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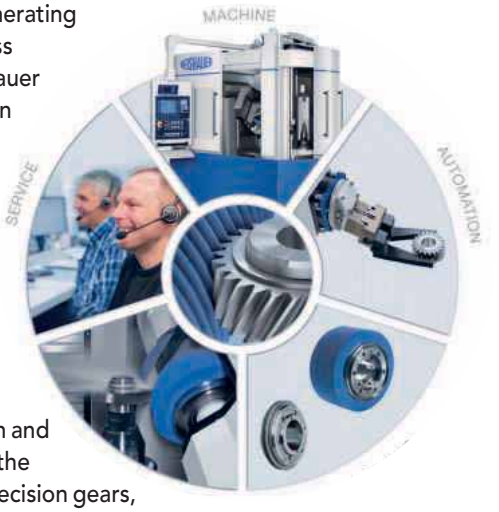
- EMO Preview
- Aerospace Report
- Deburring
- Surface Measurement
- Tool & Profile Grinding

Reishauer – Swiss precision gear grinding technology

Only high-accuracy gears guarantee the proper functioning and reliability of transmissions in cars, aircraft, and industrial machinery. Modern gearboxes need to deliver reliable transfer of torque at high power density, to feature low weight design and to function at low noise emission. From an economic point of view, expenditure must be low for costs per piece and for life-cycle costs. At the same time, uncompromisingly high part quality and process stability must be maintained to a geometrical quality of equal to two (2) µm (2/1,000 mm).



Continuous Generating Grinding, a process invented by Reishauer in 1945, has proven itself as the most productive process for the hard finishing of high-accuracy gears. Reishauer machines ensure that the industry's requirements are fully complied with and take a vital role in the manufacture of precision gears, offering the automotive and the transmission industry worldwide new impetus and a high degree of freedom of design as to how generating grinding substantially contributes to lower noise emissions of electric drives and how to decrease fuel consumption in combustion engines.

In principle, the kinematics of this process can be understood as a worm drive based on a diamond dressable grinding worm, with the grinding worm adding the abrasive machining components needed to generate the precise involute gear form.

The cornerstone of Reishauer is its Circle of Competence. The grinding machine, both in qualitative and quantitative performance levels, is at the centre of the continuous generating technology invented by Reishauer for the large volume production of high precision gears. To ensure a steady and high production output of its machines at constant quality and offering lower cost per piece, the company has continuously extended its technical competency and support structure in the areas of automation, tooling, application engineering, and service. For these reasons, today Reishauer is a single source supplier, thus guaranteeing its customers a long service life of the machine system and lower life-cycle costs.

In spite of its international scope of activities, Reishauer relies on manufacturing its products in Switzerland, a country well-known for its tradition of high precision. All the core components are made in-house in a factory near Zurich.

Mobility will continue to increase and the Reishauer Group will adapt to the industry's future needs. Whatever the mix of drive systems will be, technological demands on gears will increase and Reishauer is well positioned to meet these challenges and to drive new technologies.

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UNITED for grinding success

With a turnover of more than 700 million euros, the UNITED GRINDING Group is one of the world's leading manufacturers of precision machines for grinding, eroding, lasering and combination machining. With eight company brands, all leaders in their particular field, UNITED GRINDING offers broad application knowledge, an extensive product portfolio and a complete array of services for surface and profile grinding, cylindrical grinding and tool machining.

At the recent Grinding Symposium 2019 at the Thun Exhibition Centre, the Group showcased an impressive display of machines with a comprehensive series of individual presentations in German, English, French and Italian.

The new compact MFP 30 from Maegerle is a 5-axis grinding centre ideal for the grinding of complex geometries, particularly those of blades, vanes or heat shields for aircraft turbines. The workpieces to be machined can be loaded into the work area very ergonomically, either manually or automatically. The compact and space-saving design allows optimal use of the available production area and enables an effective production flow. For highly flexible workpiece machining, the integrated tool changer can be loaded with different grinding wheels, tools for milling and drilling operations and a measuring

probe for quality or workpiece position checks. The powerful spindle enables the combining of different grinding processes, such as creep freed grinding with corundum or grinding with CBN. Full performance and a high torque are available even at low speeds, while the grinding process is optimised with a grinding wheel cleaning function.

The second generation of the JUNG-J series is even more focused on precision and surface quality. Launched at EMO in 2013, the machine has been further developed to meet customer requirements. These include a Windows 10 Toolmaking Operator Interface enabling 25 percent faster programming, more stability against thermal factors, contact detection with acoustic emission, integrated measuring probe and JUNG measuring cycles. The latter comprise simple determination of the workpiece position in the work area through to individual workpiece measurement. Profile dressing above the grinding head enables up to six single threads on one tool. The precise mechanical design of the machine guarantees consistently first-class grinding results. It demonstrates its precision and flexibility in daily use, particularly when faced with demanding applications in the mould and die industry.

WALTER's "two-in-one concept" enables eroding and/or grinding on one machine. Tool manufacturers have been benefiting from this technology for 17 years, but WALTER has been continuously developing the "two-in -one" concept and today offers

three machines using this concept. 2016 saw the introduction of "fine pulse technology" for all two-in-one" machines, setting new standards in terms of surface quality, cutting edge roughness and process reliability of PCD tools. In particular, the generator was recognised as the central element with potential and has therefore been completely redesigned. Improvements in eroding software and a variety of other factors based on the machine's design have also been optimised as part of "fine pulse technology".

The difference is clear: a tool produced on a two-in-one machine from WALTER shines on its free surface similar to a polished ground tool. Even coarse-grained PCD types can now be eroded with "fine pulse technology."

UNITED GRINDING and Industry 4.0

Industry 4.0 is now a reality, but what lies behind it? UNITED GRINDING gets to the bottom of this topic and shows just what this vision entails and how UNITED GRINDING approaches Industry 4.0.

Everyone is talking about Industry 4.0. This means the fourth industrial revolution. After mechanisation, electrification and automation we now have digitalisation. Machines and their components are digitally networked with one another and with their environment. The aim of this networking is to simplify and optimise processes and thus to maximise the value creation chain. In the digital factory, also called the Smart Factory, there will be no more unplanned machine downtimes and resources will be optimally used.

Network, collect, analyse

Half of the population are online today. They communicate via the World Wide Web. However, more and more devices and systems are being networked together. The possibilities made available by the digitalisation and networking of machines are immense. Experts from different areas believe that new markets will open up, with an annual turnover of 100 billion euros. It is clear that "Big Data", i.e. the huge quantity of data that is collected, is worth a great deal if it is systematically analysed and incorporated into processes. This task presents a huge challenge for both industry and society, so how does UNITED GRINDING handle it? By focusing on the subject with customers.

"A Smart Factory isn't simply created overnight. It is necessary to focus on certain areas," explains Christian Josi, project manager at Fritz Studer AG. For UNITED GRINDING the basic principle applies, that all further developments should lead to a customer benefit. "We work closely together with our customers," Josi explains. But what is UNITED GRINDING specifically working on?

Simple and secure networking

The basis of Industry 4.0 is the networking of machine, logistics, product and customers' business systems (ERP, SAP). Everyone must speak the same language here. This is achieved through the simple and secure software interface used worldwide, OPC UA (Open Platform Communication Unified Architecture). STUDER, for example, has integrated the OPC UA standard into its "StuderWIN" machine software. The machine can assume two roles here: OPC UA Client and Server. This enables STUDER machines to be integrated simply and securely into the environment of the digital factory.

Elimination of unplanned machine downtimes

Another focus is on unplanned machine downtimes. The UNITED GRINDING Group tackles this topic methodically, as a Group. With UNITED GRINDING Digital Solutions, the customer will receive a tool which helps optimise its production. In other words, the machine will only be stationary if this is planned and calculated.

The UNITED GRINDING Group adopts the "predictive maintenance" approach here. In order to make this possible in future, the data of the individual assemblies and components are recorded and analysed. Different measured variables are needed here, to form a clear picture of the individual assemblies and components. This requires continuous learning and is an ongoing process. "Once there is a clear vision, suitable strategies and measures can be precisely planned and the right tools developed," says Christian Josi.

Another product within UNITED GRINDING Digital Solutions is Remote Service. This means that if an assembly or component fails, despite predictive maintenance, the problem can be reported to the responsible Customer Care Organization at the press of a button and the customer can be offered optimal support.

With the use of new technologies and digitalisation, we must never lose sight of the benefit for the customer. UNITED GRINDING consciously focuses on the individual customer and his requirements. The new technologies and digitalised products must ultimately have a positive effect on the value creation chain. But what is the role of people in the digital factory? "Doubtless the requirements will change and different competencies will become important. However, people will remain an essential part of the system in future," Christian Josi is convinced. Because the fourth industrial revolution should ultimately serve people, not vice versa.

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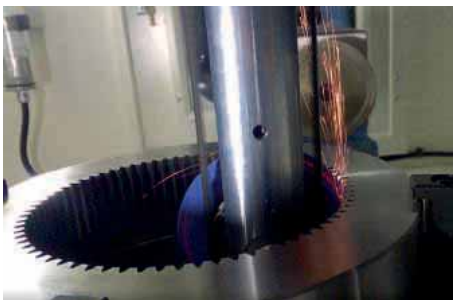
NUM helps automate production of involute and cycloidal gears for robots

NUM is helping Taiwanese machine tool company Chien Wei Precise Technology to develop innovative CNC grinding machines for manufacturing specialist gears used in robotics applications.

Based entirely on NUM's latest generation Flexium+ 68 CNC platform, Chien Wei's new machines are designed to speed the production of both involute and cycloidal profile precision gears. They are believed to be the first gear grinding machines on the market that are capable of handling both types of gear profile. There are two versions of the grinding machine, one for internal gears, the other for external gears.

Founded in 1981, Chien Wei Precise Technology Co Ltd is based in Fengshan District in southern Kaohsiung, Taiwan. The company initially specialised in precision machine tools such as vertical grinders, jig grinders and machining centres, together with coordinate measuring machines (CMMs). Over time, it also diversified into robotic automation systems.

Robotic systems typically use either planetary gearboxes equipped with involute gears, or cycloid drives based on a combination of a reduced epitrochoid rotor and a cycloid stator. While planetary gearboxes have been around for a long time and enjoy extensive use, cycloid drives have far fewer moving parts and offer a more efficient means of achieving extremely high reduction rates. A speed reducer with a ratio of 200:1 would typically need a chain of three planetary gear boxes with twelve



moving involute gears. The same reduction ratio could be achieved with a cycloid drive using one stator and one rotor. However, cycloid gears are notoriously difficult and expensive to manufacture.

In 2015, Chien Wei decided to bring gear manufacturing in-house, by developing its own gear grinding machine. By producing its own gearboxes, the company could control quality, shorten lead times and reduce costs. It would also enable it to sell gearboxes to machine builders and possibly the machines themselves to gear manufacturers.

Chien Wei initially based its gear grinding machine on a FANUC series 0i-MF CNC system, which it uses for other machine tools, together with Mastercam CADCAM software and its own CMM. But it soon became apparent that the profile complexity of cycloidal gears meant that CMM data was inadequate for controlling the manufacturing process. Another major disadvantage was that customers wishing to purchase the machines would also need to invest in an expensive CADCAM system and extra personnel.

According to Chien Wei's president Lee Cong-lin: "We quickly decided that what we needed was a CNC system that fully supported gear grinding from the outset, so that our customers could simply input the parameters of the gear they wanted, with the CNC then controlling all aspects of the machine's dressing and grinding processes in real-time. NUM was an obvious choice, because of its proven expertise in CNC gear grinding applications. The company was also willing to collaborate in the joint development of the CNC system, which includes an application-specific HMI (human-machine interface) and various dedicated control functions."

The new generation of Chien Wei's gear grinders together with NUM's new profile grinding technology now provides the ability and flexibility to manufacture both cycloid and involute gears on the same machine.

Chien Wei's internal gear grinder is a 9-axis machine. The workpiece table is mounted on a linear axis that moves axially towards the grinding wheel, which is belt-driven (due to space constraints inside the gear) and mounted on a vertical axis driven by a linear motor. As the grinding wheel spins, it is driven up and down by the linear axis, while the work piece table moves in continuously. Both flanks of the gear are ground simultaneously. The machine also handles gear dressing. During the dressing cycle, the entire tool head is moved horizontally to the right, and a symmetrical dressing disk moves along the outer shape of the grinding wheel in three sections, right/left flank and tip. Cycloids as well as involute shapes can be dressed.

The external gear grinder is an 8-axis machine. Broadly similar to the internal gear grinder in operational terms, it features a direct drive grinding wheel. Again, like the internal gear grinder, it also handles dressing. However, in this case the shape of the tooth gap can be reduced epitrochoids or involutes.

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Generating gear grinding

Transmission developments now aim at increasing power density, reducing gear noise and improving energy efficiency levels. The increase in power density translates into a boost of the power transfer while maintaining or even decreasing the available installation space. This economy of space makes weight reduction possible. Improving the energy efficiency of a vehicle reduces the power loss in transmissions and converts directly to a reduction in CO_2 emissions.

In the real world, gear teeth are rarely subjected to equal loads on both the drive and the coast flanks. If one of the tooth flanks is subjected to higher force in the direction of the applied torque, the tooth meshing can be optimised using an asymmetrical tooth flank geometry. Typical examples of a preferred direction of applied torque are tractors (the maximum torque load works in one direction only), wind turbine gearboxes (the wind load and breaking torque apply on the same gear flanks) and crane transmissions (the weight load always applies in the same direction).

Asymmetrical gears for the applications mentioned above can easily be manufactured through discontinuous profile grinding. This method, however, is very slow and, economically speaking, only makes sense for low-volume production of high-value components such as wind-turbine gears. Automotive gears can now also benefit from an asymmetric design. As they are subject to enormous economic constraints, they must be manufactured both in high volume and at low cost.

Reishauer's continuous generating grinding process represents the industry standard for the manufacture of symmetrical automotive gears at high volume, high quality and low unit cost. Based on a dressable grinding worm and a twin spindle concept, this process has proved itself in terms of flexibility and productivity. In principle the kinematics of this process are comparable to a worm drive, with additional abrasive machining movements consisting of an infeed X, a vertical feed-rate Z, and a lateral shifting motion Y. This principle applies equally to symmetrical and asymmetrical gears. The difference is the profile of the threaded wheel, which requires an asymmetrical profile (figure1).

Figure 1

Figure 2

Today, the continuous generating grinding principle also applies to the grinding of asymmetrical gear flanks, with the process now being as efficient and economical as the grinding of symmetrical gears. Furthermore, the company's continuous process allows a subsequent polish grinding stroke in the same clamping operation if a two-zone grinding and polishing threaded wheel is used. To achieve the same efficiency and economy as in symmetrical gear grinding, dedicated diamond dressing rolls with asymmetrical profiles needed to be developed to appropriately dress the vitrified threaded grinding wheels. The diamond rolls can dress the grinding and polishing section of the threaded wheel in the same dressing operation. In addition, the automatic gear meshing, which aligns gears into the correct grinding position, required additional development to ensure fast and reliable workpiece meshing and changing cycles. Given that the left and right pressure angles of the individual gear tooth are different, and therefore the depths of the grinding cuts are different for both flanks at an equal radial infeed, continuous adjustment of the synchronisation of the axes via the machine's CNC is necessary to maintain the equal grinding depth on both flanks. The asymmetric design of gear flanks serves to increase the load capacity of the gear flank and the gear root.

As shown in figure 2, an increase in the pressure angle leads to a rise of the curvature radii on the gear flank as the base cylinder is decreased (point B moves toward the outside). Increasing the pressure angle also leads to a strengthening of the root load capacity and lowers the bending load as the bending moment is reduced (point D moves downward). Moreover, increasing the pressure angle enlarges the tooth root cross-section sF, which increases its robustness. There are benefits to increasing the pressure angle, with the only limitation being that the boundary line of the undercut shifts toward the tip of the tooth. But shifting the tooth top limit of an asymmetrical design, enables increased tooth bearing load capacity, increased contact ratio, reduced contact stress, reduced noise excitations, enlarged tooth thickness at the tip and reduced danger of tooth top breakage caused by through hardened tooth tips.

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Klingelnberg presents cutting-edge Industry 4.0 solutions at CIMT

Since its inception in 1989, the China International Machine Tool Show (CIMT) has evolved, according to show organisers, to become a leading platform for the international machine tool industry in China and in the entire East Asian region.

At this year's event, Klingelnberg presented its innovative Closed Loop concept for cylindrical gears, a pioneering Industry 4.0 solution. With its entry into the robotics industry, Klingelnberg also launched an initiative to expand its business outside the gear industry. Klingelnberg's cycloid measurement option for precision measuring centres provides a reliable solution for monitoring high production standards.

Höfler Speed Viper 180 cylindrical gear grinding machine with Closed Loop technology

Focused on highly effective generating grinding in large series manufacturing, the Höfler Speed Viper cyclical gear grinding machine draws on the successful concept of Klingelnberg's well-established Viper 500 series. Four different machine models are available to suit individual requirements: Speed Viper 300 and 180 in a single-spindle configuration, and Speed Viper² 180 and 80 in a dual-spindle configuration. Speed Viper is designed for maximum workpiece diameters of 80, 180, and 300 mm, depending on the model. The Speed Viper² dual-spindle concept achieves the shortest auxiliary times and therefore fulfils the productivity requirements of the automotive industry.

The Höfler Speed Viper 180 cylindrical gear grinding machine

With an outside diameter of 320 mm and a width of 200 mm, the grinding worms ensure a long tool life while minimising auxiliary times for tool changes. An automatic tool clamping system with an integrated balancing unit also contributes to shortened tooling times. With a partial or full automation system, the Speed Viper can also be equipped with an automation interface that meets the VDMA 34180 standard.

The Speed Viper platform is optimally designed for the Industry 4.0 manufacturing environment. Thanks to a broad array of applications and software, Klingelnberg's cyber-physical production system centralises production control, leading to a standardisation of results achieved on different machines and even in different plants.

Klingelnberg P 26 precision measuring centres with cycloid measurement add-on option

Designed for use in Closed Loop processes, the P 26 precision measuring centre stands for quality management of gearing with scope for future development, and is designed as a compact unit suited to a workpiece diameter range of up to 260 mm. The machine and software concept is 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 measuring technology. This guarantees maximum measuring accuracy and reproducibility. Klingelnberg's P series is one of the most widely used standards in the industry and serves as a reference for metrology institutes, and with good reason.

With the cycloid measurement option, Klingelnberg now offers a reliable solution for monitoring the high production standards of the robotics industry. Cycloid transmissions enable high reduction ratios and are used to transmit forces in robot arms. As the need for high-precision robots increases along with increasing levels of automation, the combination of precision measuring centres and gear grinding machines for cycloids ensures continuous improvement in production quality. Klingelnberg solutions are close to the market and the user. They also include a comprehensive range of services and software solutions. Founded in 1863,

The Klingelnberg P 26 precision measuring centre

Cycloid measurement on a Klingelnberg precision measuring centre

Klingelnberg is one of the leading manufacturers in the gear industry. The acquisition of Höfler Maschinenbau GmbH's core business in 2012 added machines for machining cylindrical gears to its range of products, reinforcing its position as a complete system provider.

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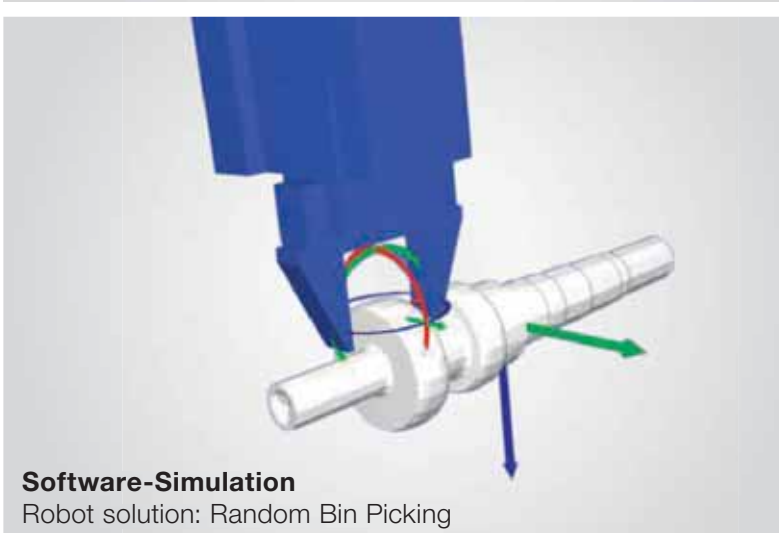

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LIEBHERR

Revolutionising gear inspection

Gleason presented its latest solutions for gear metrology applications at the Control show in Stuttgart, in the shape of the 300GMSL Gear Metrology System with full flank form laser scanning for prototyping and R&D work as well as the GRSL Double Flank Gear Rolling System with integrated laser technology for high volume, 100 percent in-process inspection of gears.

The versatile platform of Gleason's 300GMSL Gear Metrology System provides the classic tactile probing methods for inspecting conventional gear characteristics on spur and helical cylindrical gears as well as straight, spiral and hypoid bevel gears with a diameter of up to 300 mm. In addition, the new inspection system allows non-contact laser sensor scanning of tooth flanks to support gear development. Complete topography data can be recorded far more rapidly than with conventional tactile probing, with comparable results depending on the tooth flank surface.

The integration of laser scanning and associated 3D graphics with CAD interface considerably expand both the functionality and the range of applications for this machine platform. The new option makes the 300GMSL the ideal solution for research and development applications, for both prototype and production parts or when reverse engineering is required. Further options include surface finish measurement or Barkhausen noise analysis to inspect grinding burn.

The 300GMSL Inspection System is also an ideal fit for rapid measurement of topography in regular production operation and satisfies the increasingly stringent requirements on gear inspection.

Compliant, soft materials (such as plastic gears, for example) can be inspected without sustaining damage. Multiple technologies combined in one single machine platform reduce operating costs, annual maintenance, certification costs and space requirements.

The GRSL Gear Rolling System with Laser allows in-process gear inspection and sets a new standard for throughput where high-speed, high-volume testing is required. It provides both, double flank roll testing as well as analytical index and involute measurement on all teeth in a matter of seconds.

This new technology is available in manual, semi-automatic or fully automatic configuration depending on the needs of the customer. The index and involute measurements are analysed using Gleason GAMA Gear Automated Measurement and Analysis Software, which allows operators to see common charting between a GMS Analytical Inspection Machine and the GRSL Gear Rolling System. With GAMA, over fifty analysis packages are available for customers with all major industry standards such as AGMA, DIN, ISO, etc., along with customer specific analysis requirements developed specifically for the GAMA Platform.

This patent pending design is unparalleled in inspection speed and capability. It measures external cylindrical gears up to 250 mm in diameter in a range of .4 to 7.2 module. The double monitor option provides a simple view of ongoing trends in the high-speed inspection environment where one monitor can display results of several hundred parts inspected over time while the other can show real time results of the gear being inspected.

All GMSL and GRSL systems, like the entire GMS line of products, are able to export data using Gleason's Closed Loop capability function. The Closed Loop functionality has been employed for many years in bevel gear production and has been adapted to the manufacture of cylindrical gears by Gleason for several years now. Closed Loop enables a metrology system to send results directly to a Gleason production machine such as a power skiving, grinding or honing machine, to directly transmit data for auto-correction at the machine tool without the need for human intervention.

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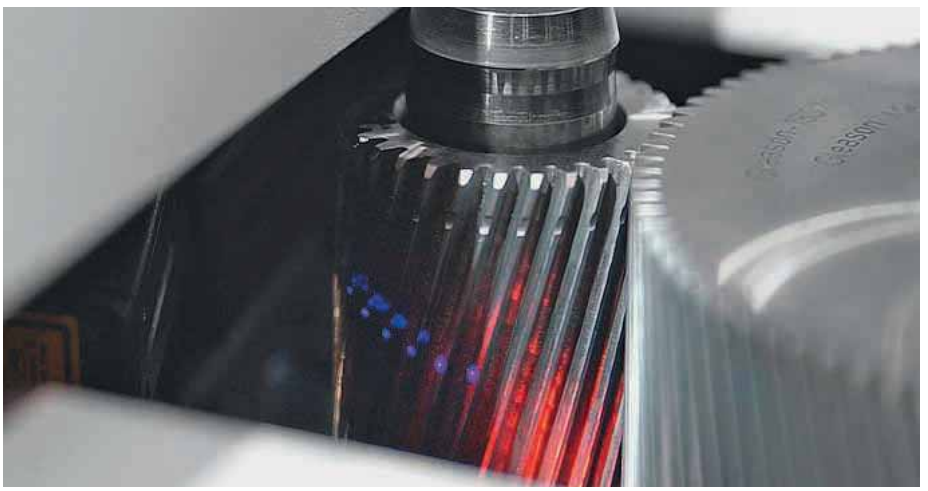

VIPER 500

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The HÖFLER Cylindrical Gear Grinding Machine VIPER 500 is designed for maximal flexibility without compromises. The VIPER is dedicated to high quality production of gears up to 500 mm and specifically for small to medium sized batches. To suit individual requirements, the machine is available in various configurations for profile, multiple-wheel and generation grinding. Furthermore the option for internal gear grinding is available for all VIPER machines. Focusing on small batch production our customers appreciate the accessibility and outstanding changeover time.

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Advanced grinding solutions for the automotive industry

All over the world, the automotive industry is evolving technologically, thanks to investment in the development of electric and hybrid vehicles. This has led Danobat to develop new grinding solutions for manual and automatic gearboxes.

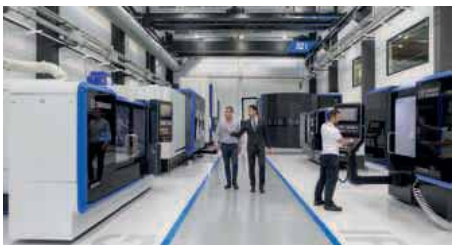
Whether vehicles use combustion engines, hybrid or purely electric motors, the trend in the automotive industry is the same: to create more efficient vehicles to increase performance and reduce fuel consumption.

The industry is also characterised by a need for machinery to be highly flexible so that it can be reconfigured quickly. Customers are tending more and more to ask for systems to be more flexible, in order to cater for the production of wide range of references in different gearboxes even within the same vehicle model.

Danobat has been working with leading vehicle manufacturers for decades, developing productive and reliable solutions. Danobat machines use natural granite beds, linear motors on all main axes and drives featuring built-in motors on the B-axis and on workheads. A network of centres of excellence for generating high value-added solutions.

Danobat has a network of centres of excellence in grinding and machining for the manufacturing of precision parts. This cutting-edge initiative is unique in the field of grinding and enables customers to become more competitive, with the highest standards of efficiency and productivity.

The company has developed high value-added solutions tailored to meet the needs of each customer in the transmissions sector. Ongoing cooperation between supplier and customer is essential if a comprehensive solution to the customer's needs is to be generated. This calls for proactive listening on the part of the company's technical and sales teams.



Danobat's catalogue features solutions designed and developed to carry out grinding operations, with uninterrupted operation and improved productivity, from machine setup to the automation of workpiece loading and unloading, ensuring easy integration into production lines. Danobat machines are designed to provide increased productivity, with the possibility of working three shifts.

These solutions are characterised by the high quality and extreme reliability of their components, achieved thanks to cooperation with first-tier suppliers while at the same time stressing the in-house development and manufacturing of components as an essential factor to ensure the immediate availability of spare parts.

The wide range of solutions offered, allow the development of a great variety of applications in the automotive field, from the manufacture of transmission shafts to pump shafts.

Precision: a key factor for transmission components

For the automotive industry, Danobat has developed solutions for the manufacturing of various gearbox models for conventional, electric and hybrid cars (CVT, AMT, DCT, AT and MT).

Transmission components are key in ensuring greater efficiency. They must meet very strict machining tolerances, especially those designed for electric vehicles. This means that there is increasing demand for more and more precise machine-tools.

Digital technologies and automation

Cycle times are very tight, which means that there is a need for automation and control systems for plant management.

Danobat integrates technological advances in communication and information. Those advances are focused on developing in-house solutions with advanced technologies that enable production lines to be controlled via continuous remote monitoring of the entire system, so that the status of machinery is known at anytime and anywhere.

Demand for turnkey lines is increasing among vehicle manufacturers, and automation has a vital role to play. Danobat meets that demand via systems built into its machines, with integrated gantries and robots. For example, the company has researched, developed and supplied complete lines for manufacturing the components that make up the CVT.

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Liebherr gear cutting machines impress with consistently good results

The production of E-cars is very demanding in terms of gear quality. Great Taiwan Gear relies on Liebherr machines and to date the Taiwanese company has invested in a gear-shaping machine and three generating grinding machines from the German manufacturer.

The main focus of Great Taiwan Gear Ltd is the production of gears and assemblies for alternative drives, such as EV (Electric Vehicle) and hybrid systems. To achieve the quality needed, the company works closely with its suppliers. The majority of the product development as result of this cooperation and is a particular feature of business in Taiwan.

"Our partnership with international equipment and tooling suppliers is of equal importance," says Great Taiwan Gear's Samuel Lin. "Our partnership with Liebherr has helped us to find solutions and to meet the very high-quality requirements of our customers."

The first Liebherr shaping machine the company purchased was an LS 120 gear shaper in 2010. Three LGG 280 gear grinding machines are now operating in the machine shop as well. The machines have performed very steadily and reliably since installation, which has even allowed inspection cycles to be shortened.

The Liebherr LGG 280 generating grinding machines ensure high quality

Company president Morley Lin presents components at a trade fair

Great Taiwan Gear focuses on superior quality and therefore gear profile and lead tolerances are very tight. Most EV applications also require bias / twist control for twist-free grinding. The LGG 280 was the best choice for these requirements, Lin confirms.

Liebherr developed a distortion-free grinding method for tooth-lead modifications, which is unique in grinding technology. "This is very important in terms of noise levels and size," explains Heribert Tichatzki, sales manager Asia at Liebherr Verzahntechnik GmbH.

The purchase of the new gear grinding equipment was one of the largest investments made by Great Taiwan Gear, but the effort paid off: The setup of the machine is straightforward and the users are very pleased with the reliability of the machines, especially considering the extremely tight tolerances involved.

Following these positive experiences, discussions about further investments have already started.

Samuel Lin appreciates the service quality provided by Liebherr: "Liebherr is very professional and also understands the challenges of meeting very high-quality specifications. We especially appreciate the on-site support, which we receive from their service engineer team, from installation to final acceptance of the machines."

Great Taiwan Gear produces components in highest quality

A further advantage from his point of view is that Liebherr can offer application engineering support to solve issues, which can occur during ramp-up or production. "This team is also of great help to us in optimising our gear machining processes," he adds.

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Agathon goes with the flow

Roger Barber reports from Solothurn, Switzerland

The Agathon Open House last month provided the perfect opportunity to discover in depth how this pioneer in grinding and laser processing is facilitating its recent investment in flow assembly and bringing huge benefits for customers. CEO Michael Merkle and CTO Dr Stephan Scholze have been co-owners of Agathon AG since September 2014. They were understandably upbeat as they addressed the gathered press, highlighting the benefits that the flow assembly line would bring, as well as connectivity and digitalisation as the key focus for the company going forward. Today, SmartConnectivity provides data for the productive use of all current Agathon machines. Together with renowned universities and proven industrial partners, digital tools are utilised for operation, maintenance and optimisation of every Agathon machine.

The English-speaking group was given a comprehensive tour of the facility by Roland Merk, the general manager of Agathon Machine Tools Inc in the USA. He explained how the new flow assembly line was providing huge benefits for customers, especially in the faster turn around of machines due to more effective

In mid-January 2019, after a changeover which lasted only a few weeks, Agathon replaced the previous stationary assembly with clocked flow assembly. The corresponding conversion work was mainly performed in parallel with the ongoing work, with the final assembly only interrupted in the first two weeks of January.

"The flow assembly was scheduled to start on January 14 and that was the day it started," says a satisfied Marcel Trüssel, head of assembly at Agathon in Bellach. At the heart of the Agathon flow assembly is the central unit for the energy and coolant supply, which was designed in the company and implemented together with external project partners. "There is no off-the-shelf solution for such a unit," explains Agathon lean manager Boban Djordjevic. The individual flow assembly cycles are located around this unit and all machines under construction can be connected to the power supply and via a quick-connect coupling to the coolant supply.

"With the introduction of the flow assembly, we can assemble twice as many machines on the same available space than before," explains Marcel Trüssel. Space at Agathon is a limited commodity, as is the case in most companies. In addition, customers rightly expect machines to be delivered within a reasonable time, even and especially during periods of strong economic activity. The introduction of flow manufacturing is part of a package of lean manufacturing measures that have been and are being implemented in the assembly areas. Not only the final assembly but also the pre-assembly have been reorganised. Since then, the individual assembly groups have also been manufactured at the rhythm of the final assembly cycle and then immediately processed further in the final assembly department. To ensure that this rhythm is maintained, additional places were created in the pre-assembly area. However, no additional space was required for this, because the individual workstations are now even more ergonomic and target-oriented, and less material needs to be stored there than previously.

The introduction of lean manufacturing

benefits not only the company but also its employees, who now work at state-of-the-art workplaces. The work has also become even more varied. "I attach great importance to the fact, that my people are in a position to master a wide range of work with highest quality as possible," explains Marcel Trüssel. A flow assembly that does not flow is not a flow assembly. This means that if an employee is absent due to an event or holidays, another employee needs to step into the gap in order to keep the flow. Employees would therefore also rotate between pre-assembly and final assembly.

The greatest benefit though is for the customer. On the one hand, the acceptance of the machine on site in Bellach is more convenient today because a new, separate and modern equipped area has been created for this outside the final assembly. Much more important, however, is that Agathon grinding machines can be delivered even faster. Finally, there are many applications where the customer does not want to do without the quality standards and versatility of an Agathon machine.

Agathon is supported in the introduction of lean manufacturing by Illing GmbH, in particular by Holger Illing himself and his freelancer Patrik Kamber. Illing GmbH offers services and training in the areas of lean management and shop floor management. Illing GmbH is one of the leading Swiss consulting companies in these areas and has successfully supported and implemented around 300 such projects for customers in a wide variety of industries.

Rolan Merk explained: "The theory of constraint means that things happen every day to create bottlenecks. The chain always breaks at the weakest link and we therefore have to identify where these weaknesses lie." This can be a process or an individual. In the case of an individual, this can be simply a matter of location of tools for the job or heath and safety issues that mean he or she is off work. Most bottlenecks are caused by hold ups in production or assembly and this is where the flow line needs to be optimised and where the consultants brought their expertise into play.

Michael Merkle and Stephan Scholze made a momentous decision in 2016 to increase production from 50 machines per year to 100 by 2020. In order to achieve this, each machine would need to be assembled, wired, commissioned and delivered in six weeks. This all had to be achieved on the same floor space as expansion would be too costly due to the price of land in Switzerland. The increased production could only be achieved through lean manufacturing and flow assembly. This meant improvements in efficiency, knowledge, safety and an optimised manufacturing process. The exercise has been so successful that the time per machine has been reduced to six days rather than weeks!

In particular, the pre-assembly has been reorganised. Today, with every assembly group that is produced there is a one-off production and is released by a specific customer order. The employees in the final assembly department process these custom-made products immediately, so that nothing is delivered to the stockroom. "This increases efficiency enormously," explains Patrik Kamber, "but it means that today the assemblies must also be manufactured at the rhythm of the final assembly cycle." To ensure this, additional places were created in the pre-assembly area. However, no additional space was required for this, because the individual pre-assembly workstations are now even more ergonomic and target-oriented, and less material needs to be stored there than previously.

There are 10 stations dedicated to either manufacturing, pre-assembly or assembly of individual machines, which are processed for two days before moving to the next station. All four Agathon machine models are built at the same time. During this time, the machine is completed to the customer's specific requirements and commissioned. It is then given an endurance test and the customer can see their machine in operation before it goes out of the door.

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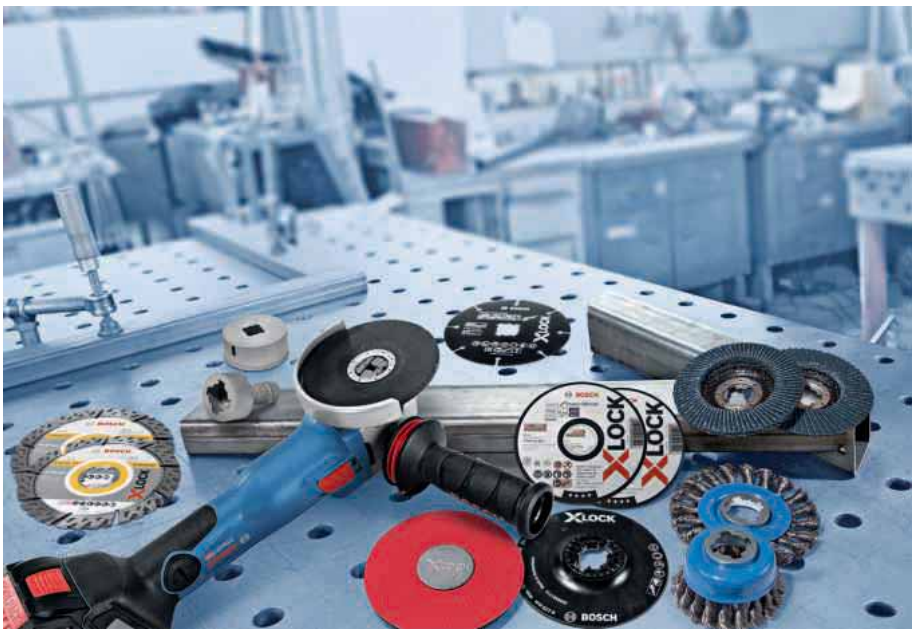
The ultimate accessory-change system for grinders

X-LOCK: another world-first from Bosch Professional

One click is all you need. Bosch Professional has introduced a revolution in convenience for angle grinder users with X-LOCK, the fastest, simplest, most trouble-free accessory-change system ever. Launched at the same time as this game changer are six small but powerful X-LOCK angle grinders, whose innovative features will improve productivity, ergonomics and safety.



X-LOCK advantages

Conventional accessory attachment involves a nut, a flange and a spanner, any of which can easily be lost leading to downtime and frustration. X-LOCK, by contrast, is a genuinely tool-less alternative. Simply bring the accessory and grinder connecting surfaces into contact and press. A reassuring 'click' sound tells you they are firmly locked.

To remove a disc, just flick a lever on the grinder. Changeovers can be completed in five seconds, which is five times faster than normal. You can even do it while wearing gloves. There's no attachment nut to seize up on a jammed disc or to get in your way when working at flat angles, or damage material surfaces. What's more, X-LOCK indicates the right accessory mounting direction and won't allow direction-specific accessories such as diamond cutting discs to be mounted incorrectly.

Accessories for every use

A comprehensive new range of more than 130 X-LOCK accessories covers everything from metalwork and stonework to plumbing, tiling and other cutting and grinding tasks. Almost all of these can also be used on your older, non-X-LOCK angle grinders with conventional clamping systems. The exceptions are diamond dry core drills and cup/round brushes. Discs vary in diameter between 115 and 125 mm. The collection includes: metalwork accessories – fibre, SCM and flap discs, as well as cup and round brushes, for cutting and roughing; stone/concrete/tiling accessories – diamond cutting discs, diamond dry core drills and diamond milling cutters; carbide multi-wheels – useful for cutting wood containing nails, along with plastic, composite or drywall construction materials

New X-LOCK angle grinders

The six small X-LOCK angle grinders comprise one corded model and five 18 V battery-powered cordless products. The cordless machines provide equivalent power to a 1,000 W corded grinder. Compared to predecessors, they are up to 35 percent more powerful and give up to 100 percent longer runtime. Their ergonomic features include an intuitive user interface, showing tool status and enabling speed selection, plus an inbuilt LED working light. They can also be fitted with a Bosch connectivity module which connects to your mobile device via Bluetooth for advanced functionality.

Enhanced health and safety

Automatic safety systems on the new X-LOCK angle grinders include KickBack Control, which immediately shuts down power to the motor if the disc is suddenly jammed. Drop Control does the same as soon as a dropped tool hits the floor. In

models with a PROtection Switch, power is instantly cut if the user lets go, while the X-Brake brings discs to a complete halt within one second of the tool stopping. Optional aids include Soft Start, allowing progressive build-up of speed to avoid initial kickbacks, and Restart Protection, preventing an unexpected start-up after a power cut or battery change. Auxiliary handles with vibration damping can also be specified.

Revolutionary convenience and performance:
Faster, easier changes, with no spanner, nut or flange to get lost Six new X-LOCK angle grinders, enhancing productivity, ergonomics and safety. Extensive new X-LOCK accessory range also compatible with standard angle grinders.

Ben Shepherd, Kel-Berg Trailers and Trucks Ltd

X-LOCK availability
Bosch Professional angle grinders with the X-LOCK system, as well as an extensive range of accessories, are available from May 2019 with additional models following in future.

A revolution in convenience and performance:
The new Bosch Professional X-LOCK angle grinder accessory-change system certainly suits Kel-Berg's truck outfitters.

It was his hobby of restoring classic cars that first inspired Ben Shepherd's passion for cutting, grinding, welding and fabricating metal. What started with an original Mk1 VW Golf has led to a role with Kel-Berg Trailers and Trucks Ltd, where he applies important finishing touches to much bigger vehicles.

Ben is one of the first people to get their hands on a Bosch Professional X-LOCK angle grinder and use it daily for work. It features the revolutionary new Bosch X-LOCK accessory-change system, which combines with innovative power tool design to save time and effort while enhancing productivity, ergonomics and safety. His fellow truck outfitters are clearly impressed, as they've been taking every opportunity to borrow it.

Well known in the UK since the mid-eighties, Kel-Berg deals in a wide variety of truck and trailer equipment. Tipping trailers, low loaders, grab loaders, rigid tippers and mixers are just a few examples. As well as stocking and selling new and used vehicles, it runs trailer production and bodybuilding operations from its purpose-built offices and workshops at Bicester in Oxfordshire. Ben is part of a team which has been in place for many years, with experience in a broad cross-section of transport sectors.

The company has invested heavily in facilities including eight workshop bays, a DVSA (Driver and Vehicle Standards Agency) authorised testing lane and an IVA (Individual Vehicle Approval) lane. Its manufacturing plant is equipped with a shot blast and paint booth, an automatic welding system and a laser cutter. It designs and

produces trailers tailored to individual markets, develops and builds its own truck bodies, and adapts other manufacturers' vehicles to customer requirements.

Angle grinders are used at Kel-Berg for cutting and grinding various metals, from aluminium and mild steel to stainless and other hardened steels such as Hardox®. All Kel-Berg truck bodies feature Hardox, a material which gives extra protection against abrasion in high-wear areas. The inner surfaces of a tipper unit, for example, are regularly in contact with abrasive materials like tarmac and aggregates. The harder the metal, the more often a grinder's discs need to be replaced. Discs may be swapped with wire wheels for derusting and paint removal from surfaces prior to welding or painting. Other options include polishing accessories for perfectly finished metalwork.

"The main metal sections of the bodies and trailers are laser-cut, but angle grinders are ideal for adaptation and customisation work," Ben Shepherd explains. "For instance, we were recently asked to shorten a tipper body which was too long for its user's needs. We used cutting discs to take off the front end and remove part of the length. We then ground and shaped the cut structures with flap discs and hard stone wheels. Finally, we removed residual paint with wire wheels, ready for welding the pieces back together."

The larger and more unusual angle grinder applications include attaching a forklift to the back of a truck, converting a truck body from high-sided to low-sided, and constructing driver access platforms over trailers. A typical small task might be creating brackets for a hand-washing unit on

a truck's side or removing rust and paint before attaching an automatic sheeting system for covering and uncovering loads. In vehicle refurbishment work, there are jobs like cutting away and replacing broken brackets and preparing surfaces for repainting.

"The work is very varied," says Ben Shepherd. "You don't always know what you'll be doing from one day to the next. It could be a two-day project, or several small things, or an urgent warranty job might come in and you then drop everything to deal with it. You have to be flexible."

Pop-on, pop-off simplicity

A major advantage of the X-LOCK accessory-change system, as field-tested by Ben, is that there's no need for the traditional nut, flange and key, any of which can easily be lost. Ben was quick to point out that this could save endless searching time. It was just one of the time-saving benefits he discovered.

"You simply press the accessory onto the grinder. You hear and feel a click which tells you it's firmly attached. It won't actually let you mount an accessory wrongly. It gives a very positive feeling, with no fear of the disc coming loose. In the traditional system, there's a chance of damaging the thread by overtightening. At the same time, if you tighten too little, a rotating disc might fly off. X-LOCK takes away all those worries."

Accessory removal, by flicking a lever on the grinder, is equally quick and easy. Ben reckons the "pop-off, pop-on" system saves him about 30 to 60 seconds per change. It also means there's no reason to provide and maintain two angle grinders for jobs that require frequent switching from cutting to grinding. With fast accessory changes, one grinder can do it all.

"The best thing about X-LOCK is its simplicity," Ben adds. "I really like the range of accessories as well. There's something for any job. We've also found that the flap discs, stone wheel grinding discs, flat wheels and all others we've used last much longer. My favourites are the wire wheels. With X-LOCK you don't have to put your hand into the

middle, and risk getting caught by the wires, when changing a wheel."

In addition, Ben notes that the absence of an attachment nut means the entire disc can be used for flat grinding, and the grinder fits into tighter spaces. There's no nut to get in the way, to damage material surfaces or to seize up on a jammed disc. He finds the angle grinder powerful, with no struggle under load, and appreciates the low vibration levels – especially as he operates the tool for at least two hours a day.

He concludes: "I find the X-LOCK grinder excellent to use and it's made me more efficient. I can't see any downside, so I'll give it 10 out of 10. My workmates agree and they'd like one too! I can easily see X-LOCK becoming as familiar as systems like SDS in the workplace."

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High-precision grinding

Okuma combines accuracy and productivity in state-of-the-art grinders

Okuma, represented in the United Kingdom by NCMT, offers state-of-the-art grinders that combine precision and productivity. The inner and outer diameter grinders possess multiple hardware and software solutions that make them exceptionally accurate, productive and reliable.

Since Okuma introduced its first grinder in 1918, its CNC machines have been improved constantly. Nowadays, Okuma offers highly advanced grinders that provide unparalleled accuracy and productivity. The machine tools are used in various industries such as the automotive sector or the aerospace industry where highly precise and extremely reliable grinding operations are required. Okuma's innovative grinders for inside and outside diameter applications are suitable for both single piece production and highly automated mass production.

Innovative spindle design

With their highly stable construction, Okuma's grinders offer extreme precision. The core of the machine tool is an advanced grinding spindle with an innovative three-point hydrodynamic bearing on the cylindrical grinders. This kind of wheel spindle bearing system supports the wheel with wedge-shaped oil film pressure that is generated by the wheel spindle rotation. This allows for a retention strength of one ton and a wheel rotation accuracy of 0.01 µm.

Uncompromised precision

The accuracy is maintained throughout the entire grinder. A robust 5-sided hydrostatic guideway offers highest reliability while achieving maximum follow-up accuracy on the internal grinders. With its wide distance between the two guideways, it holds vibration dampening properties. The grinder's precision is further improved by Okuma's Thermo-Friendly Concept which eliminates inaccuracies that occur due to thermal deformations. This makes tedious corrections and warm-ups obsolete and also renders the grinding process insusceptible to changes of the surrounding temperature.

Okuma grinders such as the GA26W combine outstanding manufacturing quality with very high productivity

With the GI-20NII, Okuma offers a grinder for demanding inner and outer diameter grinding as well as for edge surface grinding

Focus on productivity

Okuma grinders are extremely precise, and at the same time highly productive. They are equipped with multiple features that guarantee highest productivity under all production conditions. Outstanding rapid traverse speeds of 30 m/min allow for extremely short chip-to-chip times. The grinding process itself is designed as efficiently as possible. One example is the overlaying oscillation of the Z-axis which allows for higher removal rates and therefore shorter cycle times. This solution also improves surface roughness and is ideal for processing long workpieces.

Symbiosis of electronics and hardware

As the industry's only single-source provider, Okuma also manufactures the grinder control OSP-P300GA. The Windows-based control relies on an open architecture making it extremely easy to be integrated into any workshop environment. The programming itself is an easy dialogue-supported cycle programming. With its intuitive design, Okuma reduced the required manual inputs to a bare minimum. This makes the grinding process both ergonomic and highly productive. The OSP additionally shields the grinding process from blackouts and other interruptions as it uses an absolute positioning system.

Okuma's OSP-P300GA allows for the perfect combination of state-of-the-art hardware and software solutions

Okuma Europe GmbH is the Germany-based sales and service affiliate of Okuma Corporation, a world leader in CNC (computer numeric control) machine tools, founded in 1898 in Nagoya, Japan. The company is the industry's only single-source provider, with the CNC machine, drive, motors, encoders, spindle and CNC control all manufactured by Okuma. Okuma's innovative and reliable technology, paired with comprehensive, localised service protection, allows users to run continuously with confidence maximising profitability. Along with its industry-leading distribution network, Okuma facilitates quality, productivity and efficiency, empowering the customer and enabling competitive advantage in today's demanding manufacturing environment.

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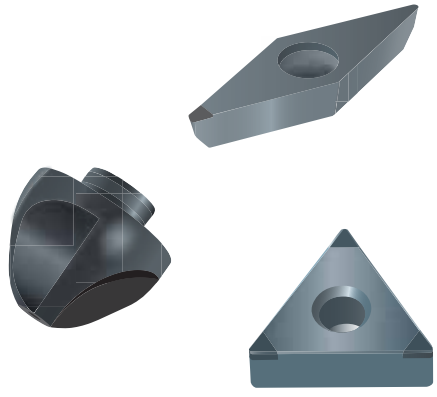

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Air conditioning leader selects Holroyd rotor grinder

One of the world's leading manufacturers of air-conditioning systems has ordered an advanced helical rotor and thread grinding machine from UK-based Holroyd Precision.

The machine, a Holroyd TG 350E-XL (XL = extra-large traverse), will be shipped to China later this year, where it will be used by the air conditioning technologies specialist to produce air ends, helical rotors and screw compressors for use in industrial cooling systems. This will be the second Holroyd TG 350E rotor grinder to be purchased by the organisation in recent years. The decision to place this latest order reflects the significance it puts on the uncompromising levels of accuracy and reliability that are provided by machines from Holroyd Precision.

Larger capacity rotor lengths

The TG 350E-XL's extra-large traverse capability offers an exciting development in helical rotor and thread production. This is due to an ingenious solution by Holroyd's design engineers, whereby larger capacity rotor lengths than can be accommodated on a 'standard' TG 350E can now be manufactured as and when required on a machine of exactly the same footprint. In short, the TG 350E-XL offers greater manufacturing flexibility, making it particularly suited to environments where there is a requirement to vary production to longer rotor lengths, or where factory floorspace is at a premium.

Typically, rotors produced on a TG 350E-XL will have longer shafts as used in semi-hermetic compressors with direct drive motors. Alternatively, the rotor body length might be longer to provide increased air or refrigerant capacity within the compressor. Compared to a standard TG 350E, which can be used to produce rotors of up to 350 mm in diameter and 1,795 mm in length, the XL variant of the machine enables components of up to 2026 mm in length to be manufactured.

"Securing this major machine tool order, worth in excess of £1.3 million to our UK manufacturing facility, was particularly pleasing," comments Holroyd regional sales director, Steven Benn. "In the face of stiff competition, we were chosen for our ability to provide the precise rotor grinding technology that the customer required, all supported by the high levels of performance and repeatability that they have come to expect from our ultra-precise grinding technologies."

The TG 350 rotor grinding machine

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 2,026 mm long.

Precision measuring of a helical rotor

Equally suited to prototyping, batch and 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.

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.

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Quality inspection and assurance for cutting tools

Only perfectly manufactured and perfectly set tools deliver the quality in production that is expected. With the machines from presetting, measuring and inspection machine manufacturer ZOLLER from the Swabian town of Pleidelsheim near Stuttgart, Germany, tools can be 100 percent automatically checked for quality after production. In the machining process, these perfectly measured tools not only ensure reproducible perfect results, but also increase the spindle running time and save resources.

100 percent control during tool manufacturing

Chamfers, angles, radii, relief grinding are the typical parameters of cutting tools. For optimal use of the tools in production, the exact adherence to the designed and calculated dimensions plays an important role. Only with the correct values can the expected tool life in production actually be achieved, the finished surfaces have the desired quality and the production speed reaches its maximum. This is why precise analysis of the tools during tool manufacturing is fundamental for the verifiable and certified quality of the manufactured tools.

The ZOLLER »genius« and »titan« inspection and measuring machines measure the produced tools fully automatically in incident and transmitted light, determine all relevant parameters and record them,no matter how complex the tool is. The CADCAM data of the grinding process form the basis for the measuring process. Once the tool has been designed and the grinding process has been simulated, this data is sent both to the grinding machine and in parallel to the control of the inspection and measuring

machine. At the push of a button, the machine automatically generates a measurement sequence - either as a complete measurement or for measuring selected parameters.

With the »threadCheck« or »hobCheck« inspection and measuring machines, ZOLLER also offers solutions for the holistic and distortion-free measurement of inclined tools such as taps or hobs.

Fully automatic measurement of tools

Simulating the grinding process in advance is a common procedure. The measuring process can also be simulated on the computer using »caz« (Computer Aided ZOLLER). In this way, the dimensional accuracy of the tool can be validated in advance on the grinding and inspection machine, independent of a blank and machine times.

Once the first tool has been manufactured, it is inserted into the ZOLLER inspection and measuring machine and the measuring sequence is started. The target and actual values are then automatically compared. From this, the quality of the finished tool can be read off directly. This data is sent back to the grinding machine via the interface and can be used directly to correct the grinding process.

Measuring tools from series production

The »roboset« automation solution is ideal for measuring every tool comprehensively and holistically in series production. A robot inserts the tools from a palletised stock into the inspection and measuring machine and starts the measuring process. The robot then deposits the tool, even sorted according to quality. Upstream and downstream cleaning and marking modules complete the inspection and measuring process. The measurement results are logged automatically, and the data output can take the form of standardised or individualised individual or collective reports.

Perfectly set tools in production

In production, the focus is on the exact geometry data: Length, diameter, step height. The ZOLLER »smile« and »venturion« presetting and measuring machines determine these values fully automatically on the basis of stored measuring programs and deliver the data directly to the machine via network or via a code on a label or a toolholder. Since the tools are measured during machining, the spindle running time increases significantly. Machine downtimes are reduced to the pure change process and setting work in the machine is no longer necessary.

Use resources sensibly

Preset tools not only extend the spindle running time, they also have further savings potential. The tool data no longer has to be determined in the machine, which is time-consuming, and this time can be used to produce good parts. The scrap for determining the tool data and the associated raw material can also be used for good parts and, since the tool data is determined with an accuracy down to the µm and reproducibly, the parts of subsequent orders can also be manufactured with the same accuracy and reproducibility. The setup effort is minimised and productivity significantly increased.

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Life at the cutting edge is never easy and for tool makers the competition is strong and to stay ahead you need to invest in the very best. Rollomatic offers class leading grinding solutions, Magnetfinish brings micron accuracy to cutting edges to improve tool life by up to 400% and Platit enables small to medium sized tool makers to coat their own tools in-house. Talk to us about your tool manufacturing needs.

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Booming business encourages investment in new machines

As a family-run business, Rye, Sussex-based BDH Centreless Ltd has been providing all parts of the manufacturing sector with centreless grinding solutions since 2002. The current directors have over 70 years' experience, having originally operated as Teddington Centreless Grinding, which closed in 2001, partly as a result of the fall-out from 9/11.

The new company was located at Sea Road, Winchelsea Beach until 2016, when it relocated to the current facility in Harbour Road, Rye Wharf. The main reason for the move was to gain better access to the business for customers. The move was successfully completed on 22nd July 2016, just two miles down the road to a fantastic newly built, 3,200-soft unit at the much sought-after Rye Wharf estate. It now has considerably improved loading/unloading facilities with excellent access for trucks and lorries of all sizes. The two roller shutter doors are 1 x 5 m wide and 1 x 2 m wide respectively, making loading and unloading easy and quick. Having extra workspace was important for the company's planned plant expansion, so the move to Rye Wharf was much needed.

This is an exciting new phase for the company and, over the coming year, it plans to introduce new CNC plant to both the bar grinding and component plunge grinding section, as well as updating inspection equipment and facilities. Business is booming according to director Stuart Hyson, with March the best month since the company has been in business. A deposit has been placed on a new CNC fully automated No2OM Cincinnati plunge grinding machine. This new acquisition will enable grinding times to be lowered by around 30 percent. This new purchase is

part of a continuing investment programme which will see the introduction of three new machines in as many years, including another plunge grinder.

BDH is also looking to expand with the possible purchase of an adjacent unit near its current facility.

With a focus on centreless grinding, material that can be ground include ferrous, non-ferrous, alloys, titanium, plastics, glass and graphite. Industry sectors served are aerospace, automotive, motorsport, marine, defence, steel stockholding and fasteners.

Having full BS EN ISO 9001:2015 accreditation, BDH Centreless can assure customers that all handling, production and inspection procedures are carried out to the highest standards. All records and documentation carry full traceability.

Plunge grinding

The plunge grinding method is used when components have a headed section that does not require grinding. The shaft can be ground without the need to touch the head. Multiple diameters can also be ground simultaneously. Plunge grinding is often used as an alternative to the more expensive cylindrical grinding method. Compared to cylindrical grinding, centreless plunge grinding reduces cost by around 50 percent.

Thru-feed grinding

Thru-feed grinding is the method used

for grinding shafts and dowel pins etc. Centreless grinding using this method is quick and achieves fine tolerances and surface finishes.

Bar grinding

As the name suggests, this type of centreless grinding is used to remove stock over long lengths of bar. BDH commonly finds itself grinding bar for steel and plastic stockholders as well as the end user. This type of grinding is essential for customers using sliding head auto-turning centres and machines that use guide bushes.

Small and large batch turning

BDH offers small and large batch turning in addition to its centreless grinding services. This gives customers the opportunity to have parts manufactured and completely reduce the need and cost in having parts shipped to various suppliers.

Steel supply

The company also buys and stocks many grades of ferrous and non-ferrous materials. If needed, it can quote and supply you with components from start to finish.

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Arrow scores bullseye with Studer grinder

Established in 1974 by David Arnold and currently under the direction of David's son Ian, Arrow Precision continues to abide by the founder's guiding principles of quality, innovation and service. The Hinckley, Leicestershire-based business's highly skilled workforce have access to a wide range of premium quality machine tools enabling the company's high-quality connecting rods and crankshafts to deliver ultimate levels of performance.

Having gained a global reputation for the components it produces, Arrow Precision now supplies three main automotive sectors. The company manufacture OE connecting rods and crankshafts for use in performance production road cars for prestigious customers throughout the world. In addition, a custom service is provided offering unique forgings, custom designs and the one-off manufacture of complete sets of rods for classic and vintage cars. Last but not least, the motorsport industry's insistence on dealing with vendors with high-levels of technical expertise, flexible manufacturing process, and fast delivery times, means that Arrow Precision is now a major supplier to this most challenging of automotive sectors.

Increasing global demand for Arrow Precision's crankshafts recently prompted a search for a premium-quality, highly-productive grinding machine that had the capabilities to grind crankshaft main bearing journals and pins to the company's challenging dimensional and surface finish standards. Having assessed several machines from leading manufacturers against a demanding list of criteria, a practical demonstration of a Studer S41 CNC universal grinding machine convinced MD Ian Arnold that the advanced Studer offering was the ideal answer to the company's requirements.

The recently installed S41 is now fully operational on 2-shifts and delivering on all the claims made by Studer and some areas exceeding Arrow Precision's expectations. For example, as the flexible machine can perform both external and internal precision grinding tasks, in addition to the external grinding of crankshafts journal and pins, the S41 is used to grind internal features such as flywheel location bores. Crankshaft bores that previously took 30 minutes to grind on a manual machine now take less than three minutes to complete. As well as producing outstanding levels of surface finish on crank journals and pins, the Studer S41 is now achieving sub-micron levels of diameter grinding accuracy.

Ian Arnold explains the reasons for the S41's purchase. "Demand for our crankshafts has grown to such an extent that a strain had been placed on our existing grinding resources, so we decided to source a new, high-precision CNC universal cylindrical grinding machine.

"As achieving the specified diameter and surface finish characteristics of crankshaft journals and pins constitutes the most critical crankshaft machining process, the highest standards of precision grinding is of paramount importance, therefore our new grinding machine needed to be of the highest possible technical standard.

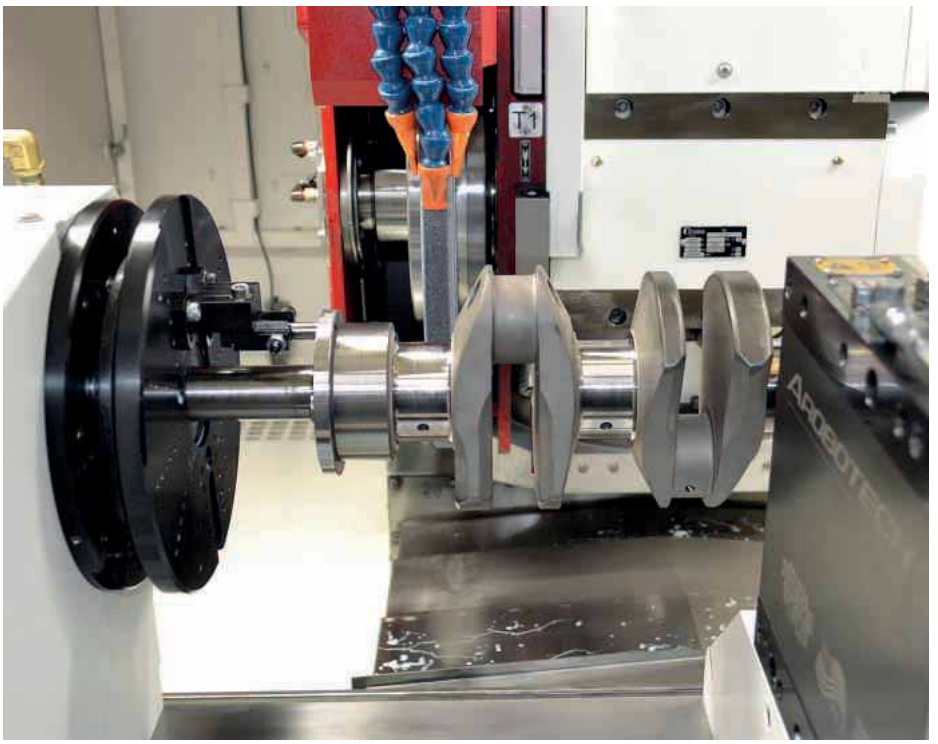
"Also, as we manufacture crankshafts in series production and in short runs, in addition to producing one-offs, we required a machine with great flexibility and quick change over times. Furthermore, as we are

often tasked with manufacturing crankshafts with really short lead times by our autosport customers, we needed a fast, extremely efficient machine.

"In addition to the S41 proving its outstanding flexibility, speed and technical capabilities, it helped our purchasing decision that we were aware of Studer's excellent reputation for the quality of the company's machines and for if its levels of customer service. The assistance provided by Mark Maurice of UK Studer agent Micronz was invaluable in helping us to specify the machine, arranging a demonstration at Studer's HQ in Switzerland, ensuring a trouble-free installation and organising our operators' training.

"As our operators received excellent on-machine training, and as Studer's controls and software is so intuitive, our staff soon mastered the S41. Although, it helps that on the rare occasion that we have a problem, Studer personnel are just a phone-call away and able to provide and instant solution.

"Not only has the exceptional speed and efficiency of our new Studer CNC universal cylindrical grinding machine removed the possibility of production bottlenecks from our grinding department, the extra capacity it has created and the additional capabilities it provides has opened-up additional commercial opportunities for us.



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Studer 'bearing' the gift of precision grinding to Loadpoint

Based in Wimborne, Dorset, Loadpoint Bearings Ltd is the UK's leading manufacturer of air bearing spindles. The company's high-precision products are used throughout the world across a variety of demanding applications, including grinding, paint spraying and lens turning. A wide range of highly accurate standard spindle designs are available to suit the majority of applications, although bespoke designs can be developed to meet the most challenging of customer requirements.

Loadpoint Bearings' global success has been built on more than 30 years of continuous technical innovation. The company's products' advanced designs provide users with ultra-reliable, high-precision motion, impressive speed and high-stiffness. To help ensure that the ISO9001:2015 certified business remains at the forefront of bearings technology, Loadpoint Bearings works closely with leading UK universities. The company has built its air bearing experience into a comprehensive suite of computer models and has achieved major innovations in the application of DC brushless motors to air bearing systems.

To help satisfy ever increasing demand for its products, Loadpoint Bearings recently relocated to a new UK headquarters that features an advanced manufacturing facility that is three times larger than its previous factory. Given the critical role high-precision grinding plays in the accuracy and reliability of Loadpoint Bearings' products, as well as the business's need to increase its output, a Studer favoritCNC, universal cylindrical grinding machine was recently installed in the company's new manufacturing facility.

The newly installed machine

Loadpoint Bearings operations director, Richard Broom explains: "Our high-quality air bearing spindles are used for a wide range of very exacting applications, such as use in high-precision rotary tables for demanding metrology-based applications. To make sure that Loadpoint spindles are manufactured to the highest quality standards we use a range of advanced machine tools, not least our 18-year-old, S36 Studer grinder. In addition to our old Studer Grinder delivering the challenging levels of sub-micron precision and first-class surface finish characteristics that we require, over the past two decades, it has proven to be highly productive and extremely reliable.

"Despite having enjoyed a first-class experience with Studer and the company's regional agent, Advanced Grinding Supplies, when an additional, high-quality grinder was needed, mindful of possible technical advancements made by other manufacturers, we did look at a couple of other brands. However, having had an impressive demonstration of a Studer favoritCNC, universal cylindrical grinding machine, we were convinced that this was the ideal machine for our demanding grinding needs and we were happy to continue our loyalty to the brand.

"The help of Peter Harding, the owner of Advanced Grinding Supplies Ltd, was invaluable when specifying our new Studer machine and ensuring that it precisely corresponded with our specific requirements. Now in constant use, our newly installed Studer grinder is producing impressive volumes of premium-quality, highly-precise components."

The Studer favoritCNC universal cylindrical grinding machine is designed for grinding medium-sized workpieces in individual and serial production. The availability of a wide range of options, including in-process gauging, a balancing system, contact detection and length positioning, means that the cutting-edge machine can be supplied to exactly match individual customers' needs.

Studer's easy to use grinding software, with pictogramming, ensures that even less experienced operators are able to quickly program grinding and dressing cycles. Optional StuderGRIND off-line programming software is also available, enabling special applications such as the profiling of grinding wheels for complex workpiece shapes to be programmed.

The favorit's machine bed is manufactured from solid Granitan® S103, a Studer developed material that has proven its efficiency over many years. The excellent dampening characteristics of the machine base ensures the outstanding surface quality of all ground workpieces. The use of Granitan S103 results in reduced downtime due to the increased service life of grinding wheels. In addition, Granitan S103 is able to provide high stability by compensating for temporary temperature fluctuations.

The favorit's V and flat guideways for the cross slides are moulded directly into the machine base and are finished with a non-abrasive Granitan S200 slideway coating. This advanced patented surface structure prevents the slides from swimming as well as eliminating the stick-slip effect that can be found in conventional guideways. The favorit's guideways offer the best possible accuracy through the entire speed range with high load capacity and cushioning levels. Thanks to the robust and maintenance-free design, these excellent guideway characteristics are retained more or less without limit.

The slides rest entirely on the guideways of the machine bed through the entire speed range, which is the basis for excellent straightness of 0,0025 mm over 650 mm measuring length. The favorit's slides are advanced by 40 mm diameter circulating ball screws connected to a three-phase servomotor via torsion-resistant, bellow-type couplings. This arrangement enables the axes to achieve high process speeds and maximum precision with in-feed movements of 0.0001 mm. Use of the swivelling machine table on the longitudinal slide enables the whole length of the surface to be ground and acts as a support for the workhead, tailstock and accessories.

The favorit's turret wheelhead can be used for both external and internal grinding and can be equipped with an external grinding wheel and an internal grinding spindle. With extreme precision, the user can manually (2.5°) index the turret wheelhead in a Hirth gear within a swivelling range of -15° / +195. The speed of the belt-driven internal grinding spindle can be infinitely variably regulated. Spindles are available with nominal speeds of 20,000, 40,000 and 60,000.

The generously dimensioned barrel, designed for the deployment of Morse 4 taper centres, glides in the tailstock housing, while centre pressure can be adjusted with the precision required for grinding high-precision workpieces. Fine adjustment enables taper corrections in the range below 1 µm when grinding between centres; also, to guarantee optimum thermal stability, cooling lubricant is passed through the tailstock, and totally covers the barrel and diamond holder.

A versatile universal workhead with MT5 fitting taper is capable of both live spindle grinding and grinding between centres. The low-maintenance workhead spindle is mounted on roller bearings and boasts an excellent roundness accuracy of below 0.0004 mm. The machine's fine adjustment allows for cylindrical corrections in the 1 µm range during live spindle operations, whilst a pneumatic lifting process facilitates movement of the workhead during setup and resetting. The machine's Fanuc 0i CNC control with an active flat colour monitor (10.4") is extremely reliable and optimally matched to the favorit's drive elements. A manual control unit facilitates setup close to the grinding process, whilst a special electronic contact detection sensitron (optional) function enables downtimes to be reduced to a minimum.

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The company's existing machine

Knowledge is the key to success

In the grinding business, experience and knowledge is king, certainly if you want to be as successful as RK International in this specialist field.

Since being established in 1951 RK International Machine Tools Ltd, a privately-owned company, spanning three generations, has been involved in the supply of quality machine tools. Clients requiring individual machine tools or major industrial turnkey packages are guaranteed service and support based on years of experience.

From initial quotation to final commissioning, all functions including demonstration; time studies; delivery; offloading and final positioning; training and, if required, after sales services are operated in house and are not dependent on subcontractors. Clients can be confident in dealing with a single source machine tool supplier.

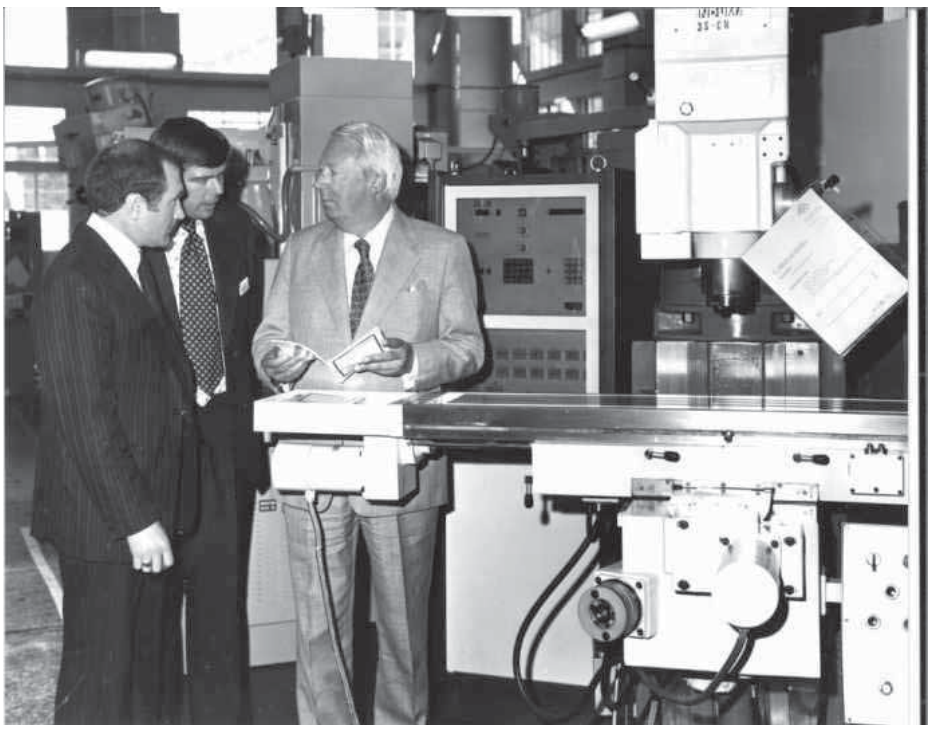
Committed to offering a quality product complete with a quality service, RK International was awarded BS EN ISO 9001 Quality Assurance in 1995. This program continues to be in operation now, further enhancing client confidence.

The company was started as a small tools operation by ex RAF pilot Ray Schwarz with financial support from his mother Kath, hence the name RK, moving to the current building in the 1970's. The new facility was opened by Edward Heath, the former prime minister in 1978. Ray's son Mike Schwarz ran the company until 1999.

Last year, RK International Machine Tools Ltd announced changes to its management team, with Simon Rood stepping up to the position of director and general manager, following the decision by sales director Dick Aldrich to reduce his work commitments. Dick has been with the company for 35 years and his experience as well as that of Simon Rood, who joined in 2010, has been invaluable in the establishment of the company as a leading player in the grinding market.

Director Dick Aldrich has 35 years' experience with RK International

The official opening of the RK 1978 Autumn Show where the Rt Hon Edward Heath MBE MP officially undertook the opening ceremony



Dick Aldrich singles out knowledge as being a key factor in the company's success: "Our focus is mainly on cylindrical and surface grinding with centreless on the periphery." Having said that, three centreless grinders have been sold since MACH 2018. One has been installed at a

manufacturer in Essex, with another going to a company in Newcastle making parts for JCB. Dick Aldrich says: "To chase five microns on a surface grinder on a plate that's 750 mm x 250 mm costs £25K; to chase three microns will cost £85K. It's the same on cylindrical grinders."

RK took a £450K order from Precision Products in Chesterfield at MACH for two machines to process 960 mm piston rings using chrome and cast iron. However, it took knowledge to ensure the correct wheel selection. As Dick Aldrich points out, very often it's the choice of wheel that ensures that the machine works to full capacity. Saving money by choosing cheaper wheels invariably affects the results.

A £600 wheel from Tyrolit, for example, will ultimately not cause the problems that a £300 wheel will. RK's application and service engineers work with customers to produce the best results from the machines. "The key to our success is that we have sold so many machines and through trials and testing issues have increased our knowledge in order to offer a better service to our customers," continues Dick Aldrich. "If you don't have a problem, you don't have a business."

On my recent visit to the RK International facility in Erith, there were six machines being prepared, with one cylindrical grinder per year leaving the factory. The company's philosophy is simple: satisfy the needs of customers that produce low volumes but demand high axis solutions. The machines are competitively priced but are built to high standards, including hydraulic ballscrews, a full Siemens control package plus Marposs and Balance Systems software.

PERFECT X36 high precision PLC surface grinder

RK has sold eight machines across the range to Morgan Advanced Ceramics and two machines to Bodycote for the manufacture of HVOF spray components for the oil & gas industry. There have been a number of Robbi machines sold including eight to BMW, four for the production of engine blocks at Hams Hall, Birmingham, one in Swindon and three in China, as well as others to Hellermann Tyton in Manchester and Danly UK in West London.

Robbi based in Italy is currently moving to brand new premises near its current factory and has installed a Soraluce 5-axis machine for the manufacture of its castings.

As well as grinding machines, RK also offers solutions for flexible manufacturing, having recently taken on a range of 4- and 5-axis machining centres from MCM in Italy. The machines can be stand-alone, bi-pallet, multi-pallet, carousel or FMS.

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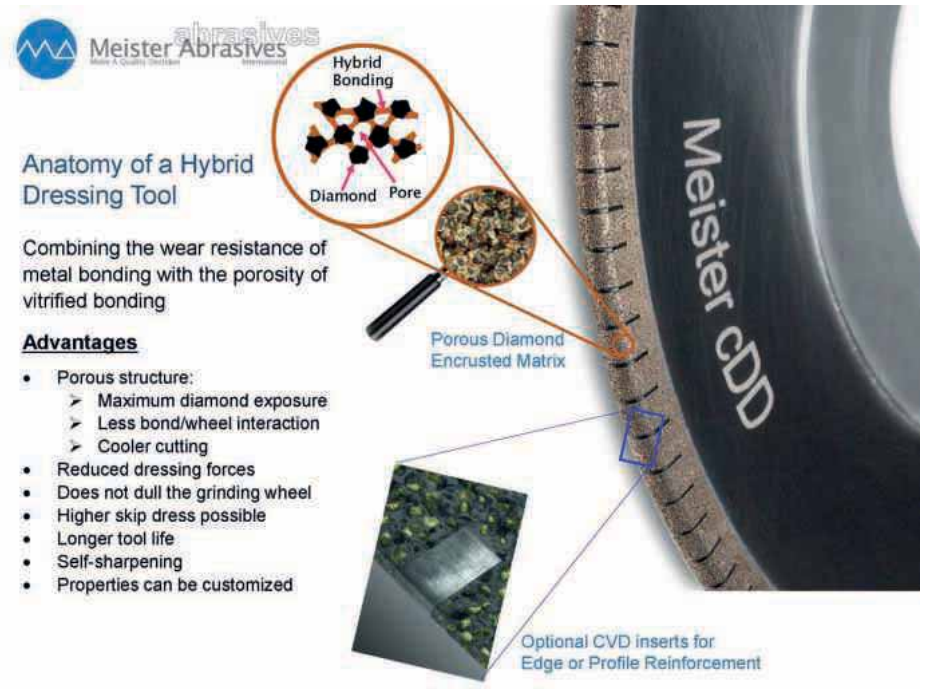
A Robbi Omicron CNC 3615 universal cylindrical grinder

More parts per year with Meister's custom tailored solution

Meister Abrasives, represented by Master Abrasives in the UK and Ireland, has helped the customer to improve productivity with the potential to produce 500 thousand additional parts per year using the same machinery with a customised grinding solution.

Finishing the contours of a fuel injection pump cam is a very challenging precision grinding application. As the cam rotates in the CNC grinding machine, the wheel is continuously driven in and out to maintain constant contact with the part's out-of-round surface. With every half rotation the area of contact of the wheel on the part varies from minimal to quite extensive. Under these conditions, intermittent high surface area contact, the openness and porosity of the wheel is critical to minimise the potential for restricting the flow of coolant into the contact area to avoid burning and other quality and throughput issues. Having a sharp wheel and being able to keep it sharp is also essential to maintain sustained levels of high productivity.

In this case study, the customer already had a very efficient grinding process using Meister's first generation HPB (high performance bond) technology. They had 14 grinding machines performing finish contouring of 7 million parts per year. Their process had been working well for them, but they wanted to know if Meister had subsequently introduced additional technologies that could make their process even more economical and productive.



More parts per year with Meister's custom tailored solution

Meister worked with the customer to develop a customised solution based on its new HPL anti friction grinding wheels in combination with an improved hDD hybrid diamond dresser. The new wheel's porous HPL antifriction bond can handle and release more material without sticking or loading up the wheel. It also helps reduce friction and heat generated as additional material is liberated. This made it possible to incorporate advanced ultra-tough CBN crystals into the wheel for even more aggressive cutting while prolonging sharpness and wheel life. The hDD diamond dressers were also upgraded with new, tougher diamond crystals. These sharper antifriction grinding wheels reduced a 15 second grind time by two seconds, and parts per wheel increased from 70,000 to 115,000.

With this customised grinding solution, Meister's customer could produce 500 thousand additional parts per year with the same equipment, enough to avoid the need to purchase an additional CNC grinding machine. There were many other systematic benefits resulting from the custom tailored solution.

Finishing the contours of a fuel injection pump cam is a very challenging precision grinding application which Master offers application advice on

Master Abrasives is the sole UK and Eire agent for the Meister Abrasives Corporation, an international manufacturer of high precision industrial abrasive products, with its headquarters in Andelfingen, Switzerland.

The Daventry-based independently owned company has built an enviable reputation for quality and service that is as strong today as it has always been. The well-known trademark of 'Master' remains on much of the product range and services offered by the company in the UK.

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ToolScope intelligent navigation system for production operations

Even in the age of Industry 4.0, a provider cannot do away with explaining what an assistant system is, everything it can do and how it is useful for the operator. TYROLIT, a globally renowned abrasive materials producer based in Schwaz, Austria, has addressed this with the ToolScope navigation system for production operations.

Just like GPS navigation systems inform a driver of the fastest way to get from A to B, in production operations, assistance is about reducing cycle times and achieving the machining objective in the shortest possible time. To this end, the system monitors the entire process in order to gather the necessary data. As well as pure speed, this also makes for safer processes. Everything that needs to be monitored, controlled, evaluated and documented depends on the specific requirements of the individual operator, who can tailor the system to their own requirements.

ToolScope analyses the machine data gathered during grinding and displays it as a diagram on the machine control panel.

ToolScope analyses the machine data gathered during grinding and displays it as a diagram on the machine control panel. Photo: TYROLIT

When TYROLIT's ToolScope system made its public debut at the Grindtec exhibition in March, the company had the advantage of the assistance system having already been launched on the market as an Industry 4.0 solution for machining with defined cutting edges. The system was originally developed by the Brinkhaus start-up, Brinkhaus was integrated into Komet Group and this partnership has made it possible to monitor all machining processes and prepare individual assistance strategies.

Tyrolit Technology Centre in Schwaz, testing the ToolScope assistance system

Dr Markus Weiss, head of Abrasive Technology at TYROLIT, explains the significance of ToolScope being run in over 1,000 manufacturing plants: "The underlying structure for the operation of our system does not differ from one to the next, and so many operators are now familiar with this assistance system. The teething troubles that occur mainly in new software have been resolved and we are able to concentrate fully on the abrasive technology." The assistance system also fits well with the corporate philosophy of the Tyrol-based family-owned company, which is also a member of the Swarovski Group.

ToolScope provides further enhancement of the machine after the experienced application engineer has set up a process and completed the operational start-up on site. The system collects information and has the capability to respond to fluctuations and optimise machines, process flows and tool use. With continuous monitoring, many safety buffers will become redundant, as ToolScope takes care of the necessary process transparency.

The goal is not to create a fully autonomous grinding process, but to achieve a changeover from manual data analysis to an 'assistant' for process managers in a first step on the road to Industry 4.0. The system processes the data to enable the operator to start out with the aid of additional information and to assist the operator in optimising the process, enhancing its design or in monitoring. Twelve apps monitor the machine and the process, perform various help functions and analyse data. The logged values are saved for further analysis as required by the user, whether on the local device, in an existing ERP system, on the corporate network or in the Cloud.

Practical tests in the Tech Centre

TYROLIT provides practical demonstrations in the Technology Centre at the company headquarters in Schwaz. TYROLIT has opted for a bench instead of the cylindrical grinding option preferred by the machine manufacturer. This, for example, enables insightful tests to be conducted for the turbine industry demonstrating that when peak power is reached during the process or peak levels of torque occur, it can provide warning of burning in the grinding process. Tests are also performed on an old Emag cylindrical grinding machine, demonstrating that use of the assistance system is not only relevant for new machines. Working under constant conditions, the system will collect values for the processes and tools involved.

In the Technology Centre, the machining run is displayed on both the machine display and on a large monitor screen. This enables multiple parameters to be observed at the same time. A lot of information can be derived from the torque of the spindle, for example taking readings of recessing operations or the influence of lateral friction. Besides torque, the level of speed offers plenty of possibilities for optimising processes. In tests, median values and critical thresholds are both identified. In multiple runs, the curve in the diagram consistently shifts downwards, which serves

TYROLIT engineers draw on the results acquired by the technology centre to deliver improvements their support for customers as well as to further the development of their own products. Photo: TYROLIT

as an indicator of the condition of the grinding wheel. Dressing processes are visible in jumps, and wheel changes can also be seen. At the Tech Centre, TYROLIT has also identified correlations between spindle torque and coarseness. After dressing, the wheel is smooth and this results in high torque. If the measured value falls below a certain threshold, the surface will become too rough and will have be re-dressed.

For one year now, ToolScope has been employed by one of Germany's major car manufacturers, where four grinding machines are used on two production lines to turn out transmission shafts in various designs. To begin with, the car manufacturer only used the system for process monitoring and logging. This meant differences in batches or the hardness of the source material that could affect the machinability of the material would be detected.

Given these kinds of variations that can result in different levels of wear in the tools involved, this is often highly relevant for grinding machines. VW has succeeded in identifying and overcoming these differences. In addition, the analysis has shown that there is room for optimising the process. TYROLIT engineers estimate that if time buffers are eliminated and the grinding wheels only dressed or replaced when necessary, this could achieve time savings of a good 20 percent.

A trial for the UK

Here in the UK, the largest original equipment manufacturer of turbine blades will be installing the ToolScope system on a trial basis. Craig Storey, techincal sales for Precision Machinery talks about the benefits for his customers: "Our customers are constantly looking to us for cost and time saving solutions, to ensure their products are manufactured using the leanest and most efficient methods. This ensures they remain at the top in a hugely competitive and cost driven market. ToolScope is the next step forward, integrating grinding processes with Industry 4.0. Not only does this increase efficiencies in production but also allows for further traceabillity and a deeper understanding of the process at the heart of the machine tool."

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Safety is in your hands

Over the past decade or so, there has been a significant change in the way tools have been made to meet the needs and requirements of the user. This has led to a large amount of investment in R&D by tool manufacturers to design and develop durable products that can deliver an efficient overall process and a high-quality finish on a variety of surfaces, while protecting users against the dangers of Hand Arm Vibration Syndrome (HAVs) and dust particles.

HAVS, which affects the blood vessels, nerves, muscles, and joints of the hand, wrist and arm, is becoming a bigger issue for workers as it is a condition they cannot see or are maybe unaware of that is affecting them until it is too late. The reason for this is basically that each worker may have different tolerances for the amount of vibrations they can handle, or they may not realise there's a problem until they try a different tool or do not use their own one for a while.

For Mirka, the fight against HAVs starts with putting the emphasis back on the user and this has been achieved with the introduction of the myMirka app (applicable in the Bluetooth enabled tools within the Mirka product range). The app provides the end user with the vibration levels from the tool on a colour graded scale, and advises on how to lower the vibration if required. Additionally, the speed the tool is being used at can be visualised in a real-time graph. Furthermore, if more detail is required, there is an in-app purchase that tracks the daily vibration levels in relation to European standards for a comparable scale of the pressures being put through their joints on a daily basis, which will allow the business to see how the tools are being used and potentially assist in the implementation of measures to protect the workers. The APP is available to download through Google App and Apple App store.

Extraction systems may seem like they

take up a lot of space, but dust particles can be a major health issue for employees and could possibly lead to respiratory problems. This is why more and more businesses or single users are investing in systems to allow them to work in a dust-free work environment.

Laboratory tests have shown that without dust extraction, dust in the air per kilogram of sanded material is over 200 grams per kilogram, while dust on surrounding surfaces is almost 800 grams per kilogram. These may not seem like large quantities but when they accumulate over a long period, they could potentially turn into both a fire and health hazard for the business.

However, investment in a suitable mobile extraction system should not be a short-term injection of cash, but should be viewed as a long-term commitment, so that it can provide an effective solution for a cleaner work space, a reduction in prepping and tidying up at the end of the day, and also deal with potential dust contamination of other tools and surfaces. The smaller systems are more often used in workspaces because they are equipped with a local air supply and extraction and are easy to move and store.

Here are some top tips to achieving a dust-free environment and protect yourself from HAVS:

1.An increase in vibration can cause damage to the tool, so be aware that any variation in the weight of pad other than when using P180 paper discs can cause the machine to vibrate more.

2. Always use a genuine Mirka backing pad on Mirka tools, as it has been specifically designed for certain machines (a DEROS / PROS 150 mm backing pad is engineered to weigh exactly 130 gm). However, if you use a generic non Mirka pad it may alter the vibration of the tool and, in turn, cause damage to the bearing and other aspects of the tool. Mirka tools returned with non Mirka pads fitted are not covered by the Mirka warranty.

3. If you intend to use an interface pad (5 mm/10 mm), you should remove the backing pad and insert the grub screw that comes in the box with the tool into the remaining threaded hole beneath the pad. This will counterbalance the weight of the interface pad and reduce the vibration of the tool when in use.

4. The grub screw should also be used if coarse or heavy weight discs (P40/60 etc) are on the sander.

5. Using a pad saver will protect the backing pad from wear. However, if used when sanding plaster, it often reduces the efficiency of the dust extraction. If P80 to P120 discs are used with a pad saver, we recommend the insertion of the grub screw.

6. Ensure that the product is regularly serviced for optimum performance.

7. Make sure the fleece bag in the mobile extraction unit is not full and does not have any rips or holes. If it does, replace it.

8. Periodically remove and clean the motor filter. This can be done by placing it in a bag and gently knocking the dust out of the filter or, better still, use another vacuum or extractor to clean the filter. Once it is clean, replace the filter in the machine.

9. Make sure the seal between the tank and upper section of the extractor is clean and not damaged.

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ALLROUND – the name says it all

The new ALLROUND cut from PFERD promises versatile use with an efficiency increase of up to 30 percent compared to conventional burrs with cross cut and also offers ergonomic and economic advantages

With the tungsten carbide ALLROUND cut, August Rüggeberg – PFERD Tools has developed completely new burrs. They are suitable for versatile use on the most common materials such as steel and cast steel, stainless steel (INOX), non-ferrous metals and cast iron.

The ALLROUND cut offers all the benefits of the tried-and-tested 3 PLUS cut, but its stock removal rate is up to 30 percent higher for steel, for example when milling out, levelling, deburring, cutting out holes or working on surfaces or weld seams. It enables comfortable working with reduced vibration and less noise. ALLROUND burrs also offer significant time savings and a high economic value.

Advantages include: significantly higher stock removal rate than burrs with a conventional cross cut; save money and time through their very high stock removal rate on the most common materials: comfortable working with reduced vibration and less noise.

ALLROUND burrs can be used manually on flexible shaft drives or straight grinders, but they are also suitable for stationary use on machine tools and robots; recommended power is from 300 watts.

PFERDERGONOMICS recommends burrs with ALLROUND cut as an innovative tool solution for comfortable working with significantly reduced vibration and less noise.

PFERDEFFICIENCY recommends burrs with ALLROUND cut for long fatigue-free and resource-saving work with perfect results in a very short period of time.

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30 percent higher stock removal rate for steel than conventional TC burrs with cross cut – ALLROUND from PFERD

Many shapes and dimensions – ALLROUND cut from PFERD

Removing dust to ensure the perfect finish

Are we on the way to beating dust in manufacturing processes? Can we finally say goodbye to this finish spoiling, disease causing and costly hazard? Paul Riddick, co-founder and technical director at fume and dust extraction specialist Vodex explores whether airborne particles really have bitten the dust

Dust can be defined as a fine, dry powder which is made up of tiny particles of earth or waste matter. It can be found on surfaces or it can be airborne.

The first thing you need to know is what these particles are and how they're getting there. Needless to say, if you have a process such as machining wood, you can expect the particles in the workplace to include wood dust, but are there other particles as well, such as chemical powders, or biological dusts caused by skin or hair? Today's quality extraction systems are extremely effective, but it depends on identifying what's in the dust, where it comes from, how it behaves and exactly which system you can use to beat it.

Is your dust supplied or generated?

The dust extraction industry uses two categories to identify the source of dust ingredients. The first is supplied dust; what that means is that an application such as weighing a powdered product or sampling a powder-based ingredient has caused the particles to become airborne dust. The second category is process-generated dust, for example, particles that are created by grinding, crushing, cutting and other industrial processes; this dust can include powders and fibres.

How dust enters your body

As far as human workers are concerned, the size of the dust particles is key to the way in which they can enter the body. For comparison purposes, bear in mind that a human hair measures around 100 microns and that our eyes can't detect any particle smaller than 30 microns. Particles over 100 microns are too large to be breathed in; they fall to the floor or collect on surfaces.

When we talk about inhalable dust, we're referring to a dust cloud that is partly visible in which the particles are between 10 and 100 microns. This type of dust is easily inhaled as it can be breathed into your mouth, nose and throat. All of these have soft tissue and the dust can, at best, cause irritation and, at worst, cause severe and lasting damage. However, the particles are usually too large to enter the lungs. Respirable dusts are smaller; the particles are typically 10 microns or less, so we can't see them, but they are small enough to enter the lungs. Once in the lung, they get lodged in the small vessels that carry air: the alveoli and bronchioles. Not good news because dust particles this deep in the lung can cause breathing difficulties, lung diseases and even cancer.

A process that creates a lot of dust may also impair the operator's vision, resulting in inaccurate workmanship and potential risk to handling in very dusty conditions. As if this wasn't enough, many dusts can be potentially explosive. It's therefore an essential part of an employer's duty to get the dust out of the air and ensure that workers are properly protected from the wide range of hazards it can bring.

What makes up a dust cloud?

A dust cloud that you can see will often contain both types of particles: those that can be inhaled and those that are respirable (i.e.able to enter the lung). Wood dust is mainly inhalable whereas something like a chemical dust will be largely respirable.

You need to assess what's producing dust in your workplace, bearing in mind that there may be more than one cause. This involves identifying both the source and the process, so it may be metal and grinding, for example. Then you assess the volume of dust and what risks it poses to health. Finally, you will need to look at which workers or work areas could be affected. You then have several choices: make less dust by changing your processes; change the material to one that doesn't create so much dust; get the operator out of the dusty area; extract the dust from the air so that it's no longer a hazard.

Cloud watching

Modern extraction technology is frequently based on dust control by a Local Exhaust Ventilation (LEV) system. Most of these capture the dust, filter it, and collect it, with the cleaned air exhausted back out into the work area. They work well, provided that you understand the source of the dust and the process that's creating it.

When you're looking at the source, you also need to understand the dust cloud being produced. How dense is it? How quickly does it move? What's its general shape? You'll have noticed that the cloud is often quite compact near the source but as it moves away, it grows and billows and becomes much more difficult to collect and contain. It also starts to mix with the air and that, in turn, helps it disperse further. So the hazard may spread to other operators in the workplace who are not involved in the process that is creating the dust. Dust extraction at source prevents this dispersal.

Dust capture

Most extraction systems work by dragging the dust cloud away from the operators' breathing area, so it's essential that you use the right type of hood and that it's positioned correctly. In addition to hoods, there are other configurations such as dust extraction arms. These have a nozzle and can be placed in the airstream of the dust. The extraction unit usually has filters and includes a filter cleaning system. The filters need to be the correct type for the dust being created and the size of the particles.

Sometimes, the extraction takes place on the tool being used, to stop the dust turning into a cloud. This frequently happens in sanding applications, where the operator is moving about over a large area such as a vehicle bodywork. Alternatively, equipment such as the AirBench downdraft bench pulls the dust particles downwards into a collecting grille, where filters trap it before it can reach the air.

For very dusty and hazardous processes, a dust control booth may be the only answer. The whole environment is purpose-built to capture dust and protect the operator working inside. However, the operator still needs effective protection such as masks specifically designed for the type of dust being generated.

Have we beaten dust? No, and we probably never will. But we are now able to protect workers and produce high-quality finishes by accurately analysing the type of dust we're creating and using professional dust extractors to capture it.

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Sales milestone provides a perfect 50th birthday present

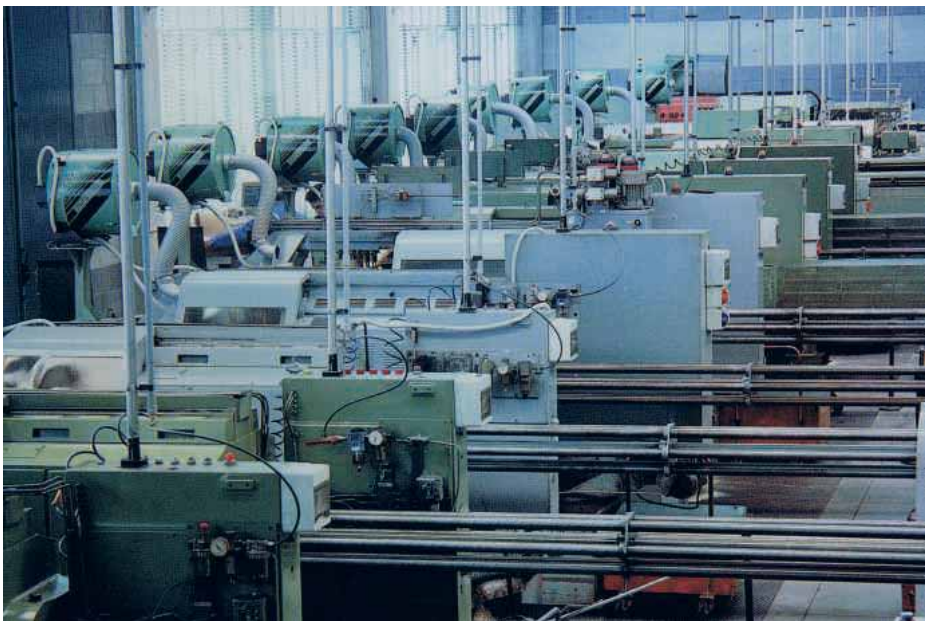
A Telford-based industrial air filtration and extraction specialist is celebrating 50 years of helping keep people safe by reaching a significant sales milestone.

Filtermist International, which is part of the Absolent Group, has just sold its 300,000th oil mist collector, marking five decades of supporting firms in creating cleaner and more productive work environments.

Headquartered in a £3 m manufacturing facility on Telford54, the company's global expansion plan has seen turnover rise to more than £20m and been responsible for the creation of 17 new jobs in the last twelve months alone. This has increased the workforce from 57 people in 2015, to today's total of more than 90 highly skilled staff members, who each receive over 50 hours of training and personal development opportunities every year.

The firm now exports its ultra-compact S-Series, FX-Series and S-Fusion oil mist collectors to over 60 countries worldwide, an international presence which has recently been strengthened with the appointment of new distributors in China, Norway, India and Malaysia.

Global growth has been so successful that Filtermist has established subsidiary businesses in India, Shanghai and Singapore to support local distributors and other customers throughout Asia. The company is also directly responsible for one of its German distributors, Bristol T&G International GmbH.



"It has been a fantastic start to our 50th anniversary year, with strong growth across all of our key markets, including automotive, aerospace, general engineering, medical and food production," explains James Stansfield, CEO of Filtermist International.

"This reflects the quality and performance of our products and our ability to offer services that help our customers make sure their work environments are compliant, clean and conducive to creating the best possible employee productivity.

"We've got lots of exciting plans in place to mark the milestone. It starts with a Family Fun Day in June to recognise the hard work and achievements of our staff, a black-tie dinner for distributors and key customers in September and a special open house that will showcase what we do and how we do it.

"There will also be a '50 facts about Filtermist' social media campaign, a book charting our history and a number of short films on some of the employees that have contributed so much to our first 50 years."

Established in 1969, the company was formed in a small unit in Bridgnorth by Jeremy Lywood and Martin Thompson. The original focus was on helping manufacturers improve the air quality of their factories through the addition of oil mist collection units and, five decades on, this is still one of its primary aims. Growth was predominantly organic and through referrals until the company was acquired by Swedish-based Absolent Group in 2010. This sparked a number of significant changes, including the appointment of James Stansfield as MD in 2012 and relocation to a state-of-the-art, purpose-built HQ in Telford in 2015.

Six acquisitions have subsequently been completed, including Multi-Fan Systems a year later and Dustcheck Ltd in 2017. This is part of the company's strategy to diversify its service offering into other air filtration markets.

James Stansfield adds: "Traditionally, we have been known for our oil mist extraction capabilities, but the acquisitions we have

made so far mean that we are now able to offer dust and fume extraction, VOC abatement, odour control, solvent recovery and lots more.

"We have extremely ambitious targets over the next five years and increasing our presence in all of our market sectors is a key strategic objective. Combining the strengths of our companies to offer our customers a complete solution for air extraction and filtration will be vital in helping us achieve our targets."

He concludes: "50 years in business is a great achievement. This is just the start and we have a lot of exciting plans for further investment and the potential for future acquisitions over the next eighteen months."

Absolent Group currently includes Filtermist International Ltd, Absolent AB, Avani Environmental International Inc., Bristol T&G International GmbH, Cades Ltd, DCS Ltd, Dustcheck Ltd,

Ecogate Ltd, Gallito Ltd, Multi-Fan Systems Ltd and SMK Sverige AB in its portfolio.

Services offered include oil mist, smoke and fume extraction, dust control, VOC abatement, production waste extraction and industrial ventilation.

In the UK, project teams comprising individuals from all Absolent Group companies work together to offer a single source solution for customers looking to benefit from cleaner, safer and more productive working environments.

An animation of Filtermist's 50 years can be viewed at **https://youtube/wDvd5oeY6z8**

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BOFA extends its global reach

The high-quality fume and dust extraction technology manufactured by Poole-based BOFA International is now available in Canada through Coding Products of Canada Ltd.

BOFA has announce that Coding Products of Canada has been awarded Platinum status as a Master Distributor for Canada. As such, the company is now authorised to stock, supply, warranty and service all BOFA products in Canada.

Training on BOFA's extensive product range has been completed recently by BOFA's US outlet, BOFA Americas, and a full range of stock was delivered to Coding Products' facility in Flamborough, Ontario in July.

This development will enable BOFA to better serve the important and rapidly growing Canadian market and, although BOFA is already the global leader in fume and dust extraction systems, it positions BOFA even further ahead of its competitors.

Coding Products provide total coding and marking solutions for their customers and have been a BOFA partner for 10 years. The company has over 20 years' experience in laser and commercial printing and so it is a very good fit with BOFA's range of products.

Joe Sarvari, president of Coding Products of Canada comments: "Coding Products of Canada has enjoyed a long working relationship with BOFA Americas and we are all very excited to grow our relationship and represent BOFA in Canada. We are a full sales organisation and stock all replacement parts, extractors and support installed equipment across Canada."

BOFA International launched in 1987 as a small family business and has developed into a multi-award-winning global leader in fume extraction and filtration, acknowledged as number one in the industry.

coding canada .com

It now employs over 260 people at its headquarters in Poole, Dorset, and in offices in Germany and the USA and exports to 120 countries around the world. Its expertise in providing reliable, high quality fume extraction solutions has become well established over the last 31 years and trusted by all sizes of business in a wide cross section of industries including laser, electronics, mechanical engineering, printing, 3D printing, dental, medical, pharmaceutical and beauty.

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FibreDrain oil mist filters

Providing oil mist collection solutions for your workplace 24/7

Oil mist almost always results in oily premises, equipment and products. Modern metalworking machinery is often controlled by sensitive electronics and production is lowered by unplanned disruptions caused by contaminated circuit boards. Handling equipment and pieces of products coated in a thin film of oil is not an acceptable working practice and definitely not production friendly. Removing oil mist is therefore essential for workplace safety and cleanliness.

Problems surrounding oil mist

Oil mist affects the health of machine operators, disrupts production and settles everywhere in the area, resulting in slippery floors and work surfaces. Almost all machining operations create oil mist to some extent. Oil mist is the aerosol that is formed when oil is used for cooling or lubricating during the machining of metal and some plastic components. Oil smoke is formed when oil contacts the hot machined surface, vaporises and condenses as sub-micron particles.

It is well known that prolonged and repeated exposure to oil products can be harmful to health, which means that good ventilation must be ensured under all working conditions. Oil emulsions normally contain 90-95 percent water and the remaining is soluble oil. The oil mist consists of aerosols from oil or oil/water emulsion. Mineral oil-based metalworking fluids are known as neat cutting oils or straight oils. Emulsions normally contain a number of undisclosed additives.

Rock solid solutions for high-efficiency air filtration

Nederman solutions for oil mist filtration are designed for continuous operations in demanding airflow applications. Its unique FibreDrain® technology ensures superior separation performance and long filter media life, thus minimizing your overall costs and ensuring total peace of mind. A wide range of filters is available, covering the entire spectrum from wet to medium wet and semi dry (MQL) and dry applications.

Nederman oil mist filters feature a unique, specially treated fibre surface that allows the collected droplets to coalesce, grow in fibre intersections and finally drain by gravity out of the filter medium. This technology, called FibreDrain ensures superior efficiency even under the most challenging conditions in continuous operations.

The filters don't absorb or get clogged by the oil. Instead, thanks to FibreDrain, the air is thoroughly cleaned and a maximum amount of coolant can be retrieved and reused.

Nederman FibreDrain oil mist filters feature: unique FibreDrain technology ensures top performance in continuous operation; exceptional fluid drainage capacity ensures maximum coolant retrieval and reduces coolant consumption; the FibreDrain design secures long filter life and thus low operating cost; a wide range of filter compositions to suit most applications; bespoke modular systems for large centralised systems; future-proof, can be adjusted to future parameters.

Nederman FibreDrain oil mist filters can be used for emulsion (oil mist), neat oil (oil smoke) and MQL applications.

How they work

Nederman FibreDrain oil mist solutions collect oil mist and oil smoke at the source, i.e. directly at the metalworking machine, either enclosed or open. The oil-laden air is passed through the layers of compressed filter media at low velocity.

The airstream enters at the bottom of the filter unit and passes upward through the filter cartridges. The filter stack is progressive in filtration properties, which means that the smaller the particle, the further it will penetrate the filters in the air flow direction. The captured mist drains from the filter surface by gravity down in the sump of the collector.

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25 years of providing dust and fume extraction solutions

In September 2018, AirBench Ltd proudly celebrated 25 years in business. Since beginning operations as WorkPoint Environments Ltd, the Colchester-based company has supplied in excess of 10,000 dust and fume extraction units to customers across the UK, EU, and worldwide. The AirBench Ltd name change came into effect in February 2011 and since then the AirBench brand has been the go-to name for downdraught dust and fume extraction.

A family business, AirBench Ltd has grown from its humble beginnings as a small contracting firm supplying dust extraction equipment from across a range of suppliers to focus on its own small range of products designed to solve specific problems for industry.

The initial AirBench range of down-draught benches has grown to include a much wider range, including the UK's most advanced downdraught bench, the AirBench RP. It also manufactures a range of cross-draught systems (VertEx), dust control booths, coolant mist filters (OMF) and air cleaning systems (MF).

With some of the staff being with the company since the very early days, AirBench can offer a continuity of customer service that is unrivalled in the industry and a network of distributors outside the UK ensures that AirBench products are available wherever they are needed.

As always, the company will continue to offer on-site demonstrations of its products across the UK, including assessments of your dust or fume extraction issues.

Contact AirBench if you have a problem it can help you solve:

AirBench Ltd
Tel: 01206 791191
Email: scook@airbench.com
www.airbench.com

Dust extraction specialist exhibits at UK's premier engineering event

Dustcontrol UK exhibited its range of centralised vacuum systems at the tenth anniversary of the Advanced Engineering show last year, showcasing its powerful DC-11 Module at this prestigious event.

The DC 11-Module, which comes in several models, is an optimised stand-alone unit for source extraction and industrial cleaning. It has been designed to service up to six normal extraction points or several cleaning outlets at a time, and is modularly built, meaning it can be tailor-made to suit any engineering environment.

The company, based in Milton Keynes, has over 45 years of experience in developing dust extraction solutions and centralised vacuum systems to fit client requirements in the engineering industry. It is an expert in capturing dust at its source, both where and when it's created.

For further information on Dustcontrol UK's products, contact:

Dustcontrol UK Tel: 01327 858001
Email sales@dustcontrol.co.uk www.dustcontrol.co.uk

High precision lapping and polishing

Engis has been developing high precision, high quality flat lapping and polishing systems for over 75 years, providing solutions to the most challenging surface finishing applications across the world.

All Engis lapping machines are engineered for maximum system compatibility, while Engis slurries, compounds, lap plates and accessories are designed to ensure consistent, efficient and effective performance.

The cornerstone of Engis advanced process development capability is its state-of-the-art Technology Centre, where specialist engineers work hand in hand with customers to develop products and processes that can finish components to sub-wavelength flatness and achieve mirror surfaces. The Technology Centre houses three laboratories staffed by technicians with decades of experience in lapping and polishing a wide variety of materials, providing process solutions for engineered substrates used in a wide range of engineering applications as well as in the optical and photonic sectors.

Benefits of lapping with diamond include: Increased productivity and throughput. Diamond cuts and polishes faster than conventional abrasives, while cycle times can be reduced as much as 80 percent.

Cleaner work environment. Lapping with diamond produces less waste significantly reducing housekeeping costs.

Easy to clean - clean cutting diamond slurry and lapping residue are easily removed from the workpiece without staining.

Lower consumable costs - due to its efficiencies, lower amounts of diamond slurry are required to produce the same material removal rates.

Environmental impact and disposal costs - with lower amounts of swarf being produced, the costs associated with disposing of waste and effluent are considerably reduced.

Engis FastLap machines

Engis market-leading FastLap series machines have been engineered to satisfy the demand for flat lapping and polishing of precision components, while providing maximum efficiency and quality control.

FastLap machines are equipped with heavy duty, high torque powertrains, which exceed industry standards, as well as soft-start and variable-speed drives for improved parts protection. The machines also offer a corrosion resistant work area, with an all stainless-steel option for use in demanding polishing environments.

All floor-standing FastLap machine functions are PLC controlled with easy touch screen interface, with full control of all manual or automatic machine functions, four-stage events in recipe building with recipe storage

and recall and optional integrated onboard facing to bring plate control into the process recipe.

Engis diamond polishing slurries

Engis diamond slurries are designed to deliver a faster, "greener" and more cost-effective process over lapping with conventional abrasives. In addition to the aggressive cutting ability of diamond, Engis' formulations provide superior surface finishes, faster part clean-up and significantly less waste to dispose of.

Engis Hyprez diamond slurry formulations are engineered to ensure that the diamond particles are well dispersed, stay suspended and dispense freely. With formulations tailored by its slurry chemists to optimize the physical characteristics of the slurry vehicle in order to deliver consistent and efficient results, taking full advantage of the diamond abrasive. In addition to its standard range of oil, water based, or emulsion carriers, Engis can also custom engineer a slurry for even the most demanding applications utilising particles as small as 50 nanometres.

As a diamond microniser, Engis has 100 percent control over the particle size distribution of the diamond abrasive used in its slurries, eliminating stray coarse and fine particles, providing customers with slurry formulations that cut faster and finish better than other products in the same nominal micron size.

Hyprez composite lapping plates

Engis offers a complete range of composite lap plates from aggressive iron composite, with enhanced material removal characteristics, to soft TX10 which yields superior flatness and finishes, while the HY copper composite provides the optimum workhorse solution, featuring good stock removal rates and high-quality surface finishes for virtually any application.

In addition to standard lapping plate sizes, special diameters up to 4,200 mm are available on request and spiral, concentric, radial, and waffle patterns can be machined onto the plate surface if required.

Maintaining the flatness of the lapping plate is critical to a stable process. The facing device, in combination with the pneumatic pressure heads of the FastLap machine, establishes a process that consistently achieves accurate plate conditioning, controlled surface geometry and texture, repeatable work pressure and fast, predictable stock removal.

Engis manufactures two types of conditioning rings for lapping applications: firstly, stainless steel backed ceramic work rings, which not only serve to charge diamond particles into the lapping plate, but also to hold the parts carriers in position; secondly, diamond plated conditioning rings which remove the previous layer of charged diamond, presenting a new face to be charged with fresh particles. These can also be used to bring the lapping plate back into its original flatness and parallelism.

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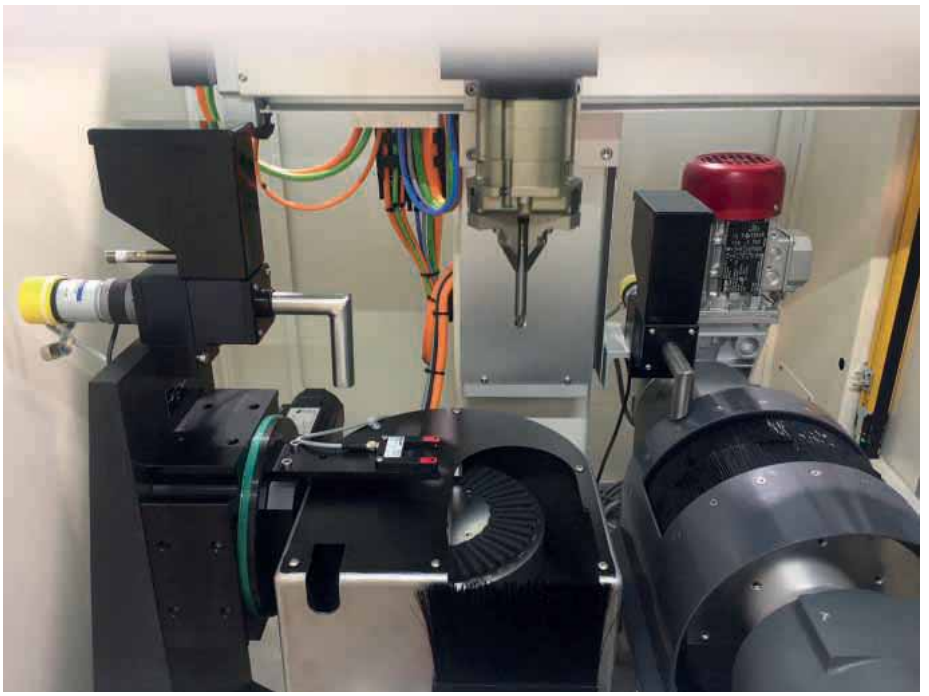
Magnetfinish deburr technology for cutting tools

Advanced Grinding Solutions Ltd is the sole UK distributor for the Magnetfinish range of machines that have been designed to finish all types of cutting tools and to vastly improve tool lifetime and performance.

Magnetfinish has supplied many machines to specialist tool manufacturers and regrinding companies that are using this new technology to offer end users within the aerospace and mould and die industries premium solutions whereby the finest and most highly precise cutters are required for arduous machining tasks.

After being produced by a grinding process, cutting tools of all types can suffer from having jagged cutting edges and micro sized burrs. These impact heavily upon the lifetime of cutting tools and can affect their performance during heavy cutting. When milling, drilling or tapping at extreme speeds, the resulting high temperatures that develop at the cutting edges are the main source for such problems because the tool becomes highly susceptible to wear. The patented Magnetfinish technology addresses this problem.

The 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. The Magnetfinish polishing process of the tools flutes results in a superior chip flow leading to the increased productivity of the tool. The tools primary cutting edges are machined to allow a defined and reproducible radius of between 3 µm and 50 µm to be created. This edge preparation process can increase the lifetime of tools such as ball nosed end mills by a factor of four and also allows more consistent machining results to be achieved as from using the tools for the very first time. The processing times for cutting tools are extremely fast with the average machining time for smaller tools being in the region of 5 to 10 seconds.



The M63 series from Magnetfinish is available with or without a tool magazine.

The machines with a tool magazine comprise:
MF 63CA with a magazine for 60 tools from D=0.1 mm to 16 mm. The machine has two different processing modules for separate processing of both tip and circumferences. This potential allows to process for example the main cutting edge of drills, ball-endmills, but also to hone cylinder edges of endmills, taps, reamers etc. and/or the polishing of flutes.

MF 63SA with a magazine for 60 tools from D= 0.1 mm to 16 mm has one processing module for example for hone cylinder edges of endmills, taps, reamers etc. or for the polishing of flutes, or deburring of taps and drills.

MF 63TA with a magazine for 60 tools from D=0.5 mm to 16 mm. The machine has one module for processing of, for example the main cutting edge of drills, ball-endmills, reamers etc.

MF 63CAD in combination with special diamond powder allows the finishing of diamond tools in a productive way.

The machines without tool magazine comprise:
MF 63C for tools from D=0.1 mm to 25 mm. The machine has two different processing modules for the separate processing of both tip and circumferences. This potential allows the processing of, for example, the main cutting edge of drills, ball-endmills, but also the honing of cylinder edges of endmills, taps, reamers etc. and/or polishing of flutes.

MF 63S for tools from D=0.1 mm to 25 mm. The machine has one processing module for the honing of, for example, cylinder edges of endmills, taps, reamers etc. or the polishing of flutes, or deburring of taps and drills.

MF 63T for tools from D=0.5 mm to 25 mm. The machine has one processing module for the processing of, for example, the main cutting edge of drills, ball-endmills, reamers etc.

Advanced Grinding Solutions can arrange for sample cutters to be Magnetfinished and returned to customers for their inspection in order that improvements in tool lifetime and performance can be established. Tool manufacturers, regrinding shops or end users can contact:

Advanced Grinding Solutions Ltd
Tel: 024 76 226611
Email: sales@advancedgrindingsolutions.co.uk
www.advancedgrindingsolutions.co.uk

One lapping/polishing machine - multiple processes

Some polishing applications require multiple lapping and polishing operations that until now have meant the purchase of a number of different machines, each designed for a particular type of lapping operation.

For some years now, lapping, polishing and cleaning expert, Kemet International has supplied machines with the ability to lap and polish using both conventional abrasive processes and the more adaptable and cost-effective diamond lapping processes, the latter with the ability to produce highly reflective surfaces straight from the process, meaning flatness can be measured with no secondary, usually manual, polishing process.

There are circumstances where these options are not good enough. Soft metals and optical materials commonly require a CMP finishing process using a colloidal silica suspension and this will usually mean the purchase of a specially designed machine that is able to cope with the aggressive corrosive nature of this type of media on top of the cost of a more general lapping machine. Kemet understands that in many instances, these applications are for low volume research and development institutions that may only be using the machines infrequently.

As a solution for this, Kemet have developed its DiaCol range of machines. These machines, available as a Kemet 15 (with a 15" lapping/polishing plate) or a Kemet 24 (with a 24" lapping/polishing plate), enable the user to lap parts using a conventional method, a diamond method, a pad polishing method with diamond or conventional abrasives and, now unique to the Diacol range, the ability to also use a CMP process on the same machine. The Kemet 15 has the additional benefit of being able to be specified with a lift off plate system, allowing quick and easy changes of plates/processes. This means that processes can be developed at the early stages of a project without the outlay required for multiple machines.

Once a process has been proven, it is then easy to increase capacity and prepare for serial production by adding the relevant machine to complement the initial DiaCol unit. This might be an additional KemCol 15 for CMP only, or a standard Kemet 15 for the initial lapping to enable the Diacol to be used for CMP polishing only.

What the DiaCol gives you is the flexibility to test any process on all materials on a single machine giving the user the confidence that you will be able to generate the results you need. For details of the DiaCol range, or for free process development or component testing, contact:

Kemet International
Tel: 01622 755287
Email sales@kemet.co.uk
www.kemet.co.uk

What is lapping?

The term "lapping" is used to describe various surface finishing operations where loose abrasive powders are used as the grinding agent at normally low speeds. It is a process reserved for products that demand very tight tolerances of flatness, parallelism, thickness or finish.

The basic theory of lapping starts with the components being placed within the confines of conditioning rings directly onto the surface of a rotating lap plate that is coated with a precision film layer of slurry. Through powered lap plate rotation, the loose and rolling abrasive particles within the slurry layer transfer cutting energy with their sharp cutting edges by penetrating the contact surface of the components removing microscopic chips of material. Concurrently the abrasive is acting on the lap plate via the contact surface of both the components and conditioning rings causing wear that when controlled by adjustable radial ring position will affect spherical curvature changes to maintain a flat lap plate condition.

One or more parts are machined at the same time in a batch process. The abrasive is usually mixed with a liquid vehicle, either oil or water based. The pieces being lapped are captured in retaining rings. Workholders also called "carriers" may be used to keep the parts separated to prevent damage to their edges. The parts are dragged across the lap plate surface on to which the abrasive is being fed.

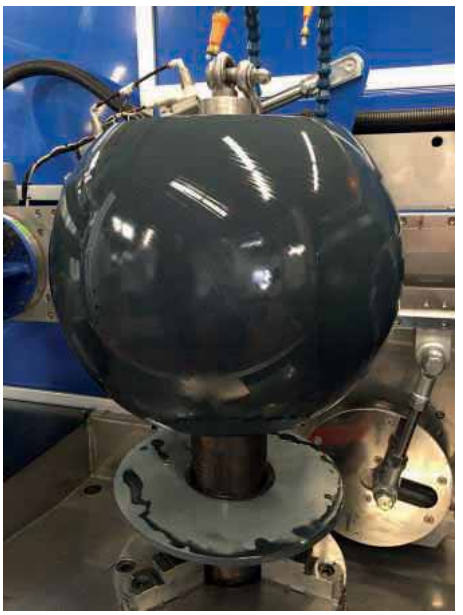
Lapping is an averaging process where the greatest material removal occurs where the high points of the surface of the part contact the flat lap plate. The object is to produce parts with a uniformly smooth and usually flat surface. A surface that has been lapped exhibits a dull, non-reflective and multi-directional appearance. This condition is referred to as "matt" finish. There may be slight reflectivity on materials lapped with very small micron size aluminum oxide abrasive. This is especially true if the material is relatively hard and the surface roughness measurement is perhaps five (.127 micron) micro-inch and below.

Very light "micro-scratches" may be viewed on lapped surfaces. Abrasive of larger micron size and harder compound will generate more micro-scratches in addition to deeper scratches. Most micro-scratches produced with small micron aluminum oxide abrasive will be less than .000001" (.025 micron) deep and can't usually be measured with a profilometer. Micro-scratches should not be confused with deeper scratches produced by particles of contamination or other causes.

The most obvious difference between lapping and the other major machining operations is lapping doesn't use a single or multiple point cutting tool. Lapping cuts chips by way of a loose abrasive process. One of several different types of precision micro-graded abrasive compound powder is mixed at a specific ratio with cutting fluid and dispensed onto a rotating lap plate.

The compound material, percentage mixture volume, abrasive particle micron size and applied pressure determine the resulting stock removal rate and surface roughness. The mixture of abrasive and cutting fluid is called "slurry" or "lapping slurry". The difference in the types of abrasives, as well as the size and cost will vary considerably so it is important to know which abrasive best suits your needs. The material to be lapped determines what type of abrasive is used, and the amount of material to be removed together with the specified surface finish governs the abrasive grain size. For example, extremely hard materials such as sapphire, carbides, and some ceramics require diamond or boron carbide. The medium hard materials, which includes harder metals and some aluminas, can be lapped with silicon carbide.

The Lapmaster Wolters SPL has been developed to produce a convex or concave scratch-free, high quality surface on



spherical components. The machine can also match lap a range of mating sphere components such as, Hydraulic timing valves. This system is effective on most materials including ceramic, graphite, ferrous metals, alloyed metals and stellite coatings

The Lapmaster Wolters LBVS has been developed to produce very accurate spherical surfaces on a variety of ball valves. A scratch free, matt high-quality surfaces is obtained on the ball valve and seat. The machine match laps two seats to the valve, achieving a perfect mechanical seal for any pressure requirement.

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Perfect surface finishing of prosthetic hips

Endoprotheses are implants that remain permanently in the body and completely or partially replace a damaged joint. The artificial or prosthetic hip joint is one of the best known such implants. A prosthetic hip joint is generally understood to be a replacement for the femoral head and the acetabulum (hip socket). At the femoral head, bone is removed on the thigh side and a long stem is inserted into the medullary cavity, to which the prosthetic femoral head is attached. One of the objectives of the prosthetic hip is to guarantee a long service life.

To ensure the prosthesis is installed well and withstands a long period of use, there are important factors that must be taken into consideration during manufacture, such as the design, the anchoring and the quality of the surface.

The prosthetic hip joint comprises the prosthetic femoral head (ball) and the femoral component (stem). Stems are installed in the medullary cavity in one of two ways: cemented or non-cemented installation. A stem that is not cemented is partially coated and is generally only polished at certain points. The coating guarantees better bonding between bone and implant. With a cemented stem, the entire stem is polished.

In this example, an OTEC DF series drag finishing machine is used to finish the surface of the stems and the balls. It is critical that the stems are not damaged when being fixed in the machine, so special holding fixtures are required for this. The stems are clamped in these special holders in the OTEC drag finishing machine and processed with a grinding media in a wet process. Afterwards, they are treated with a hard shell granulate in order to obtain a highly polished surface.

The balls are also processed in the DF machine. Here too, a grinding media is often used in the wet process as a first step. Likewise, after grinding, a hard shell granulate is used to create a high gloss finish. The OTEC drag finishing machine can be used to finish a variety of materials including stainless steel, titanium, cobalt chromium and ceramic.

The hip joint components are clamped in special holding devices in the OTEC drag finishing machine and are dragged at high speed and in a circular motion through grinding or polishing granulate. These rapid movements ensure that an optimal finish is achieved. In addition, blank areas are processed evenly, guaranteeing a homogeneous, finished surface. The DF machine from OTEC ensures the correct combination of abrasive, tool holder and process parameters for a surface finish that is on a par with hand-finished quality.

The unique feature of the OTEC drag finishing machine is the choice of machine variants, which make it possible to meet the requirements of individual customers. With the OTEC drag finishing machine, the hip prostheses achieve process-reliable results. To guarantee these results, OTEC supports its customers by using its long years of expertise to develop customised processes. A broad spectrum of knowledge in the field of implant finishing is guaranteed at OTEC. Renowned manufacturers around the globe use this technology.

With the OTEC method, a flawless, highly polished surface is achieved for both the stems and balls of hip prostheses.

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Hairline adds to Rimex's portfolio

As one of the world's leading specialists in the production of metal sheet finishes, particularly stainless steel, Enfield, Middlesex-based Rimex has constantly reinvented itself over its 60-year history. In doing so, it has maintained a high profile across global markets for its range of polished, embossed and coloured stainless-steel sheet products.

The diversity of Rimex's product range, which can be found across applications from transport, interior and exterior architecture, catering, industrial and nuclear, has been a strength over the years. Developments such as INCO coating and PVD colouring have also created new opportunities to expand its customer portfolio. The latest addition to its offering is in the form of a bespoke Timesavers 72 Series 1600-HL Hairline finishing system through longstanding supplier Ellesco.

"While many of our European customers prefer the satin finish on sheet for internal architectural features, Hairline is extremely popular in the Asian market," says Nick Barnes, Rimex sales director. "We have been able to supply the Hairline product, but it wasn't straightforward and we had to modify/reset existing machines to do it, which added time and cost. The decision to invest in a bespoke machine from Ellesco and Timesavers to achieve that finish has streamlined the whole process."

While this investment in the Hairline machine will assist exports to the Asian market, it is also expected to open up opportunities across other markets also.

Top, middle and below: The Timesavers 72-1600-HL Hairline finishing machine installed at Rimex. Combined in a flowline with a Timesavers 62-1600-WWB (belt+belt+brush) finishing machine

"The addition of this dedicated Hairline production capability is another string to our bow," says Nick Barnes. "It perfectly ties in with our existing product portfolio and the ability to offer Hairline processed sheet in combination with our INCO and PVD coloured stainless steel material provides great potential to increase sales in all of our markets. We can now confidently aim for further growth as we have the confidence in our ability to deliver Hairline as a stand-alone product. The Timesavers machine also gives us the confidence that we can supply consistent quality from order to order and that consistency is vital as our products are in constant view across projects from elevators to building exteriors, so any discrepancy will be easy to spot."

So, what is Hairline? In normal polishing and finishing, such as Rimex's Satin products, the surface finish undergoes abrasion from a fast-moving abrasive belt and rotary brush in a Timesavers 62-1600-WWB machine. This gives a finish with short and varied 'scratched' surface.

With Hairline, the material is polished and finished as normal, then passed through the 72 Series 1600-HL Hairline machine. Here the abrasive belt is moving at much slower speed around 0.6 -2 mm/min while the material is passed beneath it. The effect is to create a continuous 'scratch effect' from one end of the sheet to the other. A finish that is seen as more aesthetically pleasing for internal architectural features such as elevator doors and internal walls. To achieve this, the Timesavers machine is equipped with a harder than normal contact roller over which the abrasive belt passes. This ensures the correct 'aggression' on the material being finished as a harder roller provides firmer contact with the material. The actual finish is then governed by the grit size on the abrasive belt, which can be quickly changed if required to meet customer requirements.

"This Hairline machine is the is fifth Timesavers machine we have installed here over a 30-year period," says Rimex production director Richard Watson. "In that time, we have built an excellent relationship with the people at Ellesco and Timesavers. Of course, we consider other suppliers when looking to invest, but we always end up back at Ellesco, as we know we can rely on them for their service and applications support and the quality of the machines they supply to us from Timesavers. We are now focusing on creating a standard Hairline finish, using a grit size that gives a softer look to the surface that meets all the standards for external cladding, where the surface finish has to be less than 0.5 Ra. However, with the Timesavers machine we do have the ability to quickly change the abrasive belt to a larger or smaller grit size, which means that we can, if a customer specifies it create a wide range of Hairline finishes."

Rimex's finished stainless steel sheets are popular across a wide range of applications

Prior to the purchase of the machine, discussions took place that made use of the combined experience of Rimex, Ellesco and Timesavers. This resulted in the decision to combine the two machines into a flowline configuration, which delivers everything that Rimex was asking for. This combination of Timesavers machines also aids efficiency, with the operator feeding raw sheet at one end of the line and an automated system at the other applying a protective paper coating before stacking the finished sheets.

"When investing in machinery, we always look for something that is better than the norm," says Richard Watson. "In that regard Ellesco and Timesavers continually deliver exactly what we are looking for in terms of quality and performance."

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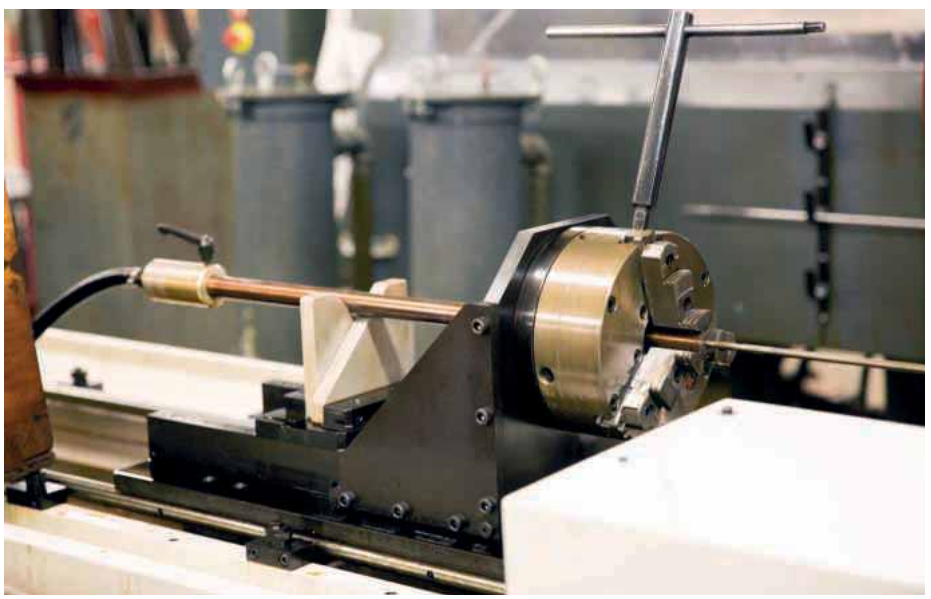
Gun barrel honing system hits bullseye for Pac-Nor

Manufacturing precision rifle barrels has always been something of an art, involving hand lapping of the bore surface twice, before and after the rifling profile is cut or swaged in by a rifling button. In fact, a bright, hand-lapped bore is considered one of the hallmarks of a precision rifle barrel, despite the inherent variations from manual work done by people who get bored and tired from the monotonous chore. Pac-Nor Barreling, Inc set its sights on this issue more than a year ago and hit the X-ring with the newly developed Sunnen HTE honing machine.

The machine has all but eliminated Pac-Nor's pre-rifling lap, which is the more difficult and time consuming of the two laps. Pac-Nor is also producing as many custom barrels as ever, but with a slightly smaller staff. "Our objectives with the hone were to build a better product with less labour, and the honing machine has exceeded my expectations," said Pac-Nor production manager Casey Dichter. "The hone produces a consistency in bore diameter that is head and shoulders above lapping, within two to three millionths of an inch end-to-end when it's really dialled in. This, in turn, improves the consistency of the rifling process by minimising variation in the depth of the grooves. We still finish lap after rifling, but it's easier because we just polish off the fine crosshatch finish that may be left after honing and rifling."

Pac-Nor Barreling is a true custom manufacturer catering to bolt-action rifle shooters. The company's principle markets are law enforcement, military, competitive shooters and hunters. Started in 1984 by avid shooter and company president Chris Dichter, Pac-Nor is now in its second generation under his son, Casey. In addition to barrel manufacturing, the shop will install the barrel on a customer's action, or add features such as muzzle brakes or fluting on bolts and barrels etc. The shop runs two shifts per day. A day shift of ten people produces 30-40 custom barrels of different calibres in 416R stainless or chrome-moly steel. A night shift of three people produces one type of barrel with about 50 AR-15 barrels per day for a rifle OEM.

Pac-Nor's process starts with cutting and facing premium bar stock, followed by gun drilling on four Pratt & Whitney twin spindle machines and an Eldorado CNC twin spindle. After reaming, the barrels are gauged for size. Depending on the condition of the reamer, 0.0004" to 0.0007" of material is left in the bore. This must be manually lapped out or honed out to final size for rifling. "Everyone who works here has done hand lapping," says Chris Dichter. "It's an unpleasant job, particularly if the reamer is starting to get dull. Lapping may take 10 to 45 minutes, depending on the calibre of the barrel. We tried to shorten this, but when chatter marks get 'ironed' into the surface by the rifling button, the finish lap is even longer and more difficult, so there is no advantage. With lapping, too, there is potential for variation, simply because it's a manual process. Lapping can also be a production limiter and in our region we have a very small labour force to draw on when we want to grow."



The company had explored honing in the nineties, but re-visited the idea when Sunnen introduced its HTE honing machine in 2014. The HTE is a horizontal machine that can hone small-bore rifle barrels, with a diameter range of 0.150" to 0.790" (4-20 mm), and lengths up to 60" (1,524 mm). Designed specifically for long small bores, the machine features an extremely sensitive drive and tool feed system that provide maximum protection against tool overload/breakage. Tool specific force limits and run settings are stored in the touchscreen PC control, allowing the system to sense tight sections in the bore and correct them automatically.

Sunnen also developed a new LongBore Tool (LBT) designed to take on industry's most difficult honing challenges in small

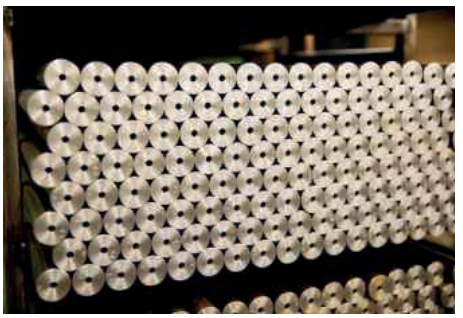
bores of .17 calibre rifle barrels. The tool quickly removes reamer marks, waviness, tight spots and other imperfections left by upstream processes. The LBT utilises metal-bond diamond or CBN superabrasives for high productivity, long life and fast cycle times. Precision machined of through-hardened tool steel, the LBT can produce bore accuracies of 0.000027" (0.0006 mm) for diameter, roundness, and taper, from first part to last.

Honing is an ideal replacement for hand lapping barrel blanks before rifling. It quickly removes reamer scratches and surface waviness without labour-intensive hand lapping. A typical 600-grit abrasive can produce a 6-10 microinch Ra (0.15 to 0.25 µm) finish in a reamed barrel blank. By producing a consistent bore diameter (±0.0001" or less), parallelism, roundness and surface finish end to end, honing yields more consistent performance from rifling buttons and cutters, resulting in a constant groove depth. The ideal bore geometry reduces distortion of the bullet shape for improved gyroscopic stability in flight.

"We are currently honing about 80 percent of what we make and will do more as we acquire the tools in different calibres," says Chris Dichter. "We have learned the quality of our reaming now does not need to be as critical because we have the hone. Although there is a trade off in cycle time and abrasive cost for additional honing, we are still able to run our reamers two to three times longer than when we lapped alone. With a hand lap, the time and effort increase when the reamer is getting dull."

After honing, the barrel is inspected again before rifling with a pull-button. PacNor makes its own Accu-Twist carbide rifling buttons and can provide different rifling styles, including polygonal, as per the customer's choice. A button is attached to a rod and the rod is pulled through the barrel. The company's hydraulic rifling machine utilises a CNC machined twist bar with a helix angle that matches the twist rate requested by the customer. The final twist rate is confirmed afterward using a Barrel-Scan electro-optical twist measurement system. The barrel is then stress relieved in a tempering furnace, followed by contouring of the outer shape and final, finish lapping of the bore.

"During the finish lap, you can really tell the difference between a bore that was



honed before rifling and one that was lapped," adds Chris Dichter. "You can easily sense any remaining tight or loose spots in the bore. The diameter uniformity and roundness of the honed bore are superb. The lap also feels different in a honed bore."

In competitive shooting where winning scores may be separated by thousandths of an inch, a few millionths of an inch improvement in the uniformity of a Pac-Nor barrel may make a big difference for a skilled shooter.

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A leading precision component manufacturer for over 20 years

Mollart Cox has supplied precision machined products into the oil & gas, nuclear, defence, hydraulic, off highway and aerospace industries for more than 20 years.

The Chesterfield-based company utilises its 45,000 sq ft machining facility to offer full project management on a range of products, with deep hole drilling and honing up to 10 m, CNC turning up to 8 m and 5-axis mill turning up to 4 m. Coupled with the large machines, a range of high-volume machines with bar feeds and gantry loading systems allow lights out running to keep costs competitive.

All the machines are planned with full scheduling software which is directly linked to the material requirements. In line with the new 9001:2015 standard, the quality management system is the key to producing precision components correctly and on time.

Quality is the centre of all machined components at Mollart Cox. With the full ISO9001 approved quality management system, all aspects of product quality is catered for. The company runs a full online calibration system for all measurement items and gauges. Included in the onsite gauge sets are a large number of thread gauges. It is possible to measure internal and external threads from 4 mm diameter up to 500 mm diameter. All thread variations are accounted for: metric, BSP, UNF, UNC, Stub ACME, NPT and many more.

With six gun drilling machines on site, Mollart Cox is the only company in the UK to gun drill holes from 1.8 mm up to 40 mm diameter at lengths up to 6,000 mm.

Bore sizes are available from 1.8 mm to 40mm diameter with a shortest length of 20 mm up to 6,000 mm 1,800 hours are available per month.

Gun drilling - what is it?

First introduced in Europe over two centuries ago, the process was born out of the need to generate the bore of gun barrels in a more efficient manner. Gun drilling allows the tool to drill the full length of the barrel without retraction by injecting cutting oil through the hollow shank of the gun drill. Once the oil has lubricated the cutting edges of the tip it escapes along the vee-shaped flute of the shank, taking with it the chips.

Gun drilling - how has it developed?

As with any new process, gun drilling underwent constant development as related technologies evolved. The most significant improvements in the early stages were development of the high-pressure pump and the debut of sintered carbide. With the switch to carbide tips and high-pressure coolant, the process was able to yield faster cycle times and better finishes.

Improvements continued as experimentation showed that by varying tip geometries, certain materials and conditions could be better accommodated.

Mollart-Cox believes that gun drilling is the most accurate and cost-effective method for drilling small diameter holes. Its manufacturing facility currently boasts eight gun drilling spindles, as well as its very own purpose-built six metre gun drill. This machine is revolutionary to the UK gun drilling market.

As with the deep hole drilling method of boring, Mollart Cox can accommodate various shapes and sizes on its gun drilling machines. This gives it the opportunity to offer customers gun drilled holes concentric to the diameter or offset from the diameter through practically any shaped component.

Brand new Doosan Puma 5100LMB arrives

The company has purchased its first Doosan to complement its ever-growing fleet of Mazak's in the finish machine shop. With a 24" chuck and SMW steady, coupled with live tooling and full C-axis, it's a great machine for producing complex components. Maximum turning diameter is 650 mm, with a maximum turning length of 2,000 mm.

Parts machined on the new Doosan can easily be transferred to the Global Advantage CMM machine, where fully temperature-controlled inspection reports can be produced upon request.

For your precision machined parts enquiries, contact:

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www. mollartcox.co.uk

Gleason completes acquisition of Faessler gear honing

Gleason Corporation has announced the completion of its acquisition of the assets of Daetwyler Industries AG's and MDC Max Daetwyler AG's Faessler gear honing business.

The gear honing machine, workholding and tooling business operations of Daetwyler's Faessler division for the high-precision hard finishing of gears have been acquired by Gleason's subsidiary, Gleason Switzerland AG by way of an asset deal. Faessler's management team and employees have agreed to join Gleason. Gleason previously announced the execution of a definitive agreement to acquire all assets and certain contractual relationships of Daetwyler's gear honing business on February 26, 2019.

Commenting on the acquisition, John J. Perrotti, president and chief executive Officer of Gleason Corporation, says: "Faessler is a leader in honing technology for gears and ideally complements Gleason's existing product line for gear hard finishing solutions. Faessler's established presence in the global marketplace and Gleason's extensive sales and service organisation will create great synergies for existing and new customers."

Gleason Sales
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www.gleason.com

The company's products are used by customers in automotive, truck, aircraft, agriculture, mining, energy, construction, power tool and marine industries and by a diverse set of customers serving various industrial equipment markets. Gleason has manufacturing operations in the United States, Brazil, Germany, Switzerland, India, China and Japan, and has sales and service offices throughout North and South America, Europe and in the Asia-Pacific region. More information about Gleason Corporation is available at **www.gleason.com**

Ralph Daetwyler, chief executive officer of Daetwyler Global Tec Holding, says: "We are pleased to have a company such as Gleason with its long tradition in gear technology and the gear production equipment market becoming the new owner of this business. We are proud of the accomplishments of the Faessler team and we believe the potential for Faessler's continued growth and success by being part of Gleason, with its market leadership and global reach, is truly exciting." Gleason is a global leader in gear technology solutions. The company's mission is to offer Total Gear Solutions ranges from the development and sale of gear design software to the development, manufacture and sale of gear production machinery and related accessories, metrology equipment and automation solutions.

Founded in 1943 in Switzerland, Daetwyler Industries manufactures benchmark-quality machine beds, frames and components across the entire machine tool industry including to customers with the highest tolerance requirements, hence the long-standing collaboration with Gleason Corporation. The highly diversified Daetwyler Group is also a market leading supplier of consumables and supplies to the printing industry with manufacturing locations in Switzerland, USA, China and India.

The solutions to your surface finishing challenges

Efficient solutions for long-standing and new requirements for component surface finishing

DEBURRING EXPO

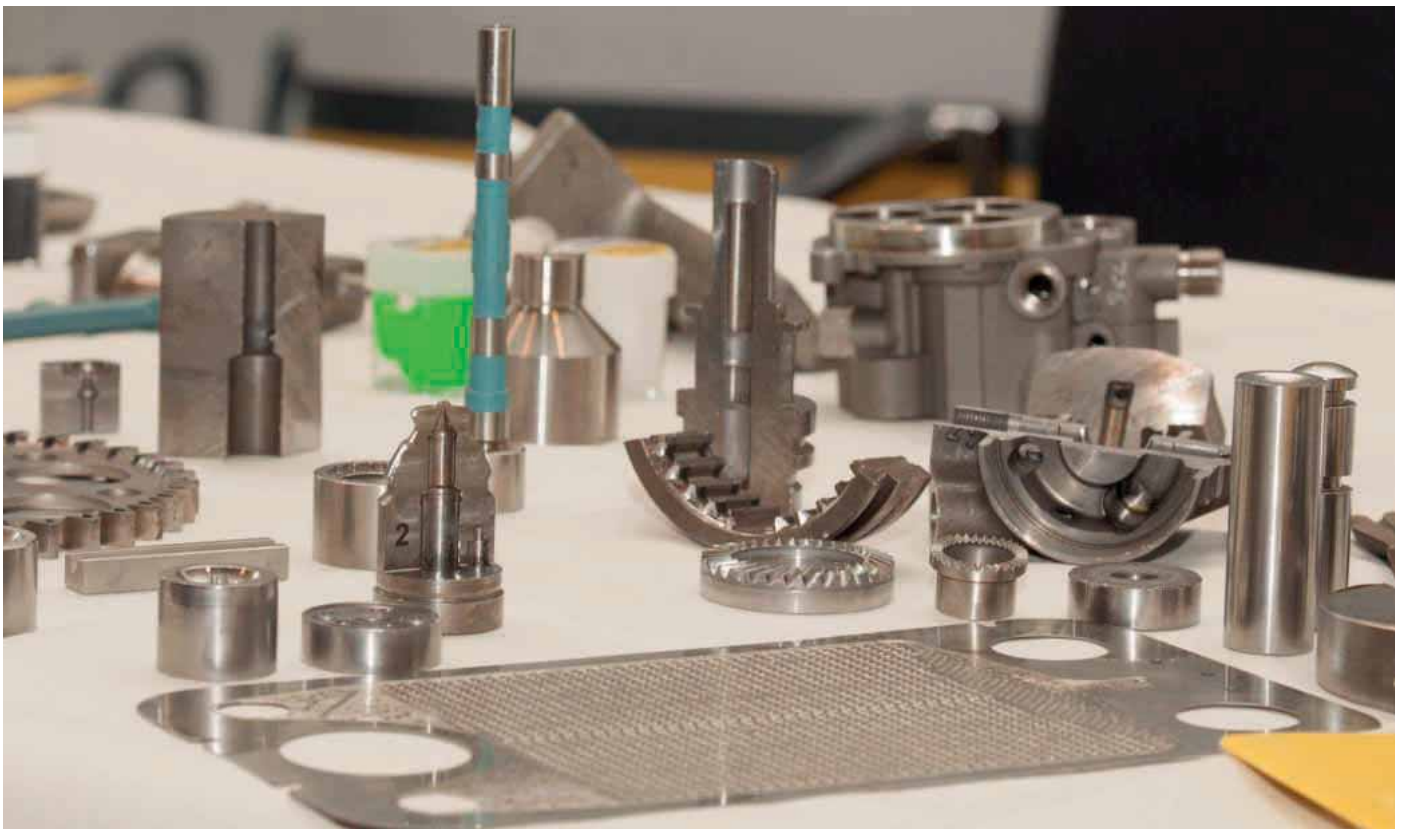
8th to 10th October 2019 in Karlsruhe, Germany

Whether traditional or new manufacturing processes are involved, none of the available technologies make it possible to produce component surface finishes in the required quality. Process steps such as deburring, rounding and cleaning, as well as targeted functional or decorative surface finishing, are thus indispensable. Solutions by means of which these tasks can be executed reliably and economically will be presented at DeburringEXPO at the Karlsruhe Exhibition Centre from the 8th to 10th October, 2019. The 3rd offering from the leading trade fair for deburring technology and precision surface finishing will provide valuable know-how at its bilingual expert forum. Parts manufacturing is currently faced with new tasks in numerous areas. Due to more and more complex geometries and finer structures, machined, formed, primary formed, forged, sintered and moulded workpieces are not only resulting in stricter requirements where actual parts production is concerned, but rather during deburring and surface finishing as well. The technical cleanliness of components is an essential quality criterion in many industry sectors such as the automobile and automotive supplier industries, aerospace and aviation, machinery manufacturing, medical engineering, metrology, precision engineering, sensor technology and drive technology, as well as in the field of electro-mobility.

"Reliable deburring, during which extremely fine burrs and flash must also be removed depending on the degree of required cleanliness, is a fundamental prerequisite for complying with cleanliness specifications," explains Hartmut Herdin, managing director of fairXperts GmbH & Co. KG, promoters of DeburringEXPO.

Furthermore, in some cases surfaces are required which minimise friction, wear and noise, and which make it possible to enhance performance and extend service life. Downstream processes such as joining, sealing, coating and assembly also necessitate burr-free and in some cases rounded edges for various reasons. For example, in the field of sheet metal processing, deburring minimises the risk of injury due to sharp edges and reduces tooling wear for edging and straightening machines. On the other hand, good deburring and well-defined edge rounding make it possible to enhance painting quality at the edges.

"Relying solely on experience gained with



previously used processes for these tasks can quickly lead to a competitive disadvantage. Benchmarking is thus advisable which focuses central attention on searching for the most effective, reliable and economical technologies," explains Hartmut Herdin.

Companies are also being confronted with new tasks in the area of surface finishing which result from innovative production processes such as additive manufacturing (AM). The removal of residual powder and supporting structures, as well as the rough and porous surfaces produced by these processes, are challenging.

Cross-Industry, Cross-Technology Information

The above-mentioned tasks and many others as well will be explored at the event. As of the end of March, 125 exhibitors from eleven countries, including numerous market and technology leaders, had already made firm booking for their booth floor space. Offerings for solutions involving deburring, rounding and the production of precision surface finishes, which are unparalleled at any other event around the world, will await the trade fair visitors.

The exhibition portfolio covers products, systems, processes and services for deburring, the production of precision surface finishes and cleaning after deburring, as well as measuring and test technology and analysis systems for quality control and quality assurance for components made of practically every conceivable material in nearly all industry sectors. Opportunities for further qualification and technical literature will also be found at the event. With its comprehensive spectrum, DeburringEXPO not only covers the entire process sequence for deburring and the production of precision surface finishes, it also identifies trends and imparts practical as well as theoretical knowledge.

Bilingual Expert Forum - know-how as added value

Due to its unique character and its highly practical orientation, the three-day expert forum integrated into DeburringEXPO is an extremely popular source of knowledge. Presentation focal points include fundamentals, approaches to process and cost optimisation, reports on best practice applications and current trends. Talks on special issues such as the process sequence for sheet metal deburring, post-processing of AM parts and cleaning after deburring round out the forum programme. All talks held at the DeburringEXPO expert forum will be simultaneously interpreted (German-English/English-German). Participation is free of charge for visitors at the leading trade fair. Further information, the entire exhibition programme and a preliminary exhibitor list are available at **www.deburring-expo.de**

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Removing micro burrs from small diameter, internal and external threads

In-house removal of micro burrs on internal and external threads with miniature brushes as small as 0.014 inches can reduce cycle time and improve part quality and consistency.

If you read the online forums, it is immediately clear that identifying the optimum technique for removing the inevitable burrs created during machining of threaded parts is the subject of much debate.

Internal threads, whether cut, rolled or cold-formed, can have burrs at hole entrances and exits, on thread crests and on most slot edges. External threads on bolts, screws and spindles have similar issues, particularly at the start of the thread.

For larger threaded parts, burrs can be removed by retracing the cutting path, but this increases the cycle time for each part. Secondary operations, such as heavy nylon deburring tools or butterfly brushes can also be used. However, the challenges increase substantially when the diameter of the threaded part or tapped holes measure less than 0.125". When this is the case, micro burrs are still created, but are small enough that removal is more a matter of polishing, than aggressive deburring.

At this point, in the miniature range, the choice of deburring solutions narrows considerably. Mass finishing techniques can be used, such as tumbling, electrochemical polishing and thermal deburring, but these require the parts to be sent out at additional cost and loss of time. For many machine shops, the preferred solution is to keep secondary operations such as deburring in house. Either automated using CNC machines or using hand drills or even manual techniques.

Fortunately, there are miniature brushes that, despite a tiny stem, filaments and overall dimensions, can be rotated using hand drills and even using adaptors on CNC equipment. Now available with abrasive nylon, carbon steel, stainless steel and diamond abrasive filaments, these tools are available as small as 0.014", depending on the type filament.

Given the potential for burrs to affect the form, fit or function of a product, the stakes are high for products that have micro threads including items like watches, eyeglasses, cell phones, digital cameras, printed circuit boards, precision medical devices and aerospace parts.

The risks include misalignment of joined parts, difficulties in assembly, burrs that can become loose and contaminate hygienic systems and even fastener failure in the field. As a result, burr removal remains a critical finishing operation.

Mass finishing techniques such as tumbling, thermal deburring and electrochemical polishing can be effective for removing some light burrs on small parts. Tumbling, for example, can be used to remove some burrs but is not generally effective on the ends of threads.

Furthermore, care is required to prevent mashing burrs into thread valleys, which can interfere with assembly.

When burrs are on internal threads, mass finishing techniques must be able to reach deep into internal structures. Thermal deburring, for example, utilises heat energy that approaches several thousand degrees Fahrenheit to attack burrs from all sides. Because the heat cannot transfer from the burr to the parent material, the burr is only burned down to the parent material. As such, thermal deburring does not affect any dimensions, surface finish or material properties of the parent part.

Electrochemical polishing is also used for deburring and works by levelling out any micro-peaks, or burrs. Although the technique is effective, there is still some concern it could affect the threads. However, generally speaking, material removal conforms to the shape of the part.

Despite the potential issues, the low cost of mass finishing still makes it an appealing process for some machine shops. However, as already noted, machine shops prefer to keep secondary operations in house if possible.

For threaded parts and machined holes less than 0.125", miniature metalworking brushes are an affordable tool to remove small burrs and perform internal polishing.

Miniature brushes come in various small sizes (including kits), contours and materials. These tools are best suited to address tight

tolerances, edge blending, deburring and other finishing requirements.

As a full line supplier of surface finishing solutions, Brush Research Manufacturing offers miniature deburring brushes in a variety of filament types and tip styles. The company's smallest diameter brush measures only 0.014 in. The miniature deburring brushes can be used by hand. However, because the brush stem wires are very fine and may bend, the company recommends using a pin-vice. The company offers a double-end pin vice in kits with up to 12 brushes in both decimal (0.032" to 0.189") and metric hole sizes (1 mm to 6.5 mm).

The pin vices can also be used to grip the small diameter brushes to allow them to be rotated under power on a handheld drill and even on CNC machine.

Miniature brushes can also be used on external threads, to remove small burrs that can form at the start of the thread. These burrs can cause problems and should be removed, because any displaced metal can cause critical and potentially hazardous situations in industries that require exceptional precision and cleanliness.

To prevent deflection of the twisted wire stem of the brush, CNC equipment can be programmed to apply the precise pressure and rotational speed.

There are several types of miniature brushes available today that vary not just in size, but also filament type. Carbon steel, stainless steel, brass, nylon and abrasive filled nylon are commonly used. Abrasive filled nylon can contain silicon carbide, aluminum oxide or diamond abrasive. Abrasive nylon is particularly effective for removing burrs and polishing thread peaks and flank angles in tapped aluminum holes.

Miniature stainless-steel brushes are popular for more aggressive deburring of materials like cast iron or steel to remove chips or clear break-through burrs. Although abrasive nylon miniature brushes are available as small as .032, due to the nature of the stainless steel, Brush Research was able to recently add three smaller brush sizes: 0.014", 0.018" and 0.020".

Brush Research also supplies miniature deburring brushes with diamond abrasive filaments for harder materials such as hardened steel, ceramic, glass, and aerospace alloys.

The choice of filament depends on the surface finish specifications, or if there is a need for a little more aggressive deburring power. Other factors that apply to miniature brushes used in automated applications include RPM of the machine tool, feed rates and optimum wear life.

Although deburring of internal and external micro threads can be challenging, using the most suitable tools for a given application can simplify the task and assure all burrs are consistently removed on every part. In addition, by avoiding outsourcing of secondary deburring operations, machine shops can reduce turnaround time and price per part.

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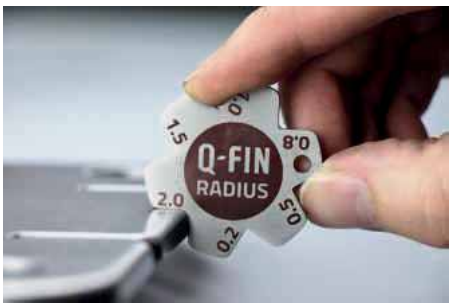
Radius 2 in one pass

The SER600 Super Edge Rounder from Q-Fin has been specially designed to apply a 2 mm radius on steel in one pass, with a speed of 1 m/min.

There is a lot of discussion as to whether such a substantial rounding as R2 is really necessary to prevent sharp edges, or if it is more important to apply a protective layer (for example, when powder coating or galvanising) on the sides, which is as thick and strong as the layer on the rest of the part.

A lot of material must be machined for R2 about a hundred times more as for R0.2. Nonetheless, Radius 2 is the recognised standard for public installations in which sheet metal is generally used. This edge rounding must therefore be achieved. This can be done by milling, but this is very expensive. The material can also be removed by abrasive techniques (sanding and grinding), both manually and mechanically. The manual application of a radius of 2 mm to is very labour-intensive and therefore increases the cost price. In case of rounding the products with a deburring machine, the material needs to be run through the machine several times before reaching a R2 rounding. In many cases it is not even possible due to the shape of the product or characteristics of the machine.

The SER600 from Q-Fin can apply a 2 mm radius on steel in one pass. "This is not a standard machine that can also give a large edge rounding, but a machine that is specifically built to put a R2 on steel," emphasises Joost Kouwenbergh, product manager at the machine builder in Bergeijk. The SER600 is about twice as long as the regular F600 deburring machine in the Q-Fin range. This is because the machine has five workstations: one grinding belt upfront followed by four brush units. Joost Kouwenbergh explains: "The first two brush units give pressure from above. Brushes three and four work the sides." The combination ensures a perfect rounding of 2 mm on the product.



The SER600 with magnetic conveyor belt is suitable for working steel sheet metal parts up to 600 mm wide, with a material thickness of 4 up to 150 mm. The length of the products is unlimited. The Super Edge Rounder machine is an important addition on the current machine program for Q-Fin.

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M.A. Ford Europe – on a Roll!

Over the years, the Rollomatic name has become a byword for Swiss precision engineering, accuracy and performance in the grinding and surface finishing industries, as well as countless OEM businesses globally. While reputation is an important part in any commercial environment, it's the ability to deliver results and meet customer expectations that really matter in the fiercely competitive machine tool sector.

We take a detailed look at the recent installation of a Rollomatic NP3+ machine by Advanced Grinding Solutions at the Custom Tools Division of leading high-performance tooling manufacturer, M.A. Ford Europe, to explore the background and the outcomes.

M.A. Ford Europe has been trading in the UK for just over 20 years and, like Rollomatic, has acquired a reputation for quality, precision and performance in high technology sectors. These include automotive, aerospace, medical and Formula 1 alongside general engineering and subcontract manufacturing, where the objectives are usually centred on improving productivity through high performance machining.

At the heart of the company is its extensive range of coated solid carbide tooling, including end mills, drills and special tools, which achieve exceptional cutting performance on tough metals, such as Inconel, titanium and other super alloys, as well as less exotic materials.

While the majority of the tooling range is manufactured at the expansive facilities at its US parent company in Davenport Iowa, which already operates around 20 Rollomatic machines, during the last five years there has been more than £5 million investment in the company's Custom Tools Division in Leeds, Yorkshire.

The new Rollomatic NP3+ installed at M.A. Ford Europe

The Custom Tools Division was created when tool manufacturer and remanufacturer, Ashton Tools, was acquired by M.A. Ford Europe in 2012 with the intention of expanding the custom tooling operation as well as designing and manufacturing 'standard' tools in the UK for the home and European market.

The challenge

"To understand why we purchased the Rollomatic NP3+, it's necessary to have some insight into our manufacturing process," explains M.A. Ford Europe's manufacturing director, Chris Wagstaff.

"By early 2018, our manufacturing facility in Leeds had undergone a massive transformation and expansion with the number of tool grinding machines more than doubled from three years earlier, giving us increased capacity and greater flexibility in the manufacturer of special and standard tools.

"However, in some respects we became a victim of our own success. We found that as our manufacturing volume and tool range expanded, our high-performance tool cutter grinders were being used increasingly to prepare the tool blank diameters, as part of each tool cutting programme. This was limiting our production capacity and efficiency. We were already running a blank grinding cell with a pre-owned machine to help alleviate some of the issues and although it proved that the principle was worthwhile, the machine didn't have the accuracy or performance that we needed."

The company had also achieved ISO 9001:2015 by this time and with its increased focus on processing, procedures and planning; one of the company's risk assessments identified some important issues. The volume of different pre-formed tooling blanks they stocked had reached more than 300 different diameters and lengths, which tied up financial resources in stock. Even with this level of stock holding, they found that bars often needed cutting to length or required the diameters to be ground to meet special orders, which increased wastage and production time. They also identified that if their ageing blank grinder was to fail, the impact would be considerable, as there was no 'back-up'.

M.A. Ford Europe's Manufacturing Director – Chris Wagstaff with the Rollomatic NP3+

The solution

As M.A. Ford in the US was already relying on a range Rollomatic blank and tool grinding machines as a core part of its production, the UK management team included Rollomatic alongside two other manufacturers as part of the selection process.

Rollomatic's sole UK agent, Advanced Grinding Solutions (AGS), evaluated M.A. Ford Europe's specifications and recommended the Rollomatic NP3+ multi-axis CNC grinding machine.

AGS's managing director, Chris Boraston, explains: "The initial contact from M.A. Ford was made on our stand at MACH 2018, as we were both exhibiting at the show. As Chris Wagstaff and MD David Ward outlined the issues they were facing and their future production targets, the longer we talked, the more confident I was that the Rollomatic NP3+ would be the best solution for them."

After extensive detailed competitive trials and proofing tests in the UK and at Rollomatic's Switzerland HQ, M.A. Ford Europe agreed with Chris Boraston and ordered the machine, which was delivered and installed in February 2019.

A special 'pinch/peel' grinding process, pioneered by Rollomatic, is used by the NP3+, which allows blanks with lengths up to 400 times the diameter to be ground without deflection issues. It also has a working range from 0.025 mm to 25 mm diameter with the ability to grind stepped diameters, angles, radii and chamfers. An integrated 3-axis robot loader provides auto-loading from pallets.

A number of other factors that influenced the decision including its performance and exceptional accuracy. Chief among these is the Rollomatic's ability to produce tool blanks in a single automatic operation using

both roughing and finishing grinding wheels simultaneously within very close tolerances. Cylindrical blanks are finished with length, diameter and concentricity tolerances of 0.002 mm and even on the longest tools a run out concentricity of under 0.001 mm is achieved.

The immediate advantages of this ability, apart from the high precision, is that it removes the need to replace grinding wheels and re-load tool blanks for finishing, which is the case on most other machines, which saves time and money. It also removes the need to undertake cylindrical grinding operations on 5- or 6-axis tool grinding machines, which are usually less accurate than the Rollomatic NP3+ and take longer. As a direct result, M.A. Ford cutter grinding machines focus on manufacturing cutting tools rather than occupying valuable production time with cylindrical grinding operations.

The daily grind

As the Rollomatic is performing a specific set of functions, its programming is also considerably simpler than that used on most cutter grinders, which also has time and cost benefits. Rollomatic's software is designed to work offline or directly on the machine and allows the most complex of tools to be typically programmed in 10-15 minutes. The software, in conjunction with the rough and finish grinding wheels set up, allows users to specify multi-pass grinding operations for roughing and/or finishing to achieve the highest possible level of accuracy whilst creating superior surface finishes on tapers and radii.

Chris Boraston added: "Accuracy is a key feature of Rollomatic machines and the integral Movomatic and Marposs gauges used at M.A. Ford Europe provide constant automatic positioning and post-process gauging of ground diameters with automatic feedback to the machine's FANUC control. This maintains the high levels of accuracy and quality demanded by their production team."

The inside view – Setting up the Rollomatic NP3+

Pictured left to right: Damien Wunderlin, sales director- Rollomatic, David Ward,managing director – M.A. Ford Europe, Chris Boraston, managing director – Advanced Grinding Solutions

The results

After installing and commissioning was completed, the Rollomatic very quickly began making a significant contribution to tool production at M.A. Ford's Custom Tool Division, which delighted manufacturing director, Chris Wagstaff: "We run an incredibly efficient manufacturing operation with 'lights-out' production, so it's important that we have reliable and robust machining plant, such as the Rollomatic, which reduces the risk of interruptions in production," he says. "Throughout the selection and testing procedure, we had a clear specification of what we wanted to achieve and even though the machine has been operational for just a few months, it has exceeded our expectations and made a significant impact on our manufacturing process."

Simple programming of the Rollomatic NP3+

For one of its customers, M.A. Ford Europe manufactures a special multiple diameter end mill in batches of 1,500 and has already seen a 30 percent reduction in the cycle time for that tool. It's a similar story for the other special products, as well as standard tools, as the tool cutters have been freed up to concentrate on flute grinding and final production while the NP3+ deals with the production of precision blanks.

The flexibility of the machine has also had a dramatic impact on M.A. Ford Europe's blank stock. From stocking more than 300 individual blanks, the company now only needs 12 different stock items, which has simplified inventory and stock ordering, as well as reducing the financial commitment to stock.

Chris Wagstaff concludes: "It's probably fair to say that, although we were expecting production and manufacturing improvements, our investment in the Rollomatic has also delivered tangible business benefits in areas that hadn't been identified. Clearly, this is a significant achievement and we can understand why our colleagues at M.A. Ford in the US rate them so highly."

Further information on M.A. Ford Europe and its manufacturing solutions can be found at **www.mafordeurope.com** or by calling 01332 267960.

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Thread milling to the fore

ANCA's LaserPlus in process measurement enables lights out manufacturing of large volumes of threadmills.

Thread milling is a versatile, cost-effective process for cutting a variety of threads, parts and workpiece materials on the same machine. This process produces an internal or an external thread by doing a helical interpolation on a CNC-machine which can make helical paths.

Thomson Mathew, ANCA product manager comments: "Threadmills generate superior burr-free surface finishes and reduce tool inventory costs. Shops can use the same tool for both left and right-hand threads as well as for different thread tolerances. A broad range of materials and hole diameters can also be thread milled with the same tool. Unlike tapping, threads produced through milling can be machined to full depth at high accuracy, even in hardened materials. Some of the other advantages are faster cycle times and less tool breakage. Basically, these are a really effective tool."

Advantages of the threadmill include: a 20-40 percent increase in tool life compared to other threading processes; increased strength and rigidity specially on hard material when cutting forces are applied; reduced inventory costs of tooling; threadmill inserts allow for small to larger cutter diameters.

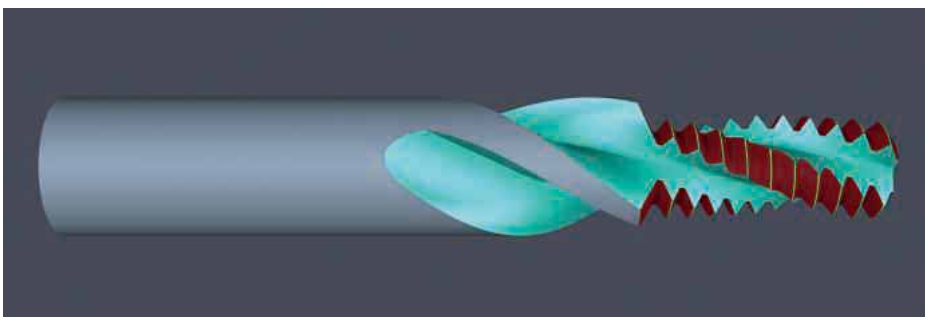
Thomson Mathew continues: "Our tool and cutter grinders can effectively manufacture a range of thread milling cutters. Customers wanting to manufacture these cutters in large volume or for lights out manufacturing can make use of the Blum laser for measurement and compensation inside the machine."

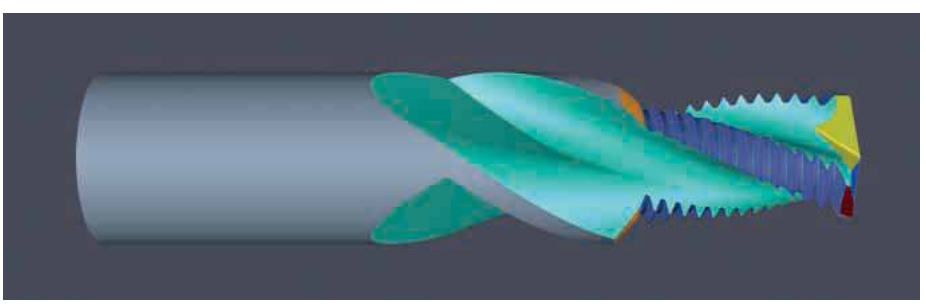
"There are so many great applications available that people are not familiar with. For example, thrilling. This is the process of threading and drilling (accomplished in the reverse order). The cutting tool tip is shaped like a drill while the body has a thread-shaped form with a countersink cutter form near the shank. The cutter first plunges to drill the hole and then the thread is circularly interpolated while the chamfer is also formed. The advantage is this process eliminates a tool, toolholder and tool change."

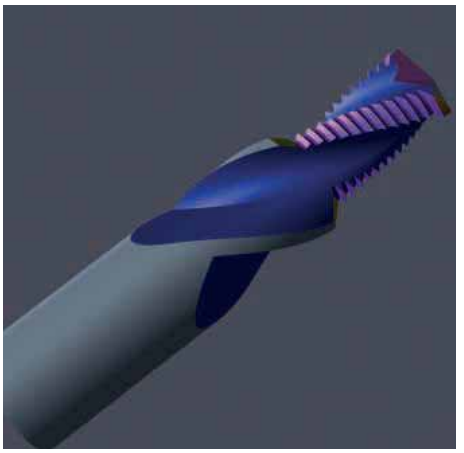
Blum laser support measurement and compensation

The Blum laser inside the machine can measure and compensate the tool diameter and crest width as shown above. There is option in software to control the upper and lower tolerance for the diameter compensation.

The software has two different operations for thread grinding and cresting. This allows you to choose roughing and finishing wheels for threading and to use number of passes if required. The laser measurement is done after the cresting for diameter and width compensation.







ANCA is a market 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 precision cutting tools and components across a diverse range of competitive industries including cutting tool manufacture, automotive, aerospace, electronics and medical.

More than anything else, what has driven ANCA's growth over the past 44 years have been a series of innovations that have revolutionised the production of cutting tools and have impacted the whole of manufacturing.

Its first significant innovation was the measurement of tool geometry inside the grinding machine by use of a touch probe. This technology seems basic today, but in 1986 ANCA was the first company to apply this technology, changing tool grinding forever.

Other firsts by ANCA include in-machine measurement using a CCD camera, 3D tool simulation, tubular linear motors, redundant axes generated in the coordinate transformations, wheel balancing and many more.

The company strives to deliver on its goal of being number one in customer lifetime experience every single day.

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The advantages of combination

While nobody can envisage what the world market for PCD tooling will be, it is certain to grow, especially as the use of carbon fibre and carbon aluminium 'stacks' increases in the aerospace and automotive sectors. So, the ability to be able to use a single machine to both erode PCD tools and grind carbide tooling, even in the same setup (a tool's carbide body and its brazed-on PCD tip) to eliminate two separate setups on different machines, makes good economic sense to all forward-thinking companies involved in PCD tool production or regrinding.

This logic has spurred Walter into developing the 'two-in-one' machining concept around its multi-axis Helitronic Diamond machines, currently the Vision Diamond 400 L (for tools of 3 mm to 420 mm long), the Power Diamond 400 (3 mm to 380 mm diameter and 520 mm long) and the Diamond Evolution (1 mm to 165 mm diameter and up to 255 mm long).

While the time and money rewards of the elimination of separate setups for grinding and erosion are undoubtedly attractive to existing tool manufacturers and regrinding companies processing carbide/PCD tooling, Walter Ewag UK, a member of the United Grinding Group, adds another major benefit of the two-in-one Diamond concept for firms which may be considering entering the PCD market.

"The fact that the machine user can perform both eroding and grinding or combinations of the two means that investing in a Helitronic Diamond is effectively a risk-free introduction to the PCD market," says sales director, Neil Whittingham. "If it happens that the PCD business does not develop as expected for that company, then the same machine can simply revert to a cost-effective way to grind carbide and HSS tools."

The affordable (and compact, occupying a floorspace of just 4.2 m²) Helitronic Diamond Evolution is the ideal entry-level machine for the production and regrinding of PCD tools with diameters up to 165 mm and lengths of up to 185 mm (end face operation) and/or 255 mm (shank length).

This size range accounts for up to 90 per cent of PCD tooling consumption worldwide, according to Neil Whittingham, and that includes increasingly complex geometry PCD tooling in various forms such as solid tips, sintered spirals and PCD on diameters, as used for milling and reaming, and 'straight' PCD 'plates' and chamfered PCD tips for drilling.

The machine can grind and erode a wide

From left: Helitronic Vision Diamond 400 L, Power Diamond 400 and Diamond Evolution

range of carbide and PCD styles, including shank, profile, circular and roll mills, multi-step tools and countersinks as well as cutting and profile cutting plates. PCD tool programming routines include the erosion of PCD on tool diameters and the production of K-Land, variable spiral and ball nose gash.

In addition to a robot loader that can boost automation (unmanned) operation by automatically handling up to 72 HSK tools or 7,500 cylindrical tools (diameter-dependent), the machine also features an HSK spindle which, being shorter than an NCT spindle, offers excellent stability and superb electrode surface quality during dressing, as well as longer life for the dressing insert.

The machine is also equipped as standard with Diamond Plus software that in addition to simplifying and speeding up the programming of complex PCD forms also enables production times to be reduced by up to 40 per cent, and cutting edge quality to be improved (edge chipping down to just five microns at 10 micron grain size).

Diamond Plus is just one of the technology innovations that Walter has developed to continually make the tool erosion process more efficient and cost-effective on its Helitronic Diamond range. For example:

The Helitronic Tool Studio software now includes erosion functionality for the fast and easy programming of 'what you see you can grind and erode' in addition to fast 3D live simulation routines, the functionality also allows, for instance, the design and programming of complex tool geometries, including individual tooth geometries and tool parameter scaling.

Software routines now enable automatic electrode/grinding wheel changing and robot loading for high levels of automation/unmanned operation as standard, a four-station grinding wheel/electrode changer (eight-station optional) and optional robot loading solutions: the Top Loader for up to 500 tools; a Robot Loader for up to 7,500 tools; or a Robot Loader 25 which has a capacity for tools weighing 25 kg including grippers.

Fine Pulse Technology routines that set new standards in terms of PCD tool surface and cutting edge quality, as well as process reliability, courtesy of improvements to the machines' generator as well as the erosion software.

Marked differences to PCD tools of 10 microns grain type that have been eroded by other machines can be seen with the naked eye. On Diamond machines, the surface finish is like that of a polished (ground) tool and even coarse-grained PCD types can be fine-finished with perfect surface qualities.

With such super fine finishes achievable with Fine Pulse Technology, PCD tool providers can achieve superb levels of tool surface quality and cutting edge within similar processing times as before. Also, subsequent steps in production can even be eliminated because no re-sharpening or polishing is required.

"The result," says Neil Whittingham, "is a range of machines and easy-to-use technologies that enable companies of every size can use to produce world-class PCD tooling."

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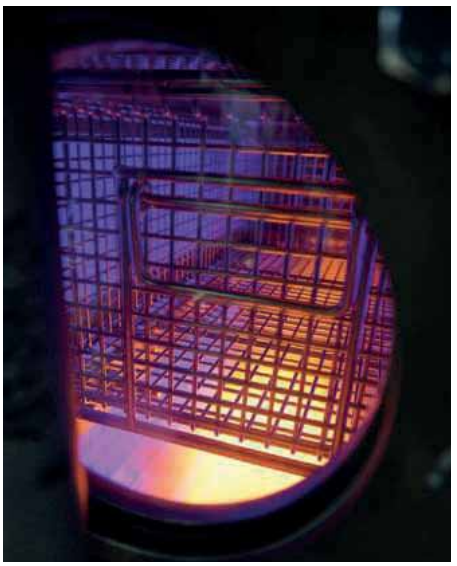
Innovative developments for ultra-fine cleaning and activation

Coating, adhesive bonding, sealing, painting. These are just some manufacturing operations calling for profoundly clean, and sometimes activated, part surfaces. It is with these requirements in mind that Ecoclean has developed a set of new cleaning solutions. One of them combines wet chemical and low-pressure plasma cleaning in a single machine. Another innovation consists in integrating diverse applications for partial or full-surface cleaning or activation, for example atmospheric pressure plasma treatment, laser, CO_2 snow blasting and/or surface inspection operations, into one processing system. This toolkit enables operators to cover virtually all pre-treatment needs.

In automotive manufacturing and its supplier industries, mechanical engineering, aerospace applications, precision and micro-mechanics, medical and optical systems, electronics and other fields of industry, component parts are subjected to cleaning in order to prevent quality problems in downstream processes and to ensure flawless product performance. In recent years, the focus in many industries lay on removing particulate contaminants. However, given new or modified production, joining and coating technologies, as well as improved materials and combinations thereof, for example the elimination of film-type residue of machining and preserving media, release agents, silicones, other auxiliary production compounds, or even fingerprints, is gaining increasingly in importance. This is because such residue can impair the quality of subsequent processes, for instance coating, welding, adhesive bonding, sealing, painting or heat treatment. Ecoclean (formerly Dürr Ecoclean) addresses these evolving requirements with a range of new solutions.

Ultra-fine degreasing by a combination cleaning process with integrated low-pressure plasma treatment

For workpieces made of steel, aluminum, glass, ceramics and some other materials that are cleaned in batch processes, whether in bulk or arranged in part carriers, the company has developed a combination cleaning technique merging wet chemical cleaning with a subsequent plasma cleaning step. To this end, a low-pressure plasma cleaning operation is integrated into the wet chemical cleaning line. Since virtually all components needed for this cleaning technology, i.e. vacuum, measuring and control equipment, are already in place in the manufacturer's wet chemical cleaning machines, the additional cost and engineering effort remains modest. The advantages of the integrated plasma cleaning process in ultra-fine degreasing are substantial, on the other hand, including a high operating flexibility, reduced process times, low investment and operating costs, plus very compact equipment build.



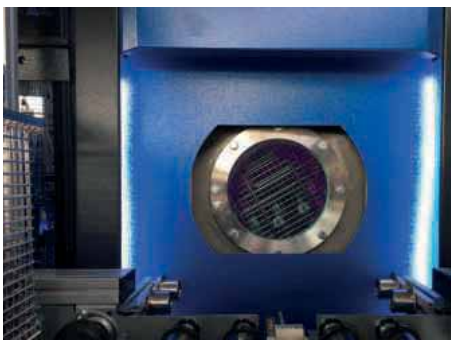
For workpieces made of steel, aluminium, glass, ceramics and some other materials that are cleaned in batch processes, whether in bulk or arranged in part carriers, EcoClean has developed a combination cleaning technique merging wet chemical cleaning with a subsequent plasma cleaning step

Cleaning is initially performed as usual by a solvent-based wet process, followed by vacuum drying of all workpieces. The work chamber is then rinsed and its internal pressure reduced to less than 1 millibar, whereupon the process gas (filtered ambient air or oxygen) is introduced and the plasma is ignited. Due to excitation by the process gas, a plasma of high-energy ions and free electrons plus other reactive particles is thereby formed in the vacuum. Contaminants on the part surface, such as grease or oil residue, are chemically attacked and transformed into volatile compounds. At the same time, the plasma's UV radiation likewise exercises a cleaning effect by breaking down long-chain hydrocarbons. The gaseous decomposition products of the plasma treatment are extracted from the work chamber by suction. Thanks to the combination wet-process and plasma cleaning operation, the free surface energy that is key to achieving an optimum adhesion strength can be raised to 50 to 80 mN/m in one single process step.

Integration of different pretreatment methods into one system

The partial or full-surface cleaning and activation and, in part, coating of individual metal or plastic products is central in the expansion of Ecoclean's process portfolio. For these diverse objectives, compact application systems were developed for integration into a host of requirement-focused equipment concepts. Each system can be fitted with different treatment technologies such as atmospheric pressure plasma, EcoCsteam, laser, CO2 snow blasting or EcoCbooster processes, whether configured as an automated standalone unit or integrated into a production line.

The company's aim is to solve each of the various surface treatment requirements with the most technically and economically beneficial technology. Thus, the use of the new Disc-Jet atmospheric pressure plasma

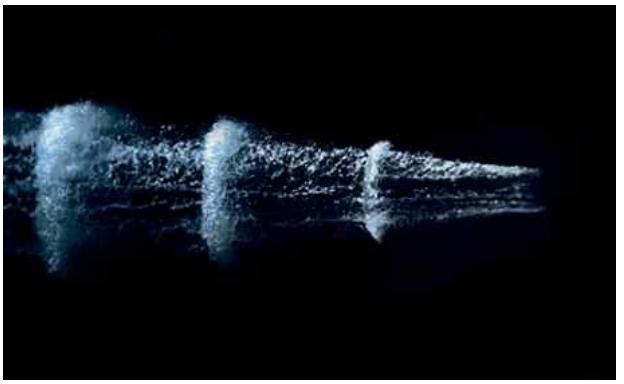


The advantages of the integrated plasma cleaning process in ultra-fine degreasing are substantial, on the other hand, including a high operating flexibility, reduced process times, low investment and operating costs, plus very compact equipment build

source developed by the Fraunhofer Institute for Surface Engineering and Thin Films (IST) permits laminar and contoured as well as depth processing. Due to the so-called "cold" surface discharge (30 to 60°C), even temperature sensitive substrates can be treated in this manner. An atmospheric pressure plasma, for instance, allows part surfaces to be selectively fine-cleaned, activated and coated with an adhesion promoting agent. Where the surface is to be textured as well as cleaned, laser treatment is the method of choice, depending on the given material.

Compact application systems can be fitted with different treatment technologies such as atmospheric pressure plasma, EcoCsteam, laser, CO_2 snow blasting or EcoCbooster processes, whether configured as an automated standalone unit or integrated into a production line

EcoCbooster technology provides a pretreatment method for the selective, effective and efficient activation of surfaces prior to, for example, thermal spraying. The automation system, too, is perfectly adapted to the specific requirements and application situation. Thus, robot-based solutions can be realised just as readily as multi-articulated handling systems and CNC linear drive units. Across all variants, either the workpiece, the tool or both can be moved to match the given task definition.



Thanks to this high flexibility, the new surface treatment toolkit is the perfect solution for diverse applications in electromobility, medical equipment technology and numerous other fields of industry.

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Image source: Ecoclean GmbH

No compromise

MecWash's Maxi provides optimum cleanliness with reduced costs for precision machining specialist Grainger and Worrall

There is no compromise for component cleanliness when it comes to the demands and expectations of global OEMs involved in the automotive and aerospace sectors, as precision engineering specialist Grainger & Worrall Machining Ltd fully appreciates.

With blue-chip OEM customers throughout the world, the company turned to MecWash Systems of Tewkesbury, Gloucestershire when it came to invest in a component washing system capable of not only meeting but exceeding the stringent standards of the automotive sector.

Grainger & Worrall, based in Bridgnorth, Shropshire, is renowned globally for being at the forefront of castings and precision engineering development and innovation, particularly for prototype engines and aerospace parts. Grainger and Worrall counts many major OEMs including Jaguar Land Rover, Aston Martin and Maserati among its customers.

The company commissioned the MecWash Maxi aqueous washing system with an Aqua-Save because of its versatility for cleaning all types of precision machined components, from small parts to blocks and heads for V8, V10 and V12 engine prototypes.

"Our customers expect a 'make like production' solution. That means whatever we are producing for them has to be as close to what the final mass-produced part will be. This ensures testing is representative of the final product and significantly reduces time in bringing it to market," says Mark Davies, plant director at Grainger and Worrall Machining Ltd.

"For that to happen we have to ensure there is no compromise when it comes to cleaning and degreasing any machined component. Even a microscopic contaminant can have a potentially devastating effect on testing and validation.

"That is why we must ensure we offer our customers the same levels of cleanliness on the prototype components as in the mainstream production facilities."

He says that the Maxi was a perfect solution as it is designed to clean complex and intricate machined parts, including the removal of many different types of contamination, like coolant and swarf.

"The Maxi delivers unrivalled and repeatable cleanliness on even the most complex of components, harnessing the advantages of traditional agitation, jet wash and spray wash technologies," he continues.

"It is capable of cleaning components to the most exacting standards, enabling us to measure them accurately against the ever increasing and more rigorous manufacturing tolerances demanded by OEMs."

The addition of the MecWash Aqua-Save technology to the Maxi provides additional benefits for Grainger and Worrall.

John Pattison, managing director of MecWash, explains: "The Maxi is already at the forefront of aqueous washing technology. With the addition of our Aqua-Save water recycling system, the company is also reducing the amount of water it uses and cutting the amount of effluent it needs to dispose of. This ensures additional cost and environmental benefits for the company without compromising on the levels of cleanliness."

The Aqua-Save system can be used with MecWash's complete range of washing systems. Its principal advantages include a reduction in effluent disposal costs of up to 95 percent and extending the time between changing wash solutions, reducing down time. The Aqua-Save range recycles 15 to 50 litres an hour and the system can be used for treatment of wash water, waste coolants and general wastewater. The system is also ECA allowance eligible.

"Grainger and Worrall, like their global OEM customers, have no room for inefficient washing systems. They have to ensure the cleanliness standards are reaching the highest levels possible. It is a testament to MecWash and our washing systems that they have chosen the Maxi as part of their significant investment in this process," added John.

As part of the commissioning process, MecWash works with its clients to ensure its systems are operating to the highest levels possible. This includes using its in-house laboratory to develop and provide bespoke detergents used in the washing process.

MecWash launches new website to showcase world-class systems

Global leader in high performance aqueous cleaning technology, MecWash, launches a brand new website to showcase its range of aqueous parts cleaning and degreasing systems for a variety of specialist sectors.

As well as offering a modern new look, the

website's objective is to display the new cleaning technologies available, including the chemical design and specification, as well as the global servicing and support available by the specialist service engineering team. The bold navigation bar aims to provide a simple user experience for all, whether visitors are browsing for products specifically, or by sector.

Component cleanliness is undoubtedly a key quality criterion in numerous industries, with many requiring complete bespoke systems. MecWash is renowned for its unique, bespoke designs that cater to the needs of each and every sector in which it operates, delivering both value and productivity. The addition of specialist sector pages was therefore essential,

including: Automotive, Aerospace, Fluid Power, Precision Engineering and Medical.

MecWash has a facility dedicated to chemistry and cleanliness analysis and chemical manufacture. This technical expertise lies at the heart of its approach to cleaning components. The new Chemical Considerations download allows customers to explore some of the main cleaning chemical products and applications.

MecWash is one of the leading designers and manufacturers of aqueous parts cleaning and degreasing systems. Its range of systems are used globally by companies with exacting standards. MecWash has a comprehensive and lasting commitment to its customers and the new site highlights the features, benefits and support opportunities that MecWash offers.

John Pattison comments: "We're delighted with our new website. When initially discussing the site, we made sure we had our customers at the forefront of the design process. It was imperative for us to ensure customers had a user-friendly experience, with easily available information; be it by product or sector. We hope our customers are happy with the finished product."

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.

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.

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Water replaces solvent for cleaning transmission components

A Java aqueous washing and drying machine has been supplied by Turbex to a UK manufacturer of automotive transmissions, resulting in a three-fold reduction in the time taken to prepare steel components for heat treatment. A basket of, say, 30 parts can now be processed in typically 15 minutes, whereas previously the same job took about 45 minutes.

The reason for the former lengthy process was due to legislation in 2016 banning the use of trichloroethylene in non-hermetically sealed systems. It required the manufacturer to change to another solvent, methylene chloride, which turned out to be less effective at removing coolant residue from machined components due to an inferior vapour-only cycle.

If any trace of coolant remains, it can cause passivation masking during subsequent heat treatment and the component has to be scrapped. To avoid the risk, mechanical cleaning was added as an extra, manual process. Constant operator attendance was needed to hand-blast components one at a time with an aluminium oxide-based compound during both a day and a night shift.

It was arduous and expensive in terms of labour cost and was also time-consuming, which meant that bottlenecks could occur when feeding heat treatment furnaces from the single vapour blast cabinet.

Installation of the Turbex Java provided the ideal solution, as the machine is able to wash and degrease parts reliably to a high level of cleanliness before heat treatment. It is now no longer necessary to use the vapour cabinet at all. Dramatic time savings have resulted, especially when processing dozens of complex parts with intricate machined features, as they can now be batch-cleaned automatically in one basket.

A basket of pinions entering the Turbex Java process chamber at the automotive transmissions manufacturer

A spokesperson for the transmissions producer advised that when the company changed solvent a couple of years ago, consideration was given to using perchloroethylene, which would have been more effective than methylene chloride. However, as it boils at 121°C, which is higher than the temperature at which some materials on site are tempered, it could not be used. HFE (hydrofluoroether) was also evaluated but did not prove to be a cost-effective solution for the application.

The improvement has been dramatic since installation of the Turbex machine, which allows batches of up to 40 parts to be processed in modular stainless-steel baskets. Trials were carried out at the supplier's technical centre in Alton to help identify the type of detergent (with corrosion inhibitor) and its concentration (fairly low to avoid staining) that would best remove coolant residue.

The machine is so efficient that pre-heat treatment cleaning is no longer a bottleneck at the factory, even though every component now goes through the aqueous process. A meticulously consistent finish is routinely achieved in a fraction of the time previously needed with solvent and manual blasting.

The Turbex system comprises two tanks, one for spray or flood washing in the presence of ultrasonics, followed by rinsing in RO (reverse osmosis) water. A patented feature of the machine is the ability to program the basket and spray bars to counter rotate, amplifying the cleaning effect and improving penetration of the water into difficult-to-reach areas.

Drying completes the process, either with hot air at ambient pressure for general use or by pulling a vacuum for more complex parts. Inclusion of the latter extends the cycle time by only around five minutes.

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TLM announces new laser cleaning technology partnership

TLM Laser continues to expand its portfolio of laser-based technologies and systems, by announcing a new partnership agreement with German laser surface processing specialist 4Jet.

The addition of laser cleaning technology to the company's product offering complements what is an already comprehensive range of laser processes including: welding, cutting, marking, engraving, hardening and 3D additive layer manufacturing. In this article, TLM director Andy Toms explains the benefits that laser-cleaning technology brings to a wide range of applications and industries:

Lasers continue to find their way into a growing number of industrial applications, in many instances offering a highly efficient and more cost-effective alternative to traditional technologies and processes, and this is certainly the case for laser cleaning.

The traditional methods used to remove rust, debris or other surface contamination from components typically involve either physical contact with the part through brushing, scraping, polishing and shot blasting or alternatively through the use of dry ice or chemical substances. Both these approaches have their own drawbacks as they are either abrasive, which can potentially damage the base material, or in the case of chemicals somewhat aggressive and through their use adding to environmental pollution.

Laser cleaning offers an efficient and effective alternative to traditional methods used for removing surface contamination

As a result of the issues surrounding the more traditional approaches to component cleaning, laser cleaning is increasingly becoming the preferred method for rust or paint removal and descaling operations.

The new handheld JETLASER platform from 4JET is the latest addition to their range of laser surface processing systems. Potential applications are wide and varied and include cleaning of moulds, tools, fixtures, paint and coating removal operations and pre-treatment of surfaces prior to welding, glueing or coating applications. The JETLASER is currently available in two power levels, 200 W and 500 W average laser power, and is optimised for manual use in the JETLASER M configuration or available for integration to a robot in the JETLASER R variant.

The hand-held unit has been designed to offer improved ergonomics and safety. Rather than conventional single hand devices that operate in a similar manner to a gun, the symmetrical 4JET system is based on a two-hand operation that provides for more comfortable use during processing. The 3D printed enclosures on the handheld device mean that it is extremely light to handle and use. The unit is powered by fibre-coupled, maintenance free solid-state lasers, that are integrated into a rugged mobile supply unit.

TLM's new partnership with 4Jet adds this range of hand-held laser cleaning systems to the company's portfolio. TLM director Andy Toms comments: "The hand-held JETLASER platform offers an entry level, yet very powerful solution for customers that may have a diverse range of cleaning tasks or low production volumes. We are delighted to have been able to add this product as part of our broad laser processing portfolio."

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The benchmark for surface finishing of blanks for collector coins

When it comes to special coins, collectors are expecting a perfect finish, especially if the coins are made from gold and silver. To deliver just that, Rösler has developed an innovative, fully automatic plug-and-play finishing centre for processing blanks from precious and other metals that guarantees excellent, absolutely repeatable, surface finishes.

The proper cleaning and polishing of blanks have a significant effect on the quality of newly minted coins. Thoroughly adapted processes allow not only to remove dirt, oxidation and slight irregularities stemming from the various production stages, but they also create perfectly polished pre-minting surface finishes. Through numerous process and equipment innovations, Rösler has been setting new standards for coin blank finishing throughout the world. That is why one of the leading minting companies in the Far East decided to re-organise its manufacturing operation with equipment from Untermerzbach. The main goal of this investment was to further improve the quality of gold, silver and other coins by highly controlled, stable processes for finishing of the blanks

New standards in coin blank finishing

With its new coin blank finishing centre, Rösler has brought coin blank finishing to a completely new level. The compact system, designed for plug-and-play operation, impresses by its attractive design. The optically pleasing, space-saving enclosure contains the processing bowl, the automatic dosing unit for pickling chemicals and polishing compounds, the vibratory screening unit with rinse-cleaning station and undersize media discharge, as well as the control panel with PLC that allows storing up to a hundred workpiece specific cleaning, pickling and polishing programs. No detail has been left unattended. This, of course, also applies to the excellent noise protection.

During the finishing process all process parameters are collected and stored. With the system's industry 4.0 compatibility, data can be sent to a higher-level production control system. When designing the new coin blank finishing machine Rösler's engineers did not only consider functional criteria for increased operational

The Industry 4.0 compatible coin blank finishing centre is designed for plug-and-play operation. All equipment components like processing bowl, separation unit and control panel are integrated into a compact, space saving and noise reducing enclosure

To ensure gentle processing and prevent any damage to the coin blanks, the system has no drop heights, for example, into the processing bowl, the transfer of the finished workpieces from the processing bowl to the separation unit and from there into the drier. The handling by the operator was also optimised by consideration of ergonomic aspects

stability but also ergonomic aspects: Material handling by the operator was simplified and they can easily monitor the entire process. All equipment components exposed to aggressive chemicals are made from stainless steel. Despite the space saving, compact design all service areas, including the dosing system are easily accessible.

Designed for gentle processing

To prevent any workpiece damage, gentle processing was a key aspect for the entire system. For example, the transfer of the coin blanks from the processing bowl to the vibratory screening unit takes place with a combined rotational/swivel movement without any hazardous dropping heights. The precise dosing mechanism ensures that the finished coin blanks travel only in small quantities from the tilted processing bowl to the vibratory screening unit for complete separation from the processing media. The vibration intensity is adjustable and easily programmable from the PLC. To prevent any spots on the work piece surface, the blanks are rinsed with demineralised water. Of course, the transfer of the blanks to the hot air linear vibratory drier also takes place without any dropping heights. In the drier, embedded between two heated pieces of special cloth, the finished blanks are passing through a tunnel hat is continuously supplied with fresh air.

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Economical shot blasting of castings

The surface treatment of castings has a decisive influence on the quality of the final products. At the fair GIFA which takes place in Düsseldorf from 25th-29th June, AGTOS will present a steel mill tumble belt shot blast machine in Hall 16 Stand A39. This type of machine is used for removal of sand and finishing the surfaces of casted mass products.

Special features bring decisive advantages to the operator. The brackets of the steel mill tumble belt are designed to be particularly wear-resistant. The change intervals extend significantly. The ventilation of the blasting chamber has been designed in a special manner which ensures that the workpieces leave it dust-free immediately after blasting. In this way, the cycle time can be shortened. A longer air outlet is avoided after the blasting process. In addition, the system has comparatively small gaps in the blasting chamber. This prevents jamming of the workpieces and ensures their quality.

In addition, the plants will be equipped with the strong and easy-to-maintain AGTOS high-performance turbines. Even the reliable filter technology is a popular advantage due to the maintenance-friendly design. The exhibition team likes to show the details at the exhibit.

The workpieces are fed to the blasting system by means of a feeding device. A steel caterpillar belt forms a hollow and mixes it. After the machine is closed, the blasting process starts. High-performance turbines installed in the upper part of the blasting room throw the blasting abrasive onto the parts. In this way, they are removed from the moulding sand and blasted. By changing the belt movement in the forward run the workpieces move back from the blasting chamber into grid boxes, or on a discharge belt. After the blasting process, a coating or the dispatch of the workpieces follows.

AGTOS was founded in 2001 in Emsdetten by experienced employees in the industry. Meanwhile, over 160 employees work at the two locations. In Emsdetten, the headquarters of the company, the concept development as well as the design of the blast wheel blasting machines are carried out. The own production is located in the Polish town of Konin, near Poznan.

The constant focus on the requirements of the customers has meant that the company is also internationally known as a specialist in the design and manufacture of wheel blasting machines for roughening, cleaning, derusting, descaling and solidifying. That's why customers on all five continents work with AGTOS blasting machines.

In addition to new centrifugal blast machines AGTOS offers used blast machines. This is advantageous for companies that need a blasting machine at very short notice or only want to use it on a temporary basis.

The abrasive used in the wheel blasting machines does not only work on the workpiece surfaces. The abrasive effect is also noticeable in the shot blasting machines. Therefore, the service i.e. the storage and delivery as well as the installation of spare and wear parts, plays a major role. In addition, maintenance, repair and modernisation work on machines from other manufacturers are offered by the company. These are always carried out by experienced specialists.

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Advanced heat treatments and hard coatings

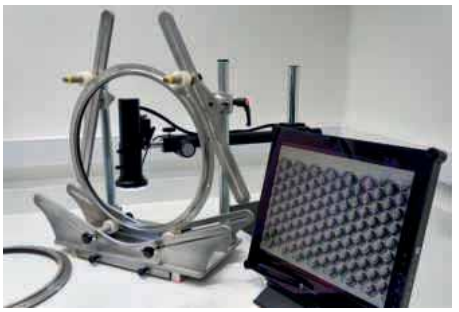
Stand L22 at the Made in the Midlands Expo 2019 on June 20 will see Wallwork Group showcase a range of heat treatment and ultra-hard coating services. "The Midlands and surrounding area represents a significant customer base, so we are pleased to be exhibiting again at MIM in their 10th anniversary year. Wallwork Birmingham, based in Smallheath, is one of our busiest group members," comments sales manager Howard Maher.

Being close to the UK's huge motorsport cluster means Wallwork's expertise in highly controlled metal component heat treatments and precision plasma vapour deposition (PVD) and diamond-like coatings is sought out by top racing teams.

With AS9100 accreditation and many aerospace prime approvals, the company is also a significant supplier to the aerospace industry. Recent Group investments at Birmingham include additional capacity for the processing of aluminium components as well as more vacuum furnaces.

"While aerospace and motorsport are the glamour industries, we also undertake a vast amount of work for general and precision engineering contractors of all sizes and specialisms. These can include tooling, prototypes, small batch work through to high volume needs," adds Howard Maher.

One of the large vacuum furnaces at Wallwork Birmingham



Increasingly complex component assemblies are growing demand for vacuum brazing

Following the 2017 acquisition of the Metaltech business, the company has also established the processes of Xylan Fluoropolymer coatings and Molybdenum Disulphide dry film lubricants at other Group locations.

Highly skilled metallurgists and skilled surface engineers, along with full laboratory and substantial in-house testing facilities, enables Wallwork to provide a quality service. A dedicated, national fleet of over 50 commercial vehicles ensures end-to-end speedy order turnaround.

Visitors to Made in the Midlands 2019 can **register at: www.eventbrite.co.uk/e/made-in-the-midlands-exhibition-2019-tickets-57941279928**

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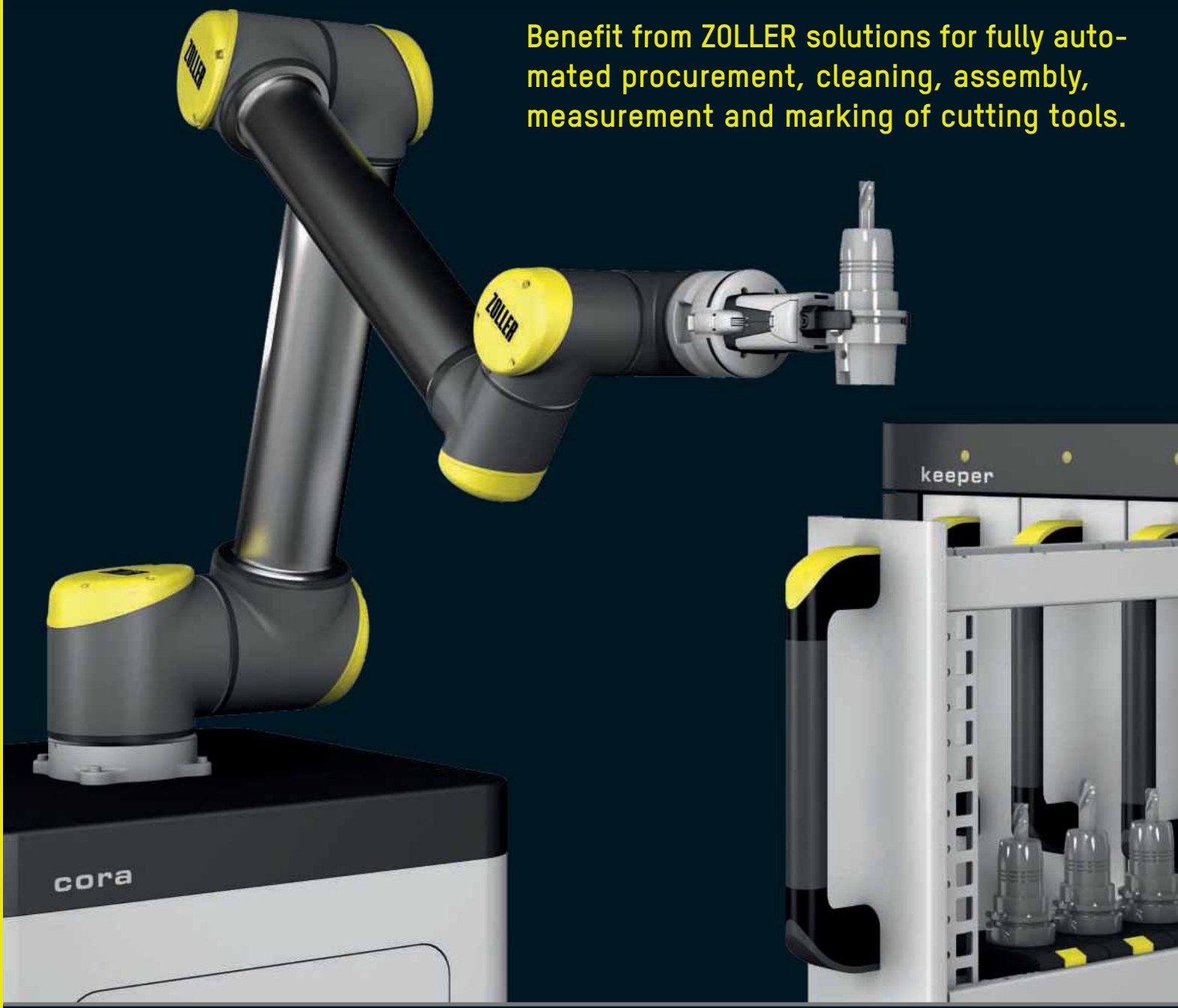

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