1.0 K. No buffer tank is required for the unit and it is also suitable for outdoor installation such as in an industrial park. The dimensions are 2,200 x 1,900 x 2,700 mm (W x L x H). Steffen Strobel adds: "The VOMAT KWS 250 scores particularly well with its performance and energy efficiency. The chiller consumes up to 62 percent less energy than similar conventional systems."

Special solutions are also possible for recycling. In addition to manual bag disposal, VOMAT offers the fully automatic, patented sedimentator. The residual moisture content of the sludge is only five to ten percent. The disposal takes place time-saving and user-friendly directly into the transport container of the recycling company.

Steffen Strobel concludes: "VOMAT Filtration systems can be equipped with almost all OEM tool machine interfaces. This allows them to be optimally integrated into the customer work flow. Thanks to our WIFI based remote control system, VOMAT systems can be controlled by remote service personal."

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In addition to manual bag disposal, VOMAT also offers the fully automatic and patented sedimentator unit. It reduces the residual moisture content to below five percent. The disposal takes place time-saving and user-friendly directly into the transport container of the recycling company



Magnetic Filtration



Huge Savings in Filter Media Costs

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Removes Virtually 100% of Ferrous Contamination

Leading car manufacturer solves contaminated coolant problem with magnetic filtration

A leading car manufacturer has enjoyed dramatic benefits after MMTCI Group installed magnetic filtration units on its gear box shaft manufacturing line.

The AutoMags, which are fully automated filters designed and manufactured by Eclipse Magnetics, have drastically reduced the level of contamination in the coolant liquid, improving surface finish quality of components and the efficiency of the manufacturing process. The car manufacturer has also benefited from a reduction in downtime that used to be a result of rectifying the problem.

Jonathan Michels at MMTCI says: "This technology is economical, reliable and efficient. I believe that magnetic filtration technology is the future. There is still work to be done, however, with educating customers to overcome the reticence that they may have about this technology. We have to prove to them what we already know: it works."

The material machined by the car manufacturer is steel grade 27 CrMo4, which is used in turning, drilling, and deep drilling processes. Due to the nature of the machined material and the application process, the coolant tended to become saturated with particulate. The car manufacturer's initial situation involved a centralised media-based filtration system (threshold 340 µm) with a volume of 92 cubic metres and 800 cubic metres per hour of water. 14 machines were connected to the central filtration system. A more effective method of filtration was required to solve the problems associated with the particulate building up in the coolant.

MMTCI Group's Environmental Division installed Eclipse Magnetics high-performance filtration systems to recover the particles that were collecting in the coolant and effectively remove them from the process. An initial solution of two FiltraMag FM2.0+ were installed to protect the two machines equipped with high pressure pumps. The Filtramags were installed in parallel for a flow of 30 cubic metres per hour.

Filtramag+ is a high performance magnetic filter with full stainless-steel construction. Its high intensity magnetic



cores make it 100 percent effective for use with materials which have lower magnetic permeability and it can be used to remove both magnetic and non-magnetic contamination. Eclipse Magnetic's Unique Dual Flow Technology™ maximises collection capability and its non-block, easy clean design offers rapid return on investment.

The second phase included the installation of a set of Eclipse Magnetics magnetic filters, which enabled the filtration of the full volume of fluid. This closed-circuit assembly is installed directly on the central filtration system and consists of two AutoMag AM12s, a separator drum for the evacuation of the sludge, a plunging pump and the electric/pneumatic steering box.

The AutoMag is a fully automated magnetic filtration unit which is ideal for

24/7 machining operations. With high contamination collection capacity and an ability to handle high flow rates, the Automag was able to offer a solution for the car manufacturers' problems with contaminated coolant, enabling the effective removal of contaminate.

Before the Eclipse Magnetics filters were installed by MMTCI Group, the machining liquid had a contaminate reading of 556 parts per million. After a week of use, this had reduced to 139 ppm, and is now less than 100 ppm.

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Guide to the latest generation metalworking fluids

Master Fluid Solutions' long-established expertise in the development of metalworking fluids for cost-effective, high quality machining is highlighted in a new publication that introduces the reader to its comprehensive range of premium cutting and grinding fluids that include boron- and formaldehyde-free products. The four-page brochure covers synthetic, semi-synthetic, soluble oil-based formulations, many of which carry approvals by the major aerospace manufacturers.

The new additions mentioned in this publication include TRIM® C116 and TRIM SC440, both low foaming fluids, specifically developed for machining cast iron and mild steels. Also appearing for the first time is TRIM MicroSol 590XT, an aerospace semi-synthetic with Boeing and Airbus approval, which harnesses the latest technology to provide long life and excellent protection of sensitive alloys.

Entitled the TRIM Solutions Product Guide, the brochure provides a brief description of each product in this latest range with a quick guide to its mineral oil, EP and polar additives content.

Hard copies are available from:

Master Fluid Solutions
Tel: 01449 726800

It also available as a pdf download at
www.masterfluidsolutions.com



The all-rounder for metalworking

The selection of the right cooling lubricant is important, as this allows optimisation of the machining process, which increases productivity.

Furthermore, the quality of the produced parts is significantly influenced by the cooling lubricant.

The water miscible cooling lubricant AquaTec 7520 from oelheld combines high emulsion stability with low maintenance and covers a wide range of applications.

The concentrate has a low mineral oil content of approximately 20 percent. AquaTec 7520 guarantees excellent lubricating and good corrosion protection during grinding. Other advantages are good compatibility with aluminum and an above-average service life which can save enormous amounts of cost and time.

Excellent results were achieved during the long test phase with development partners and in oelheld's own technology centre. Many customers confirm the results of the test phase and are very happy with the performance of AquaTec 7520.

The multi-purpose cooling lubricant concentrate is ideal for turning, drilling, milling and grinding of steels, cast iron, aluminum alloys and plastics and offers a good price-performance ratio.



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Filtration leader launches American-made range of micro-filtration products

An international leader in filtration and separation has unveiled its new made-in-America microfiltration product range, opening up fresh market opportunities to a wider range of customers.

The Porvair Filtration Group manufactures air, liquid and gas filtration products for industrial and commercial markets and is now providing a nominal range of filter cartridges and housings, suitable for industries including chemical processing, process water and food and beverage.

MicroKey™ and PolyKey™ filters are suitable for a broad range of industries and with a polymeric filter housing range to complement; they provide a complete solution for many industrial filtration requirements.

The PolyKey range of filters is manufactured in standard 2.5-2.75" diameter and GIANT 4.5" sizes, from melt-blown and spun-bonded pleated polypropylene media. Its high quality pleated polypropylene construction meets FDA CFR Title 21 criteria for the processing of liquid foods and allows for usage with many aggressive chemicals.

MicroKey filters are manufactured from micro fibreglass layered with spun-bonded polyester. The high-efficiency pleated construction allows for greater surface area in a compact design. The excellent capacity of the cartridge maximises time between filter changes, therefore lowering operational costs.

Both filters feature highly efficient media with excellent particulate removals as well as low-pressure drops making them suitable for challenging filtration environments.

Available alongside these filters are a range of plastic filter housings, which are suitable for new applications as well as retrofit into existing applications. These filter housings can provide a cost-effective alternative to Teflon™ or fluoropolymer housings and include a wide-diameter GIANT HOUSINGS® option that is not widely available in the filtration industry.

Trevor Waghorn, VP of Sales and Marketing states: "We are delighted to be able to offer our customers a nominal range of filters and housings to complement our existing range of absolute polymeric filters.

"This new range will further expand our



microfiltration customer market and allow us to provide filtration solutions to new industries such as commercial, residential water treatment and high purity water for pharmaceutical, food & beverage and electronics applications."

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parts2clean 2018 on course for another successful show



Wherever industrial parts are manufactured or processed, parts cleaning technology is critical for the successful outcome of downstream manufacturing processes and for the quality of the finished product. High standards of cleanliness are required, involving the removal of particulate residues and surface films, while standards are getting more demanding all the time. In order to remain competitive, companies around the world are under pressure to clean their parts to the required standards at the lowest possible cost. They can only do this, however, by reviewing and optimising their processes on a regular basis.

parts2clean, which takes place from 23 to 25 October at the Stuttgart Exhibition Centre, is a prime international source of the necessary parts cleaning know-how as well as an ideal buyers' platform.

The market relevance of parts2clean is underscored by the fact that as many as 87 percent of the show's attendees play a role in their companies' procurement decisions. Moreover, as Olaf Daebler, global director of parts2clean at Deutsche Messe points out: "81 percent of the professionals who attended parts2clean in 2017 came with actual purchasing intent, with nearly half planning investments in excess of 100,000 euros." In 2017, the International Trade Fair for Industrial Parts and Surface Cleaning was attended by some 4,900 trade professionals from 41 countries.

Solutions provided by the exhibitors cover plant and installations, processes, process media and their conditioning for the degreasing, cleaning and pre-treatment of parts and components, handling and process automation, washer baskets and pallets, cleanroom technology, quality assurance, test methods and analytical procedures for cleanliness inspection, corrosion protection, preservation and packaging, as well as contract cleaning. While the range of exhibits addressing every link of the process chain is unparalleled throughout the world, parts2clean also highlights various special-interest themes such as deburring and cleaning in electronics production and medical technology, as well as ultra-fine cleaning

and quality control in cleanroom environments.

"The displays not only cover the latest in technology but also the demands posed by global trends such as digitisation, electromobility, miniaturisation and lightweight construction, as well as the solutions capable of meeting these challenges," comments Olaf Daebler.

Lightweight construction, changing manufacturing and coating technologies, new materials and material combinations, the digitisation of production, electromobility and autonomous vehicles: these trends are putting pressure on manufacturers to clean parts and surfaces to ever higher standards.

"The solutions on offer from exhibitors at this year's parts2clean are designed to not only meet current standards for the cleanliness of parts and components, but also even more stringent requirements coming up in the future, with consistently reliable results at an affordable cost," remarks Olaf Daebler.

"But the products and services showcased by exhibitors at this leading exhibition are not the only reason parts2clean is a must for cleaning technology users from every branch of industry. The show's supporting program also offers an unparalleled wealth of know-how and added value. Among the supporting events are the information-rich, bilingual Industry Forum and the associated Innovations and QSRein 4.0 Forum as well as a special presentation on 'Process Flow in Parts Cleaning, Including Cleanliness Checks,' one on QSRein 4.0 and another on the role of automation in parts cleaning."

Special presentations on hot topics

The special presentation 'Process Flow in Parts Cleaning, Including Cleanliness Checks,' staged in conjunction with the CEC (Cleaning Excellence Center), provides live coverage of the deburring of workpieces, cleaning in a cleanroom environment, and the contamination-free transfer of parts to a Class ISO 7-compliant clean room for cleanliness checks using a cleanroom-compatible transfer cart. These checks are likewise performed live and involve a series of processes: rinsing, filter



drying, gravimetric analysis, visual checks using optical microscopy, and protocol generation. Specialists in industrial cleanliness will be giving visitors guided tours of this special presentation on all three days of the show (mornings and afternoons).

Visitors to the special display on the role of automation in parts cleaning will discover what solutions are already available for these applications, such as robots for parts handling, and what future trends are starting to emerge. Another special presentation is entitled 'QSRein 4.0 – Opportunities for Industrial Parts Cleaning.' Here the focus is on new approaches and possibilities in plant engineering, and on process solutions for parts cleaning in the future.

Knowledge and innovations for parts and surface cleaning

The three-day Industry Forum at parts2clean, organised by the Fraunhofer Cleaning Technology Alliance (FAR), is one of the most internationally respected knowledge resources for parts and surface cleaning. The talks by renowned experts from industry and science will be given in simultaneous translation (German <> English), and are grouped together under the following topic clusters: 'Cleaning processes;' 'Maintenance and operation of plant and process chains;' 'Analytics;' 'Field reports and examples of best practice from various sectors;' 'Automation/Robotics and Industry 4.0 in parts cleaning.'

"Thanks to the excellence of its guest speakers and the quality of the information provided, the parts2clean Industry Forum effectively serves as a high-calibre seminar," comments Olaf Daebler, adding "the forum is open to all parts2clean visitors." Also part of the Industry Forum is the successful 'Innovations for parts cleaning' session, held by the German Industrial Parts Cleaning Association (FiT). The agenda features talks about innovative products and solutions in chemistry and processes, plant engineering and equipment, measuring, testing and control, as well as consultancy, applications and services. Also organised by FiT is the session 'QSRein 4.0 – Opportunities for Industrial Parts Cleaning.'

The complete program for the Industry Forum and the special sessions will be available from about mid-September on the parts2clean website under the 'Supporting program' menu.

Industry Forum and guided tours in English and German

parts2clean is known to users around the world as a valuable source of orientation and know-how. The show's reputation owes much to the bilingual Industry Forum offering simultaneously translated lectures and presentations (in English and German) on every conceivable aspect of industrial parts and surface cleaning.

Guided tours will be offered on all three days of the show, in both English and German. Taking in specially selected exhibitor stands, the tours will give visitors the opportunity to get informed about topics of particular interest to them regarding every single step of the industrial parts and surface cleaning process. Participating exhibitors can present their products and innovations to a highly receptive audience, right at their stands, giving them a prime opportunity to generate interest and leads.

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Comprehensive cleaning solution for metal cutting tools

Ultrafine parts cleaning system with robotised loading

High quality and productivity are key success factors, not just in machining but also in the production of cutting tools. Accordingly, exacting demands on cleaning quality, capacity and process reliability had to be met when Sandvik Coromant invested in new equipment for its in-process and final cleaning of drill bits, milling cutters and indexable inserts. The company chose several solvent-based cleaning machines made by Ecoclean (formerly Dürr Ecoclean) plus one highly automated ultrafine cleaning system from UCM AG.

Sandvik Coromant, part of the Sandvik Machining Solutions division within the global Sandvik group, is a world market leader for tools and metal-cutting solutions. With its know-how, the Swedish company sets industry standards and is a major innovation driver for the metalworking industry thanks to its substantial investment in research and development. Together with its customers from the automotive, aviation and energy industries, Sandvik Coromant defines ever new benchmarks of quality and productivity.

Decision based on technology and design features

These criteria were also essential when the Gimo, Sweden-based company decided to replace existing cleaning equipment on its manufacturing lines and to invest in cleaning technology for an all-new product range. Environmental protection, health management and labour safety likewise played an important role. Sandvik Coromant's decision fell on three Type 71 C solvent cleaning systems by Ecoclean and one ultrasound-based ultrafine cleaning system sourced from UCM AG, a SBS Ecoclean Group company.

Anna Landström, project manager Machine Investments at Sandvik Coromant, explains: "The companies are well known partners throughout Sandvik Machining Solutions. What convinced us, on the one hand, was the technology and the design features of their machines. On the other hand, the systems provide many detail solutions ensuring high cleaning precision and longevity."

An additional criterion was the outcome



Different cleaning programmes are stored in the controller of the solvent cleaning machine. Process parameters are visualised

of the cleaning tests performed in Ecoclean's and UCM's technology centres. "The tests at UCM were very comprehensive as they involved various cleaning detergent suppliers and many process combinations," adds Anna Landström.

Quick and reliable solvent-based removal of oil residue

One of the solvent-based cleaning machines is used for cleaning cemented carbide and cermet indexable inserts, ranging from 5 to 50 mm in size, following a grinding operation with oil. "For downstream processes such as blasting, the oil residue must be removed 100 percent," explains Magnus Utberg, production engineer Grinding and Cleaning, identifying just one requirement: "Additional objectives were to cut cycle times and to provide optimised drying of the product."

For quick and reliable degreasing, the hydrocarbon-based cleaning system comprises two flood tanks with separate filter circuits, and an extra 10 cm has been added to the length of its work chamber. The resulting load dimensions of 770 x 480 x



For quick and reliable degreasing of the cemented carbide and cermet indexable inserts, ranging from 5 to 50 mm in size, the hydrocarbon-based cleaning system comprises two flood tanks with separate filter circuits, and an extra 10 cm has been added to the length of its work chamber

300 mm (L x W x H) allows two trays filled with indexable inserts to be placed in the basket side by side and stacked on top of each. This contributes to increased throughput rates. In the work chamber the load undergoes two immersion cleaning operations with fluid from tanks 1 and 2, each with ultrasound support. This is followed by vapour degreasing. To accelerate this latter step, the vapour is directed into the work chamber straight from the distillation system. Subsequent vacuum drying ensures that all parts leave the system fully dry.

"The result we achieve with this equipment is often better than anticipated," states Magnus Utberg.

The high cleaning quality is aided by effective solvent treatment. To this end, the standard main distillation system is assisted by a bypass distillation for continuous oil discharge. The filtration circuit for the No. 1 tank comprises magnetic and bag filters that retain both fine grinding particles and coarser matter. The cartridge filters integrated into the No. 2 circuit remove even very fine particles from the fluid.

"We recycle the system's waste heat to heat or cool our production shop," notes Magnus Utberg

Ultrasound fine cleaning yields parts 'ready for coating'

Further cleaning steps are carried out after grinding with emulsion and/or after sandblasting and before PVD- or CVD-coating of the indexable inserts.

"From the last cleaning step, the part surface must emerge ready for coating, which means absolutely free of dirt residue, traces of corrosion, or water stains," explains David Eidenqvist, T&B grinding manager, whose department operates the UCM-designed ultrasound fine cleaning system. It comprises a total of 11 treatment stages, an automatic cleaning agent dosing system, and an oil separator. The indexable inserts are subjected to three successive ultrasound cleaning steps, each followed by rinsing with municipal water. Then two rinsing steps with de-mineralised water in a cascaded arrangement are carried out. The first demin-water rinsing cycle is carried out with ultrasound as well. This ensures that any surfactant or salt residue still present on the part surface will be reliably rinsed off. The four-sided overflow feature developed by UCM and the option of tilting the trays in the rack are additional technical features that contribute to high product cleanliness.



With the new ultrasound fine cleaning system the company achieves not only better cleaning results, the input of chemicals and manpower could also be reduced, thus improving cost efficiency and providing better working conditions for the employees

After the last rinsing cycle, a blow-off station removes most of the surface moisture before the parts reach the downstream dual-stage continuous hot air-drying unit.

Robotised feeding facilitates unattended operation

Exact demands were also imposed at the level of automatic handling. "The system was expected to support unattended operation," David Eidenqvist points out. To this end, it was equipped with a handling robot.



Exact demands were also imposed at the level of automatic handling. To this end, it was equipped with a handling robot

For cleaning, the indexable inserts are placed in coded trays which are then stacked. Each stack is covered with a lid and advanced by an automatic cart to the cleaning line. Here, an operator scans the bar code from the accompanying paperwork. This prompts the system to select the appropriate cleaning program. The stack is then transferred from the cart to the system's loading conveyor, which can accommodate five tray stacks at a time. The robot is equipped with a height sensor to determine the number of trays of a stack. It first removes the lid and deposits it in a lid collector. The topmost tray, which is often not fully loaded, is then temporarily stored in a waiting position until all other trays have been placed in the system's conveying racks.

The loaded racks travel along the back of the system to the first treatment station from where they complete the automatically selected cleaning process toward the loading/unloading station. Upon completion of the drying step the robot picks the trays and re-stacks them. To this end, the trays pass an indexing station with forked photoelectric sensor informing the robot how to place the tray on the stack so that all trays will be identically aligned.

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Cleaning with CO₂ snow in a dry and residue-free process

Trends such as electromobility, lightweight engineering, miniaturisation and Industrie 4.0 have given rise to new challenges in the field of industrial parts cleaning. With its quattroClean system, acp offers a solution capable of performing a wide range of cleaning tasks reliably, reproducibly and cost-effectively. In addition, the dry, residue-free and environmentally-neutral cleaning technology can be adapted to individual requirements, is highly compact, easy to automate and simple to integrate into production lines, Industrie 4.0 manufacturing systems and cleanrooms.

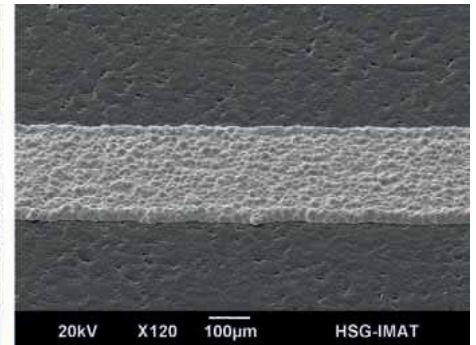
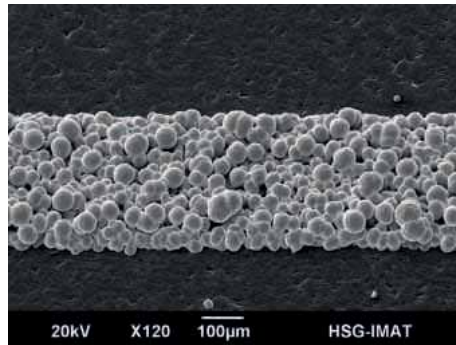
Whether it is the automotive or supplier industry, precision or micro engineering, medical technology, mechatronics, electronics or other industrial sector, current trends are changing requirements concerning parts cleaning. This also includes an increasing number of smaller and more complex parts and components. Shorter product life cycles, lower product volumes right down to the manufacture of single parts, the use of new materials and material combinations, for example for lightweight engineering applications, and new or modified production processes.

Electromobility, autonomous driving and manufacturing environments designed for Industrie 4.0 are further developments which are influencing parts cleaning. There are cases where material combinations or surface structures are unsuitable for wet-chemical cleaning, or only certain areas of components need a specific degree of cleanliness, such as bonding, welding or sealing surfaces, or cleaning steps are performed on assembled components.

Scalable cleaning solution with CO₂ snow

This is where the reliable and cost-effective snow jet technology from acp – advanced clean production GmbH comes into its own. The scalable cleaning system can be easily adapted to diverse component geometries to clean selective areas or whole components.

This environmentally-neutral technology uses liquid carbon dioxide as a cleaning medium which, as opposed to dry ice, is gained as a by-product from chemical processes and the generation of energy



from biomass. It has an almost indefinite shelf-life and is supplied in cylinders or tanks.



Dry, residue-free and selective cleaning process

Liquid CO₂ is guided through the non-wearing two-component ring nozzle of the acp system and expands on exiting to form fine CO₂ crystals. These are then bundled by a circular jacketed jet of compressed air and accelerated to supersonic speed. The patented technology ensures uniform cleaning results, even on large surfaces where several nozzles are used.

The jet of snow and compressed air has a temperature of minus 78.5°C and can be focused exactly where it is needed. When it impacts the surface to be cleaned, a combination of thermal, mechanical, sublimation and solvent effects take place. These four cleaning mechanisms enable the quattroClean system to remove filmic contamination, such as residues of cooling lubricants, process oils, polishing pastes, separating agents and silicons, as well as particulate contamination, for example chips, dust and abrasion. Since the cleaning step with the non-combustible,

non-corrosive and non-toxic CO₂ snow is also gentle on materials, even delicate and finely-structured surfaces can be treated. The aerodynamic force of the jet transports the detached dirt away. This is then extracted from the cleaning cell together with the sublimated CO₂ in a gaseous state. The workpieces are dry on completion of the cleaning process, enabling them to be further processed or packaged straightaway.

Cleaning solution suitable for a wide range of products

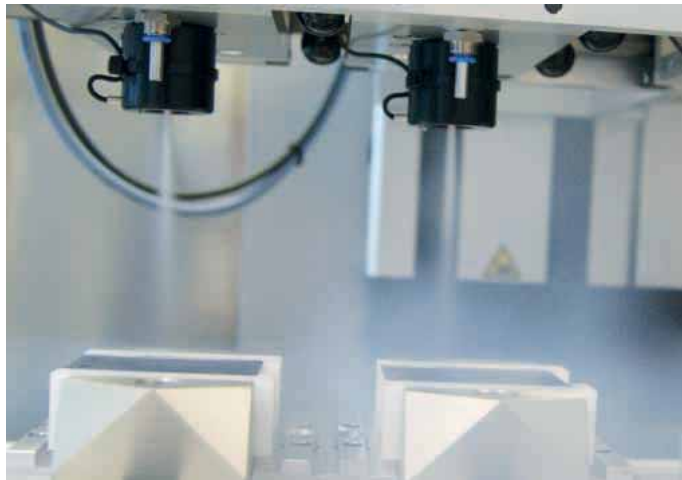
The quattroClean snow jet technology has proved to be effective in numerous applications in various branches of industry. For example, the cleaning system has been in use for several years now to remove ablation residues from injection-molded interconnect devices (MID) produced by means of laser direct structuring. Compared with common cleaning methods, such as ultrasonic or high-pressure washing processes, the quattroClean system has the advantage that the rough laser structures are smoothed at the same time, thus simplifying joining and assembly tasks. Laser residues also need to be removed when manufacturing batteries. Residues from laser processing cells, which could cause shorting, are removed selectively and reliably.

A manufacturer of sensor systems uses the snow jet technology from acp to clean off particles before sensors liable to damage are packaged. For this application, a hermetically-sealed cleaning cell was developed, which is integrated into a clean zone and fitted with a filter fan unit to supply clean air. The quattroClean system is also

used in an inline application to clean engine pistons before their surfaces are optically measured. The parts are cleaned by a robot. The system works in the production system's one-piece flow and is capable of cleaning 11 cm²/sec. When it comes to die-cutting, an almost manual system removes production residues from strips immediately after cutting. This single-part cleaning step replaces the commonly-used wet-chemical cleaning process.

Compact, easy to automate and targeted control

Thanks to its modular design, the compact quattroClean system from acp is easy to adapt to specific customer requirements. This allows manual, partially-automated and even fully-automated cleaning systems to be developed and integrated into existing



production, assembly and packaging lines. Cleaning tests are conducted at the acp technical center to accurately determine all the process parameters for the application concerned, such as volume flows for compressed air and carbon dioxide, as well as the duration of the jet. Material properties and the type of contamination requiring removal are also accounted for. These parameters can be filed as cleaning programs in the system control. Depending on the task at hand, systems for cleanroom use can be realised with their own local cleanroom system, including a specially-adapted extraction system.

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Clean and dry supply lines

Flexible BvL cleaning system meets high cleanliness requirements

A supplier from the automotive industry requires an additional cleaning system that meets special requirements in order to clean different supply lines. In addition to reliable cleanliness in pipelines with the narrowest of diameters, the components should also be completely dry upon leaving the cleaning chamber. The company has been cleaning and drying one section of pipeline using a system from BvL Oberflächentechnik GmbH for four years. The new system was therefore designed and produced by the experienced Emsland company for a larger component batch.

Various components on different goods carriers

The OceanAF cleaning system was designed by BvL so that different goods carrier types can be used in the cleaning chamber. The supply lines to be cleaned are first manually placed in the appropriate goods carriers. The components are so securely braced that tightness is ensured but at the same time, it is guaranteed that the delicate pipes are not damaged. A crane system then lifts the goods carriers into the cleaning chamber. The loaded goods carrier is then sprayed from below with water and the appropriate pressure through various connection points.

Space-saving and efficient washing, rinsing and drying

An intensive wash process is initially completed in the same process chamber that is fed by a two-tank system. The individual lines are completely flooded by the pipes in the goods carriers. Any remaining contamination and cleaning agent is then removed in the same manner using water from the rinsing tank. The return water flows through drains back to the corresponding tank. The required size of the process chamber also ensures that the flow back filter baskets are positioned on the outside. The last process step involves blowing out the supply lines fixed on the goods carriers using side channel compressors. In combination with the components' intrinsic heat resulting from the wash and rinse process, they are dried quickly and highly efficiently.

Sophisticated complete system for the highest demands

Using the Libelle Fluid Control from BvL, the cleaning medium is continuously checked, ensuring good bath quality is maintained. Furthermore, a connected plate phase separator ensures reliable oil separation. Using the two-hand operation, the process chamber pneumatic cover opening is also



A smaller version of the OceanAF from BvL, modified specifically for this particular application, already provides the customer with reliably clean and dry components

ensured. In addition to looking through the viewing window, the cleaning process can also be observed with the help of an internal integrated waterproof light.

BvL Oberflächentechnik GmbH is one of the largest suppliers for water-based industrial cleaning systems in Germany. As a system partner, BvL offers comprehensive customer solutions through integrated services, from simple cleaning units and filtration and automated solutions to complex large projects with process monitoring, always complemented by reliable service. The domestic market in Germany is the most important target market for the approximately 160 employees at BvL Oberflächentechnik. With regard to exports, the company has expanded its position on an international scale and can rely on an extensive sales and service network in 19 countries.

BvL Oberflächentechnik GmbH
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www.bvl-group.de



The cleaning system from BvL enables narrow supply lines for the automotive industry to be cleaned and dried reliably

MicroCare highlights critical cleaning lab services

MicroCare Corp. has created a dedicated webpage to introduce the company's state-of-the-art Critical Cleaning Lab services. As a part of a fresh new website update, the page highlights the company's unique service which analyses specific critical cleaning applications for electronics, industrial parts and medical devices.

Developing custom critical cleaning solutions for industries that demand perfectly clean products is important. To achieve this, MicroCare invests in pioneering research and development to provide customers with both off-the-shelf products and customised cleaning fluids tailored to meet their specific needs.

"The Critical Cleaning Lab provides a service to help customers clean better, faster, more safely and more economically. The website is our window to the world, and the new webpage is the perfect platform in which to highlight this service," comments Guylaine Guerette, MicroCare senior marketing manager.

"The new webpage explains exactly how

we can help businesses in this process to make a smooth, seamless transition."

"Through the advanced lab services our chemists and technical representatives develop tailored formulas and processes to suit individual critical cleaning applications," explains Elizabeth Norwood, MicroCare senior chemist.

"The Critical Cleaning Lab provides a service to help customers clean better, faster, more safely and more economically.

"It is important to consistently review cleaning processes. If a contaminant has changed, or standards have evolved with old-style solvents being eliminated due to a regulatory transformation, then our Critical Cleaning Lab can offer the best advice and solution to any cleaning application."

MicroCare's Critical Cleaning Lab service helps customers to select the right cleaning fluid and process. First, a comprehensive audit will be conducted of the current cleaning process. This is followed by discernment of applicable chemistries and procedures to be evaluated with the



components. The team of expert chemists and technical representatives then recommend the best cleaning fluid and process improvements to achieve the lowest cost-per-part cleaned. Before any changes are implemented, pilot tests may be run at a client's facility using on-site solvents, equipment and staff.

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YOUR EXPERTS IN COMPONENT CLEANING

It's all about quality

Costs cut, increased productivity and new orders for Swiftool with MecWash industrial washing system

A need to radically improve the component cleaning capabilities at one of the UK's leading precision engineering companies has resulted in significant savings, reduced production times and new orders, thanks to a new MecWash industrial parts washing system.

Nottinghamshire-based Swiftool Precision Engineering Ltd is an award-winning subcontract manufacturing business boasting a range of blue-chip customers in the aerospace, nuclear, marine and petrochemical sectors, among others.

With demanding quality standards for its high integrity precision machined components, it found that an existing basic spray wash and small ultrasonic bench washing system was not as thorough as the exacting requirements needed to meet increasing demands from customers. It therefore turned to Tewksbury-based industrial parts washing specialist MecWash for a solution.

"Quality is what Swiftool is all about. The existing washing system was just not cleaning well enough. We needed to surpass the standards that not only we expected, but that our clients demanded," says Andy Carnell, project manager at Swiftool. "The system was dated and, more importantly, unable to clean to the much smaller micron levels expected nowadays within the sectors we work in. Manufacturing high volumes of precision machined components in a range of materials also meant we needed to increase production time without losing quality."

Working with the company, a MecWash MWX400 system was tested and configured, along with trials involving MecWash's in-house laboratory and chemist to ensure the right wash chemicals were designed and matched, before the system was commissioned.

The MecWash MWX400 system provides ultrasonic wash and rinse, flood wash and rinse, mist rinse, spray wash and rinse, hot air dry and vacuum dry. All providing exacting washing and cleaning results. Contaminants needing to be removed from the manufactured components included neat oil, coolant and metal swarf.

The MWX400 system was commissioned into the manufacturing process and in



addition to significantly enhanced levels in cleanliness, production was also increased as a direct result.

"The MecWash system is far superior to what we had. It has saved so much time. It's a lot quicker, more thorough and the results are so much better," added Andy Carnell.

Swiftool has one of the most safety critical environments, with verification of the absence of foreign debris and contaminated material being critical. It has its own clean room certified to Rolls Royce SABRe standard. Andy Carnell says that the cycle times for cleaning both at the end and during process have been improved significantly and "this has allowed us to reduce lead times and overall costs thus attracting more business from our customers."

Alan Atkinson of MecWash comments: "Swiftool works with companies that have the highest level of cleanliness requirements. We are talking the size of particles having to be no larger than 500 microns. It's vital there are no contaminants leaving the production process.

"Our systems provide the levels of cleanliness for such exacting results. They are designed to clean at much higher speeds with the same results that mean production processes can also increase without compromise. This saves time and increases productivity for our clients and

that's through our team working with each customer to ensure the final commissioned system is optimised for their needs."

Established in 1993, MecWash Systems Ltd specialises in the design and manufacture of a complete range of aqueous parts cleaning and degreasing systems for metal and plastic engineering components. Its capabilities include laboratory analysis of complex component cleaning issues and specifying or developing specialist detergents, plus the ability to design special processes and parts washers for particularly difficult cleaning challenges.

World class parts washing technology

MecWash parts washers are used in the aerospace, automotive, defence, general engineering and medical industries. It specialises in achieving high cleanliness standards for components with intricate geometries, difficult substrates or tenacious contaminants. Its parts washers support the full range of engineering processes, including machined castings, forgings, turned parts, pressings, extrusions and mouldings.

MecWash Systems Ltd

Tel: 01684 271600

Email: enquire@mecwash.co.uk

www.mecwash.co.uk

Henkel develops four new cleaning innovations

Henkel has developed no less than four new cleaning products designed to bring a host of advantages to those faced with cleaning industrial surfaces and components. New cleaners, defoamers and descalers are now available, all offering differentiation against competitor products and the ability to deliver competitive gain for users.

There are four fundamental parameters associated with cleaning: chemicals, mechanics, temperature and time. Ensuring the cleaning process is as efficient and cost effective as possible means looking for the optimum balance between the four.

To help identify the ideal chemical, there is again a four-step rule which can be applied to almost any cleaning challenge: identify the contamination to be removed; identify the necessary characteristics of the cleaner required; specify the application type, such as manual, spray, dip or ultrasonic; select the cleaner's product group – alkaline, neutral or acidic.

Henkel has introduced a new mild alkaline parts cleaner aimed at the maintenance market. BONDERITE® C-MC 90014 offers strong degreasing properties without any of the harmful vapour issues associated with solvents. Featuring low VOC content of ± 6 percent, the product is non-flammable and safe to use on painted surfaces. Moreover, it provides fast evaporation without any visible residue and can be applied either manually or via a fountain table. BONDERITE C-MC 90014 can also provide temporary corrosion protection of the cleaned surface.

Another new innovation from Henkel is BONDERITE C-MC 21130, an environmentally compatible product for cleaning-off uncured paints and adhesives. It is ready-to-use, although it can be diluted up to 80 percent) and contains 50 percent less VOC than conventional solvent cleaners. Designed to dissolve both aqueous and solvent-containing paints, lacquers, varnishes, latex, rubber, resins and electrophoretic deposits (EPD), it will even remove adhesives such as cyanoacrylates, silicones, two-component PU silicones and other bi-component polyurethanes (provided they have not completely dried). BONDERITE C-MC 21130 is non-flammable and odourless up to 40°C. In addition, it can be recycled up to a certain percentage using a simple distillation process. The product is remarkably easy to use: simply apply with a



brush or spray gun and wipe the paint away with a cloth.

For those seeking new descaler innovations, Henkel can now offer BONDERITE C-IC 90001 acid foam descaler, which provides a highly effective replacement for hydrochloric acid (HCl). This product not only removes scale, but also salts, light grease and carbon steel contamination from stainless steel. Furthermore, it passivates stainless steel, emits no hazardous fumes and, as a stable foam, allows long contact time and application even on vertical surfaces.

Last but by no means least is Henkel's BONDERITE C-AD RT 1020S, a low temperature cleaner for surface preparation prior to painting. This product is designed to offer a significant cost reduction for users as the pre-treatment tank only requires heating to 30°C, as opposed to 55°C using conventional cleaners. Due to the lower temperature, worker safety is also improved.

Successful application examples involving early adopters of these new cleaning technologies are beginning to emerge across Europe. For example, a large paper mill is now using BONDERITE C-MC 21130 cleaner to remove latex contamination from its equipment. Once cured, latex is a hard and difficult substance to remove, but the

use of BONDERITE C-MC 21130 has proved successful in replacing traditional high VOC solvents such as toluene and acetone. In fact, the same paper mill is also taking advantage of BONDERITE C-IC 90001 foam to remove scale deposits from any equipment that comes into contact with water, replacing HCl in the process.

Elsewhere, a major lighting manufacturer has adopted a low temperature cleaning solution from Henkel on its pre-treatment line for aluminium and steel without losing cleaning efficiency or requiring any mechanical changes to existing equipment. Here, the use of an alkaline, two-part low temperature cleaning system based on BONDERITE C-AK 6444 and BONDERITE C-AD RT 1020S is providing powerful degreasing at 25-30°C. Previously, the company had to heat its tank to 60°C, a requirement that commanded 23 percent of the company's total annual gas consumption.

As a result of the switch, the plant now enjoys 30 percent lower gas consumption, which currently equates to a saving of €21,000 a year. Furthermore, there is no foam formation or discoloured surfaces.

Henkel Ltd
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Choosing a heat transfer fluid

Weighing up heat transfer fluid properties and cost

Most vehicles have a normal operating engine temperature between 90 and 100 Celsius. If it rises too far above this, the engine will overheat. Thankfully, a warning light will appear on the dashboard to warn the driver of this, but it's not as easy to tell if your heat transfer system is running incorrectly. Here, Dr Chris Wright, head of research and development (R&D) at thermal fluid specialist, Global Heat Transfer gives his view on the main considerations when choosing a heat transfer fluid.

Heat transfer fluid systems allow manufacturers to indirectly heat products in several industry sectors, including pharmaceuticals, food and chemical processing. The thermal fluid moving through the system transfers heat to base, intermediate and final products during manufacturing or processing. It is important that manufacturers choose the right thermal fluid for their system and application to get the best results.

Manufacturers can select a heat transfer fluid based on its properties, such as thermal stability and heat transfer efficiency, but must also take into account the requirements of the system and the cost.

Fluid choice

One factor on which to select a heat transfer fluid is its chemical composition, which can be an organic or a synthetic compound. Chemical based heat transfer fluids can be based on several chemicals, including silicone, terphenyl and alkylated aromatic compounds.

A heat transfer system based on one of these chemicals has several benefits over a traditional steam and water approach. This is because they do not require high pressures, are less reactive and less corrosive.

Properties

Because of their chemical compositions, heat transfer fluids have differing properties. Manufacturers should be aware that the chemical composition of the fluid has an impact on how suitable a fluid is for a specific application. Though all thermal fluids will degrade over time, matching the



fluid choice to the system and the operating temperature can help to preserve fluid life.

Synthetic heat transfer fluids, such as a silicone, have a lower propensity to form carbon than mineral based oils, offering better heat transfer efficiency and thermal stability up to 425 degrees Celsius. They are also more resistant to fouling, which means they tend to form less coke on the internal pipework and heater.

For example, a eutectic based fluid containing biphenyl and diphenyl oxide, such as Globaltherm Omnitech, is generally considered to have better stability at high temperatures compared with a mineral based fluid. A manufacturer looking to operate a system at a high temperature should consider thermal stability to ensure fluid breakdown isn't accelerated at high temperatures.

Fluid viscosity can also influence a manufacturer's choice, as it impacts how easy it is to pump around the system and therefore how much energy is used. Synthetic fluids tend to have a lower viscosity than mineral-based fluids, so a manufacturer looking to reduce energy costs may prefer this option.

Consider the application

In certain industries, including food and beverage, fluid choice may be dictated by legislation surrounding which oils are suitable for a manufacturer's process. In this case, the manufacturer should opt for a food grade oil because it is certified non-toxic, as opposed to another fluid type.

Ultimately, a manufacturer must weigh up heat transfer performance with the cost of filling the system. Filling a new system, or re-filling an existing system, can be an expensive task. However, poor fluid choice can lead to inefficient system operation and accelerated thermal fluid breakdown, which can increase maintenance requirements.

Understanding the operating temperature of a thermal fluid is a little more complex than just a warning light on your dashboard. However, by carefully considering the requirements of the system and the application, manufacturers can make an informed heat transfer fluid choice.

Global Heat Transfer is a thermal fluid specialist, providing heat transfer engineering assistance and thermal fluid supplies. Services offered include sampling and analysis, 24-hour delivery of premium quality thermal fluids, system drain down / cleaning / waste management, planned maintenance programs and a broad portfolio of affiliated system design and installation services. It is part of the Global Group of companies.

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Double Success for Keighley Laboratories

Having one accreditation assessment is a stressful time for any business but Keighley Laboratories Ltd is proud to have successfully completed two assessments just two weeks apart.

The Heat Treatment division of Keighley Labs first underwent an intensive, week long assessment from BSI, successfully transitioning to AS9100 Rev D / ISO 9001:2015. This revised standard focusses on quality and continuous improvement being at the heart of the business.

Managing director Debbie Mellor explains: "The assessment results from BSI provide reassurance that the company is robust and focused on continual improvement. The assurance marks demonstrate to our customers that we are committed to best practice and delivering value to them."

Just days after the successful completion of the BSI audit, the assessors from Nadcap's Performance Review Institute arrived in Keighley to conduct a demanding four-day audit for the heat treatment nitriding process.

Joe Pinto, executive vice president and chief operating officer at the PRI says: "Congratulations to Keighley Laboratories on successfully passing what may be aerospace industry's most stringent process capability assessment audit. Nadcap audit criteria are widely acknowledged to be hard to meet and companies who succeed at doing so rightfully deserve recognition."

Debbie Mellor continues: "It was a challenging time moving from BSI transition to the Nadcap audit in such a short timescale. The quality and production teams showed great dedication, commitment and perseverance to enable successful outcomes for both assessments."

Cost reduction and economy of scale

One client was considering the potential cost savings of manufacturing parts overseas. The company approached Keighley Labs to see if by working together it could keep both manufacturing and heat treatment in the UK.

Due mainly to energy and labour costs, overseas heat treatment costs were 40 percent lower than the UK for this range of transmission components. The client was manufacturing small bi-daily batches which were subsequently heat treated bi-daily.



Debbie Mellor, managing director of Keighley Laboratories Ltd with members of the Quality and Heat Treatment production teams

On analysing the throughput, logistics, quality control and setup costs, it was clear that the small batch approach was not profitable for either business.

With close co-operation and optimisation of material type and batch size production to suit furnace capacity, Keighley Labs was able to offer heat treatment cost savings to the client of 35 percent on a range of products. The batch sizes were increased between two and three times. This saved the customer setup time, and quality control, and reduced transport requirements, logistics and furnace capacity. This made the end result profitable and kept business within the UK.

Keighley Labs at Advanced Engineering

Keighley Laboratories Ltd will be exhibiting at the Advanced Engineering Show at NEC, Birmingham on 31st October and 1st November 2018.

The company's nationally and internationally recognised quality assurance certification and approvals are essential in providing you and your customers with the confidence and knowledge that your



metallurgical components are fit for purpose.

Come and discover how its independent BSI and Nadcap accredited Heat Treatment facilities, together with its UKAS 17025 and Nadcap accredited Testing Services, can make Keighley Laboratories your trusted metallurgical partner. As a convenient one-stop solution provider, the company offers a vast range of metallurgical services and heat treatments on one site.

Keighley Laboratories Ltd

Tel: 01535 664211

Email: info@keighleylabs.co.uk

www.keighleylabs.co.uk

Advanced heat treatment

With the ability to process air, hydrogen, reducing atmosphere, high vacuum and vacuum with a partial pressure of nitrogen, argon or hydrogen, Kepston is in an advanced position to offer a range of heat treatment services to the UK manufacturing industry.

With 16 furnaces available on site, including both batch and continuous, Kepston has the capability of handling components in a range of shapes, sizes and materials.

Heat Treatment has long been recognised as one of the essential weapons in the metallurgist's armoury and is capable of radically changing the structure of metal.

Heat treatment is used either to prepare a material for further processing, for example machining, forging, pressing and spinning or to add a property such as surface hardness to improve a product's performance in service.

Kepston's quality accredited subcontract heat treatment service is a major benefit to any manufacturer looking for a specific thermal process but lacking the specialist equipment themselves.

Heat Treatment is commonly used by the following market sectors: aerospace, defence, heat exchangers, marine, medical, motorsport (including F1); power generation/nuclear; scientific.

First registered in 1916, Kepston is a privately-owned company with two sites in the West Midlands.

The Aldridge site offers subcontract precision CNC jig and universal grinding to tolerances of 0.001 mm under a temperature-controlled environment, in addition to wire eroding capable of a zero re-cast or "white" layer.



The Wednesbury site offers subcontract furnace brazing and bright annealing using vacuum and continuous furnaces, materials including stainless, steel and copper alloys. Magnetic annealing of soft magnetic alloys is carried out under a hydrogen atmosphere.

Both sites are approved to AS9100 Rev C & ISO 9001:2008

In recent years, substantial investment has been made at both sites including a new extension, a CNC Hauser, a Kellenberger and an additional wire eroding plant at the Aldridge site, while a new larger hydrogen atmosphere humpback furnace and a vacuum furnace have been acquired at the Wednesbury site.

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Bodycote enters into 15-year contract with Rolls-Royce

Bodycote, the world's largest provider of heat treatment and specialist thermal processing services, has announced that it has signed a 15-year contract with Rolls-Royce's Civil Aerospace business. The contract is expected to be worth over £160 million in incremental revenues over the 15-year period. Sales will ramp up over the next five years.

Bodycote will provide thermal processing services, which include specialised vacuum heat treatment and hot isostatic pressing (HIP), supporting Rolls-Royce's turbine blade casting facilities in Derby and Rotherham.

The agreement ensures the provision of specialist thermal processing capacity utilising Bodycote's high performance, quality-focused approach to support the growth of Rolls-Royce's large civil engine programmes. These include the Trent XWB, Trent 1000, Trent 7000, Trent 700 and Trent 900.

Bodycote's core business is to provide services that protect and improve the properties of metals and alloys, extending their operational life and making them safer. The company plays a vital role in the aerospace supply chain.

With more than 180 accredited facilities in 23 countries, Bodycote is the world's largest provider of heat treating and specialist thermal processing services. Through classical heat treatment and specialist technologies including Hot Isostatic Pressing (HIP), Bodycote improves the properties of metals and alloys, extending the life of vital components for a wide range of industries, including aerospace, defence, automotive, power generation, oil & gas,



construction, medical and transportation. Customers in all these industries have entrusted their products to Bodycote's care for more than 30 years. For more information, contact:

Bodycote plc Tel: 01625 505300
Email: infotp@bodycote.com www.bodycote.com

Successful premiere of SurfaceTechnology GERMANY

By 2 p.m. on Wednesday, SurfaceTechnology GERMANY was only half over, but most exhibitors already voiced a great deal of satisfaction, with many of them expressing downright enthusiasm over the large number of successful customer interactions. In the end, slightly more than 6,000 trade visitors attended SurfaceTechnology GERMANY over the three days of the event.

The international trade fair for surface technology had been eagerly awaited. With a new name and all in green, the former O&S had set out to become even more international and the plan succeeded, with 25 percent of the approx. 300 exhibitors as well as the 6,000+ trade visitors coming from abroad.

"This was a successful premiere," reports Olaf Daebler, global director of SurfaceTechnology at Deutsche Messe. "The fact that we were able to launch the event with a record amount of display space was an ideal prerequisite. The great response from our visitors has now made things complete".

"SurfaceTechnology GERMANY not only maintained the strong performance of its O&S predecessor but also enhanced it in terms of internationality, user industries and market significance."

With a record 8,286 sq m² of occupied display space, SurfaceTechnology GERMANY was already reflecting the good mood in the coating technology industry even before the gates opened.



High-calibre business leads and excellent talks

An important area of SurfaceTechnology GERMANY is traditionally the group pavilion of the Central Association of Surface Technology (ZVO). With its 77 companies, the pavilion once again provided an impressive presentation of electroplating technology.

"The exhibitors at our pavilion have predominantly rated the experience as 'good' to 'excellent'," says Christoph Matheis, CEO of ZVO. "The quality of contacts and discussions with numerous OEMs and TIER1 suppliers was high right from the start. On the second day of the fair, the anticipated flow of visitors also set in and almost all of our exhibitors' stands were highly frequented. The international

makeup of the visiting professionals turned out highly positive, with 50 percent coming from abroad, many from outside Europe."

Dr. Martin Riester, head of the Surface Technology Department at the German Engineering Federation (VDMA), also has positive things to say about the show: "Our industry is doing very well. This was clearly noticeable at the fair. We had lots of interesting technical discussions with customers who were looking for the right surface technology solutions. Here we were able to point out a number of suitable approaches. The event's location in Hall 1 and the new name 'SurfaceTechnology GERMANY' sent exactly the right signal to strengthen Stuttgart as a location for surface technology," he remarks.

VDMA member companies showcased resource-efficient surface treatment solutions for a wide variety of user industries at the Stuttgart-based event and SurfaceTechnology GERMANY was successful in drawing the corresponding broad-based user audience.

The percentage of trade professionals attending SurfaceTechnology GERMANY was again very high, at 98 percent. In addition, visitors were characterised by a high percentage of decision-makers, with 86 percent stating that they play a role in their companies' buying decisions. Significantly more than one in two were of managerial status, with top managers accounting for 31 percent. When asked what the aim of their visit to the fair was, most answered: the



search for new products, getting a market overview and finding the right suppliers. Almost a third of them were also looking for best-fit solutions for their companies. The share of visitors coming to the fair with firm investment plans was equally high, while an additional 47 percent were at least considering making new investments.

The SurfaceTechnology Forum was packed, especially on the Wednesday at the fair. This event served as a key hub for knowledge transfer and industry networking. In 42 lectures lasting 20 minutes each, top-notch speakers informed their specialist audience about the latest surface technology trends. For topics like REACH or new electroplating processes, the 100-seat forum was packed.

Another forum highlight consisted of the presentation of the Stuttgart innovations prize "Oberfläche 2018" by Fraunhofer IPA. The 2018 winner was plasotec GmbH, whose engineers developed a process for the contact-free polishing of metallic surfaces. The newly created Speakers Corner proved to be a clear improvement over the past: There, in direct proximity to the forum, listeners were able to engage in further dialogue with forum speakers.

The exhibitors participating in the "Surface Technology Process Chain" pavilion were also satisfied with their success. This special display presented a comprehensive cross-section of the industry, providing insights into the different areas involving surface-technical machining of parts.

"Our exhibits were the main drawing card in getting visitors out to our stand," says Herbert Kaesmann, organiser of the



WoTech pavilion. "The companies that appeared here intend to return next time around."

The range of categories covered at SurfaceTechnology GERMANY reflected the entire spectrum of surface technology, including electroplating, blasting technology, thermal spraying, industrial plasma and laser surface technology, coating materials, surface treatment, environmental protection, supply technology, services, pretreatment, cleaning, measuring, testing and analysis equipment.

Georg Harnau, head of marketing, Walther Trowal GmbH & Co. KG says: "For us, the fair was a big success in two respects. On the one hand, we spoke with many new interested parties. On the other, we presented two different product categories for the first time at a trade fair: Vibratory finishing technology and small parts coating. And the interest was equally high in both categories. The percentage of

potential new customers ran at around 60 percent. Many of the interested parties came from the surrounding region, but we also had quite a few international ones. For some of our sales colleagues, it's definitely worth learning Italian."

Björn Laskowski, sales director, Auer Strahltechnik says: "For us, the show went better than expected. We feel much more at home exhibiting under the new name, SurfaceTechnology GERMANY. Here we were able to meet up with leads and existing customers from the automotive and plant engineering sectors who are strongly represented here in Southern Germany."

Benjamin Diener, general manager, SurTec Deutschland GmbH comments: "This was an excellent fair for us, with numerous talks with customers. We were represented here by a staff of 11 people and everybody was busy all the time. Our industry is not all that big, so this fair is always a bit like a class reunion. However, the added value also adds up. Here we are able to hold highly promising talks with our customers and really get down to detail on projects we are pursuing."

Matthias Böhlend, product marketing Microscopy, Keyence Deutschland GmbH says: "The last O&S was good and we were also very satisfied with HANNOVER MESSE, so our expectations for SurfaceTechnology GERMANY were correspondingly high. But our expectations have been met. We were able to conduct discussions with our customers here with a high number of hits. Quality and quantity were very good. We noticed that interest in research and development and quality analysis of surfaces was very high."

The next SurfaceTechnology GERMANY will be staged in Stuttgart from 16th to 18th June 2020.



Riley Surface World announces successful partnership with leading European industrial ovens manufacturer

Riley Surface World is now in the third year of a successful partnership with Romer, a leading European manufacturer of curing ovens for powder coating, surface treatment and general industrial applications. Romer has been established for more than 20 years. From its production facilities in Poland, the company exports its products to over 26 countries.

Riley Surface World is one of the world's leading resellers of new and used surface finishing plant and machinery. The company has been trading since 1966 and operates from 5,000 sq me premises in Aldridge, West Midlands, UK.

Riley selected Romer ovens to become part of its new equipment portfolio after visiting the factory and doing an extensive audit of the products' specifications, performance and manufacturing standards.

The Romer product range includes modular sizes with maximum operating temperatures up to 300°C, electric, gas or oil-powered options, forced air or natural convection, stainless steel internal cladding and HMI touch screens with ThPID controls that allow the operator to record and download extensive data about process and production cycles.

Since their introduction into the UK in 2015, Romer ovens from Riley Surface World have been specified by many global

companies in the aerospace, energy and general engineering sectors.

This includes names such as GE Renewable Energy, that is using a Romer oven as part of the curing process for wind turbines at their manufacturing facility in the North East of England. Other recent examples include international aerospace companies AEM Ametek, Avia Technique and Teledyne CML as well as construction materials giant Saint Gobain and Irish engineering group Clarke Rewinds.

Commenting on the partnership with Romer, managing director Michael Riley says: "Romer has been an excellent addition to our new product offering. The build quality of the ovens is first class. They incorporate smart technology and are competitively priced. Our partnership agreement ensures we always have ovens in stock for immediate delivery when the requirement is urgent. Customers are welcome to view the products in our well-equipped showroom anytime by appointment."

Riley Surface World awarded ISO 9001:2015 certification

Riley Surface World is one of the world's leading resellers of new and used surface finishing plant and machinery. The company has been trading since 1966 and operates from 5,000 square metre premises in Aldridge, West Midlands.

In recent years, Riley has invested heavily in technology and people in order to become a global force in the surface finishing industry. The next logical step was to achieve ISO 9001:2015 certification to move the company to a different level.

The certification assessment programme was overseen by Riley site director Dave Smith, who has a strong background in the implementation and monitoring of ISO standards.

According to managing director Michael Riley: "The decision to apply for certification was taken to provide a clear structure for our



team and enhanced confidence for our customers.

"As dealers in used machinery, we were conscious that there is sometimes a negative perception of what we do. ISO certification helps to dispel that perception and lends more integrity to our products and services.

"It is also vitally important that our people adhere to the quality standards that ISO demands. This extends to all aspects of our business, including controlling costs, reducing risk, managing quality and improving profitability.

"In today's globalised industry, we constantly have to account for the regulatory requirements of different countries and markets. Due to the international nature of ISO, these requirements are now built into all stages of our processes and ensure that we always deliver what our customers expect from us.

"Finally, ISO certification enables us to trade with many larger and more diverse companies and organisations where previously our credentials were not sufficient. Our new processes also make it possible to develop long-term relationships with many companies and become recognised as a valued and quality-driven partner."

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Shot blasting power also for large steel beams

The quality of surfaces is becoming more and more important. Users are paying more attention to economical concepts and the aspect of time when it comes to shot blasting.

Large steel beams are used more and more often. Depending on the condition of the beams, the shot blasting process is very complex. In order to solve this task, AGTOS is offering a powerful roller conveyor shot blast plant. This machine type will be exhibited at the upcoming EuroBLECH exhibition.

The passage width is 1,500 mm, enabling the shot blast plant to treat steel beams up to a width of 1,100 mm and a height of 420 mm. Rust and scale will be removed reliably. This machine type is also suitable for the treatment of metal sheets. The max. sheet width is 1,500 mm. In case smaller parts need to be processed, appropriate wire baskets are available. The machine shown at the exhibition is part of a product series which is offered in different sizes.

The workpieces will be supplied to the machine via a roller conveyor. They pass a switching threshold installed in front of the inlet sluice. This threshold releases the automatic supply of abrasive to the running high performance turbines. By means of this measure, it is made sure that the blasting only takes place when there are workpieces in the blasting area. This limits the wear and tear of the machine and saves energy and abrasive media.

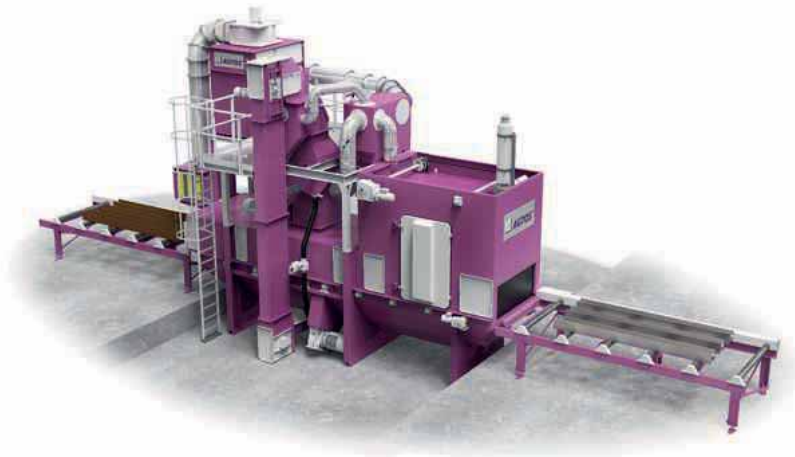
The inlet sluice is sealed with easily replaceable and wear-resistant rubber curtains in the upper part. They avoid the escape of abrasive and dust. The lower part is sealed by means of adjustable rubber lamellas which adapt to the contour of the respective workpieces.

While passing the blasting chamber itself, the workpieces are blasted evenly and accurately. Four AGTOS high performance turbines with up to 22 kW have been provided for this task. They are distinguished by their high performance and long-life times of the wear parts. In case of maintenance, they can be changed relatively quickly and easily.

After having passed the blasting area, the workpieces reach the combined brush and blower unit. Here, the abrasive cleaned from the surfaces of the workpieces is returned to the abrasive circuit. In order to do this, the abrasive is collected in the hopper below the machine, forwarded by means of a screw conveyor and transported to the upper part of the machine by means of a bucket elevator.

There, bigger particles are filtered out and small grain and dust are removed from the abrasive. The purified abrasive is led from the abrasive silo back to the high-performance turbines by means of the abrasive control unit.

The dust separation of the shot blast plant is realised by means of a cartridge filter. The filter has a fan which creates a negative pressure. A deflecting separator and filter cartridges with an appropriate medium clean the aspirated air. It is clean when it returns to the factory hall. An additional filter provides double security.

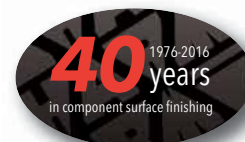


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Rapid expansion at anodising centre specialising in automotive applications

BCW Treatments Ltd on Innovation Drive in Burnley is an aluminium anodising facility opened in early 2015 to provide a full service to companies using the subcontract machining services of BCW Manufacturing Group's machine shops on the same industrial estate.

Anodising is carried out in a Galvatek automated finishing line supplied by Turbex, which was deemed to be the best all-round package of three alternatives considered. Currently, an average of 2,600 square metres of product per week are finished across more than 240-part lines.

One of BCW's automotive contracts involves the production of aluminium components, mainly from A365 castings, 6060 extrusion, superplastic 5083 and 5754 sheet, for a premium automotive customer in the UK specialising in manufacturing luxury sports cars and grand tourers.

More recently, the subcontractor has received further business from another prestigious UK automotive customer that produces high performance 4 x 4's and special operations vehicles. The work will start at the end of 2018 and entail the installation in an adjacent factory of a line for passivating components as a corrosion resistant pretreatment.

Enquiries have also been received for finishing lightweight components for aircraft, such as cabin seating and for electric cars, hybrids, amphibious vehicles and lorries. Consequently, by the end of the decade, the firm is destined to become a major force in component finishing in the North of England.

Dr Andrew Wilson, managing director of BCW Treatments explains: "Although more than a century old, modern anodising is an exacting discipline requiring extremely close control to achieve the highest quality and even more importantly the correct film properties.

"Some manufacturers' car parts are adhesively joined rather than welded and a nominal thickness of the anodic layer of between two and 10 microns is required, above which there is a risk of components pulling apart under stress. A tolerance band of four to six microns is achieved in the Turbex line, so precise is the process."



The Turbex automated anodising line at BCW Treatments, Burnley



Two overhead transporters dip flight bars carrying aluminium components into 15 tanks sequentially. Up to five jobs can be processed simultaneously in the line

An enterprise resource planning (ERP) system drives the finishing process in Burnley, raising each manufacturing order and triggering the issue of material. The line's control system learns which aluminium products are mounted on which universal or part-specific jig by scanning the manufacturing order. Once it knows the part number, the correct program is automatically selected.

There are four load/unload stations at one end of the line, where components are loaded onto flight bars that progress to a



A flight bar being lowered by one of the transporters into a tank

buffer station from where they are picked up by one of two overhead transporters and dipped into 15 tanks sequentially. Up to five jobs can be processed simultaneously in the line.

Automatic dosing stations are provided for metered dosing of chemicals into several of the tanks, the quantity being worked out automatically according to the amount of surface area to be anodised on each flight bar. The working environment is clean and fume-free, as each tank is hermetically-sealed and the lid is not opened until a transporter is directly above it. Positive pressure pulls the fumes through the

handling system and extracts them to a scrubbing unit.

After processing, flight bars are returned to four load/unload stations adjacent to the loading area and the test pieces are taken away for analysis, which includes pull and shear tests after adhesive has been applied. Following each successful test, the ERP system is advised that the components are ready to deliver to the customer.

The anodising sequence

As a conveyor is not involved in transporting flight bars around the system, the anodising process starts in the centre of the line and progresses initially away from the load/unload stations. Alkaline degrease takes up to one hour in the first tank for the most soiled castings and the solution is rinsed off in town water in the next two tanks, the water being recycled between the second and third stage.

Tank 4 is a chemical etch using sodium hydroxide to remove pre-existing aluminium oxide from the surface of components. Immersion time is controlled to avoid unduly

changing of the geometry of the components. It also precludes the need to plug holes, resulting in a cost saving and eliminating the risk of parts being returned by the customer if plugs are inadvertently left in at the time of delivery.

An eco-rinse cycle in town water is performed in the next three tanks, again with recycling between the stages. The following process, which takes place at the far end of the line in tank 8, is the removal in a mix of nitric acid and hydrofluoric acid of alloying elements on the surface of components, especially of castings, that remain after chemical etching. Two further eco-rinse immersions in tanks 9 and 10 brings the pre-treatment to a close, by which time the components have travelled back past the centre tank towards the load/unload stations.

The actual anodising stage of the process is in tank 11, which contains sulphuric acid, and lasts between eight and 10 minutes, during which time a nominal four to six microns film thickness is deposited. An ecological feature of the equipment is

continuous dosing of the acid, instead of recycling the fluid when the aluminium content reaches say 20 grams per litre. Avoidance of waste is made possible by employing a pump to recirculate the fluid through a retardation unit, where the aluminium is filtered out.

A clean rinse in three successive tanks containing deionised water, which is produced locally within the line, ends with an ultra-clean rinse to ensure that conductivity is less than 200 microsiemens.

The last stage, prior to the flight bar being taken back to the unload station, is hydrothermal sealing at 96°C in a proprietary chemical blend. Reserved for high-end applications and involving 30-micron particulate filtration, the process seals microscopically small pores created on the surface of components as a result of dielectric breakdown during anodising.

Turbex Ltd

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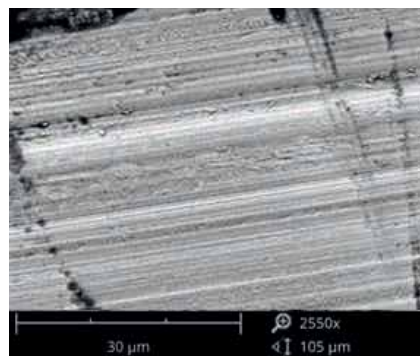
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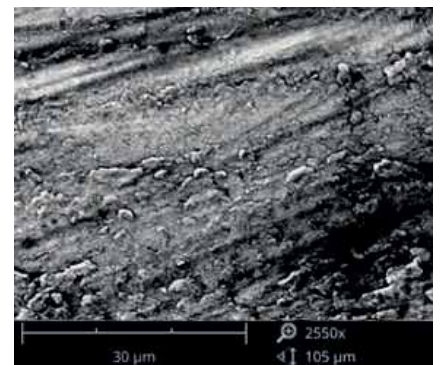
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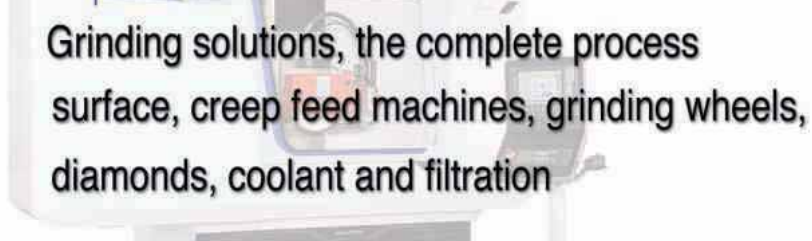
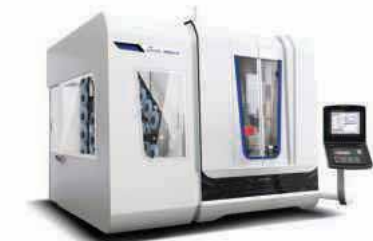
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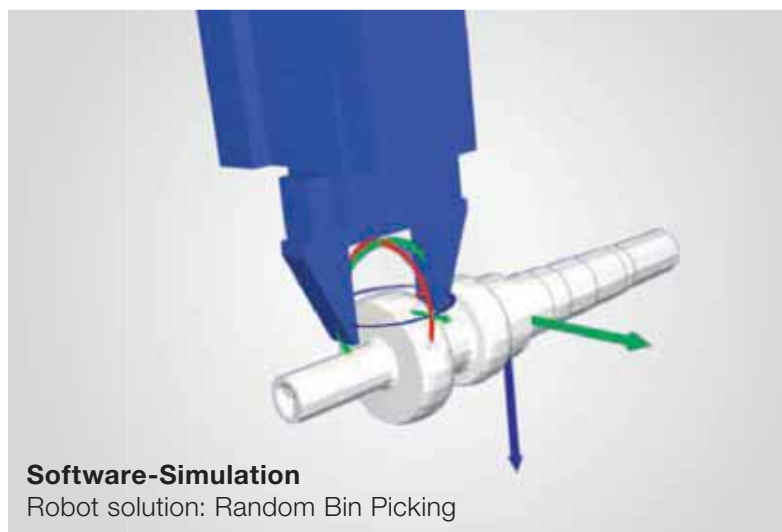
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