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SEPTEMBER 2024

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DF Precision Machinery: the home of high precision

After spending the previous decade at the heart of the Jones & Shipman/Hardinge management team, Mike Duignan and Alan Fisher established DF Precision Machinery Ltd in 2020. The partners' founding objectives were to use their wealth of experience, related to precision grinding machine applications and sales, to benefit the UK grinding fraternity, as well as provide highest standards of customer care. In addition to precision subcontractors, key industries now being served by DF Precision include the aerospace, automotive, autosport, mould, tools & die, bearings and medical sectors.

As well as offering a range of highly efficient, cost-effective grinding solutions and related support services to potential UK customers, DF Precision Machinery is the official global supplier of Jones & Shipman spare parts and support services. The company holds the extensive J&S OEM records, drawings and software and offers unrivalled expertise related to Jones & Shipman products.

Over several years, Hardinge has acquired many iconic, globally renowned precision grinding brands, including, Kellenberger, Voumard, Hauser, Tschudin, USACH and Jones & Shipman. As exclusive UK and Ireland representatives for Hardinge Grinding products, DF Precision Machinery boasts an impressive portfolio of solutions. Complementing Hardinge products, the company is also the exclusive UK distributor of Okamoto Grinding Products. In addition to Okamoto's extensive range of surface and profile grinders the renowned manufacturer also offers internal, cylindrical, vertical and rotary grinding products.

Explaining DF Precision Machinery's ethos, Mike Duignan says: "To ensure the delivery of highly efficient precise grinding machines and solutions that provide an attractive ROI for our customers, we use only quality partners. The companies we represent are global leaders in their fields and have built strong reputations through their dedication and commitment to offering first-class products and support.

"All at DF Precision Machinery are committed to supporting our entire product portfolio with first-class levels of service. In addition to offering expert advice related to all aspects of grinding, we are able to help potential customers to specify machines that enable their purchases to match their specific needs and budgets."

"Our customer first philosophy ensures that all of our customers receive high-quality specialist support from initial sales discussions, through to the provision of long-term support services that optimise returns on investments."

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Advanced grinding with Danobat

Coventry based Advanced Grinding Solutions (AGS) has announced its new partnership with Danobat, the Spanish manufacturers of internal, external and combined multi-tasking grinding machines. Chris Boraston, MD at AGS, comments that Danobat approached AGS at this year's MACH show and the possibility of working together in the UK was discussed. That lead to a further meeting at the BIEMH exhibition in Bilbao whereby AGS and Danobat agreed to come together to further promote Danobat's range of machines in the UK.

Danobat were forerunners in creating a group of machine tool manufacturers to partner together way back in 1954. Indeed, the Danobat name means 'All Together' and derives from the Basque language Danok (All) and Bat (together). Today, Danobat has grown into a giant amongst grinding machine tool manufacturers with its turn-over for 2024 set to be in the region of some 200 million euro's. The Danobat group, that employs over 700 people globally, now includes Hembrug, a Dutch leader in manufacturing finish hard turning lathes and also Overbeck who are based in Herborn, Germany and were purchased by Danobat in 2003, who makes internal, external and radius grinding machines.

Chris Boraston says: "We have long since recognised Danobat as a major player in the manufacturing of grinding machines and knew that they offered a broad range of machinery for many applications but were very surprised indeed to fully understand their true scope of supply and the addition of Danobat into the AGS portfolio will very much increase the range of solutions we can offer to our customers here in the UK and in Eire. Particularly, we can now offer, for the first time, very high precision solutions for the grinding of large parts. To quantify; Danobat has machines capable of grinding many different types of components, from very tiny to very large ones but always with high accurate conditions and specifications.

"However, Danobat also offers very high precision grinding machines capable of grinding bores down to 1 mm in diameter with a sub-micron capability. The Danobat range is vast and includes internal grinding machines, external grinding machines and combined internal/external machines. It also covers machines with multiple grinding spindles, up to four in the case of internal grinding and machines that can also grind faces and radii as well as OD and ID work."

Chris Boraston confirms that Danobat are able to offer highly capable solutions for all of the applications that we have long since being supplying machinery for including all industries such as aerospace, automotive, hydraulics, transmission and medical. The applications covered by Danobat machines are vast and include shafts, gears, printing and packaging rolls, aero engine cases, stators and rotors, axial and radial piston pumps, pump shafts and valves, artificial hip joints and diesel injection components.

Igor Arambarri Berasategui, Danobat's area sales manager, comments that 2024 is turning into a very special year for the Danobat group: "Earlier in the year we celebrated Danobat's 70th anniversary and Overbeck's 100th anniversary and we have also implemented a 12,000 sqm extension to our headquarters near to Bilbao as we expand our machine tool production capabilities to respond to an increasing demand for machines from our growing customer base. This new building, as with the other temperature-controlled production buildings on our campus in Elgoibar, Spain, continues with our philosophy of having shopfloor modularity with each one being dedicated to a different type of machine or technology.

"We very much welcome AGS as an appointed agent for Danobat as we seek to further improve and increase out footprint into the UK and Irish markets where we have already seen a great deal of success in recent years. We now look to build upon that success working together with AGS. AGS will further complement Danobat UK, who are located in Peterborough, where we have operated for over 20 years with a team dedicated to supporting all of the many Danobat machines installed in the UK and in Eire."

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Advanced Grinding Solutions at AMB

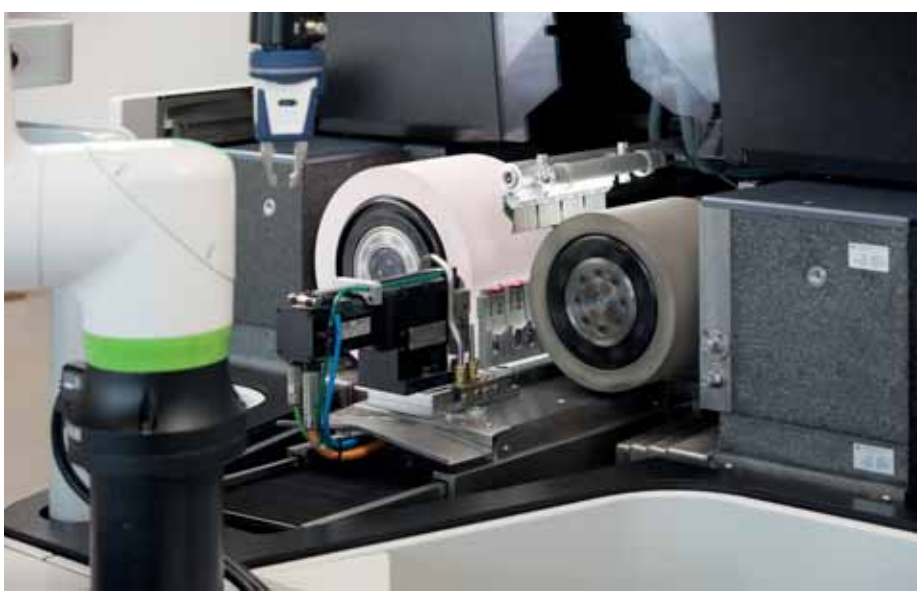
Coventry based Advanced Grinding Solutions has four of its principals exhibiting at the forthcoming AMB show in Stuttgart: Tschudin in **Hall 5 - Stand 5C11**, Rollomatic, also in **Hall 5 - Stand 5B41**, Gerber in **Hall 6 - Stand 6B71** and lastly its newest principal, Danobat in **Hall 5 - Stand 5B64**.

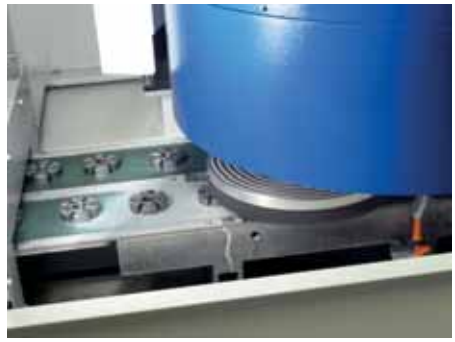
Tschudin will be highlighting its Cube 350 centreless grinding machine at the show. The Tschudin Cube centreless grinding machines enable end users to achieve significant productivity gains and the machines particularly quick and flexible changeover times help to minimise machine downtime. What sets the Cube machine apart, in particular, is its very small size and radical open design for easy access. Users only need access to the rear of the machine to perform maintenance and servicing tasks, which means that several machines can be positioned together without any gaps. The Tschudin Cube centreless grinding machine uses Tschudin's patented W-axis which has the workrest blade mounted onto its own CNC axis that allows for parts to be loaded to it outside of the grinding area making loading efficient, fast and very safe. Traditional centreless grinding machines require parts to be loaded to a fixed work-rest blade that sits inside of the machine between the grinding wheel and control wheel making loading difficult, more expensive and sometimes unsafe. This also makes changeovers more complex and therefore lengthier.

Rollomatic is one of the world's leaders in tool grinding and more rotary cutting tools are manufactured in the UK and in Eire on

Rollomatic grinding machines than on all others put together. Rollomatic will be exhibiting several machines including ones from within the GrindSmart® range. GrindSmart machines excel at producing cutting tools of up to 20 mm in diameter and the superior Swiss manufactured quality of every Rollomatic machine is demonstrated with the leading 3-year unlimited hours parts and labour warranty that comes as standard on all new Rollomatic grinding machines. GrindSmart machines are available with a 6th CNC axis to ensure perfect tool geometry because the contact point of the grinding wheel remains constant over the entire grinding path during production. The latest linear motor technology provides more benefits such as enhanced surface finishes and reduced maintenance costs.

Gerber offers a range of brushed based deburring and polishing machines for a large variety of components. With its comprehensive range of modern machines and over 60 years of experience in deburring, rounding edges and polishing, René Gerber AG is also your reliable specialist when it comes to outsourcing





work as they have a fully equipped workshop for processing parts on a subcontract basis for you.

AGS's newest principal, Danobat, are using the AMB show to showcase its latest machines. The Danobat group comprises of three leaders in their chosen fields: Danobat, Overbeck and Hembrug. The range includes internal grinding machines, external grinding machines and combined internal/external machines. It also covers for machines with multiple grinding spindles, up to four in the case of internal grinding and machines that can also grind faces and radii as well as OD and ID work.

Overbeck, who are celebrating its 100th anniversary this year, manufactures a range of internal grinding machine for bores down to just 1 mm in diameter. Hembrug is a Dutch leader in ultra precision hard turning lathes and hybrid machines, bringing its fine turning and grinding capabilities to the forefront. Its machines are capable of achieving dimensional tolerance of around 2 µm and 0.5 µm roundness values with a surface finish of 0.1µm Ra.

You can find out more about AGS and its range of machinery on its website. **www.advancedgrindingsolutions.co.uk**

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International meeting point for the metal working industry returns

AMB has presented the highlights of the international metal working industry since 1982. This year's event takes place from 10th to 14th September in Stuttgart, Germany. AMB is the marketplace and the meeting point for the metal cutting industry where the latest products, technologies, innovations, services and concepts are presented in all their facets. AMB is backed by the following promotional supporters: the VDMA Precision Tools Association, the VDMA Software and Digitalisation Association and the German Machine Tool Builders' Association (VDW).

Every two years the heart of metal working beats at AMB in Stuttgart and therefore turns Baden-Württemberg into an international meeting point for the industry. Sebastian Schmid, vice president of Messe Stuttgart, says: "With over 1,200 exhibitors from 30 countries, AMB 2024 is booked up solid. This number will increase once again due to subsequent registrations by co-exhibitors." Visitors to AMB can therefore look forward to a wide range of exhibitors including globally leading manufacturers of cutting machine tools and precision tools, efficient medium-sized companies and innovative start-ups from the region.

The focal points of AMB will also again be the latest developments in machine tools, production systems, control and drive systems, automation solutions and the associated measuring and test systems. With regard to the topic of Industry 4.0, whose importance in the metal working industry has again increased enormously, interested visitors will be able to obtain information on intelligent networks, automation solutions, CADCAM applications, collaborative robotics and AI. Visitors to AMB will have the opportunity on the stand to use an ordering software to start the production of a multi-tool aluminium cube which will be created live during the exhibition. As soon as the workpiece is finished, the person who triggered the order will be informed that his/her multi-tool is ready to be collected.

The AMB Award will celebrate its première at AMB 2024. The Award will be presented for outstanding new and further developments in different product

categories that represent significant value-added for the industry. The submitted exhibits will be judged on the basis of various criteria by a first-rate neutral jury with members equally represented by trade associations and science.

Another innovation for AMB, the AMB app, will help to make visit planning even easier and provide guidance on the trade fair grounds and in the exhibition halls. A visit to the exhibition can be prepared quickly and easily with the app. It not only contains all the important information about AMB along with the accompanying programme, talks and workshops, it also has a favourite function with which an individual exhibitor list can be generated for an efficient day at the exhibition. An interactive hall plan ensures that users always have an overview. The AMB app for iOS and Android is available for downloading.

Martin Winterstein, managing director of ANCA Europe GmbH says: "AMB in Stuttgart has always been a very lively and inspiring exhibition. The trade visitors are characterised by a high level of expertise, internationality and a broad range of industries while the discussions are technically complex and productive. As an innovation driver in precision tool manufacturing, we want to provide impetus for the upswing. To this end, we will be presenting live demonstrations of gear tools and blank machining, as well as technologies, automation and software for maximum efficiency and quality."

Dr Markus Heering, managing director of the German Machine Tools Builders' Association (VDW) states: "In its capacity as the promotional supporter of AMB, the VDW represents machine tool manufacturers at the exhibition. The Mechanical Engineering Youth Foundation, which was initially founded by the VDW and is now being continued together with the German Engineering Federation (VDMA), has promoted young industrial employees in metal working occupations for many years and will also do so at AMB 2024."

Markus Heseding, managing director of the VDMA adds: "Manufacturers of metal cutting tools, clamping systems and industrial length measurement technology are already looking forward very much to AMB in September. These industries regard AMB as the exhibition highlight of the year in Europe and also as an event from which they are hoping for positive impetus for business."

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ANCA solutions boost quality and efficiency

Grinding technology specialist ANCA is celebrating its 50th anniversary at AMB in Stuttgart and will present a number of innovations and partner solutions. The grinding experts will be showcasing smart automation specifically for the needs of tool manufacturers, integrated, lean peel and geometry grinding and the complete package for gear cutting tool manufacturers. In addition, the new versions of ANCA's ToolRoom and CIM3D grinding software promise productivity boosts of up to 20 percent.

Martin Winterstein, managing director of ANCA Europe GmbH says: "AMB in Stuttgart is a very inspiring trade show. The expert visitors from Germany and abroad are bringing in their specific industrial and local requirements. As a driver of innovation in precision tool manufacturing, we want to use this opportunity to drive efficiency and productivity in the industry."

ANCA's ULTRA series has been continuously expanded since the introduction of the nanometre control in 2022 and is now available for tools down to 0.1 mm in diameter. Thanks to the precision package, which includes spindle temperature compensation, in-process quality control and tool runout compensation in addition to the high-precision control, the ULTRA models of the MX, FX and MicroX variants produce tools of consistently high quality quickly and reliably.

The MX7 ULTRA, which will be on display at AMB, comes in a configuration that has great potential for lean production. Equipped with a P-axis and a steady rest from ANCA's long-standing partner Arobotech, the machine enables integrated blank preparation, peel grinding and geometry grinding in a single clamping. This allows users to simplify their processes, shorten throughput times and reduce complexity in production.

The MX7 ULTRA also serves as an illustrative example of an automation solution from ANCA that enables a quick and easy introduction to digital production control. AIMS Connect connects machines with each other and enables transparent and verifiable processes. An operator guidance system informs employees about the production process, i.e. which tasks are due and when. Skilled labour is relieved and can be deployed where it is really needed. Each cutting tool is comprehensibly described in an order process based on a recipe and ensures consistent quality through defined compensation strategies and logic. In Stuttgart, trade visitors will be able to experience an example of the process using a demo that includes digital operator guidance, measurement and compensation on a genius universal measuring machine from ZOLLER and a link to the MX7 ULTRA grinding machine.

In line with the focus on gear manufacturing, ANCA will present the package for gear cutting tool manufacturers, consisting of the ANCA GCX grinding machine and the matching complement, the MP1200 EDM dressing machine from Mitsubishi. The established partnership

between the grinding machine manufacturer ANCA and the EDM specialists from Mitsubishi is intended to lead to greater precision and productivity through linked processes and shared expertise. This is crucial in the production of gear cutting tools, especially skiving tools, taps or thread mills. The GCX comes as a turnkey package with functions for the design of gear cutting tools, integrated tool measurement and the provision of setup parameters for gear skiving machines.

Visitors will experience live how this configuration enables short setup times, simulation and monitoring as well as quality-enhancing functions through ANCA Motor Temperature Control (MTC) or integrated balancing (iBalance) for unrivalled long-term grinding profile accuracy of +/-0.0015 mm. The erosive dressing on the Mitsubishi not only contributes to this through flexibility and precision, but the data exchange between the two machines also makes everyday production considerably easier. Another highlight in Stuttgart is the new ToolRoom software version RN35 and CIM3D. It promises a productivity boost of up to 20 percent with federate optimisation, statistical process control, software-supported airtime reduction and extended functions for in-process measurement with ANCA's LaserUltra, the further development of the non-contact measurement and compensation system introduced by ANCA already in 2014.

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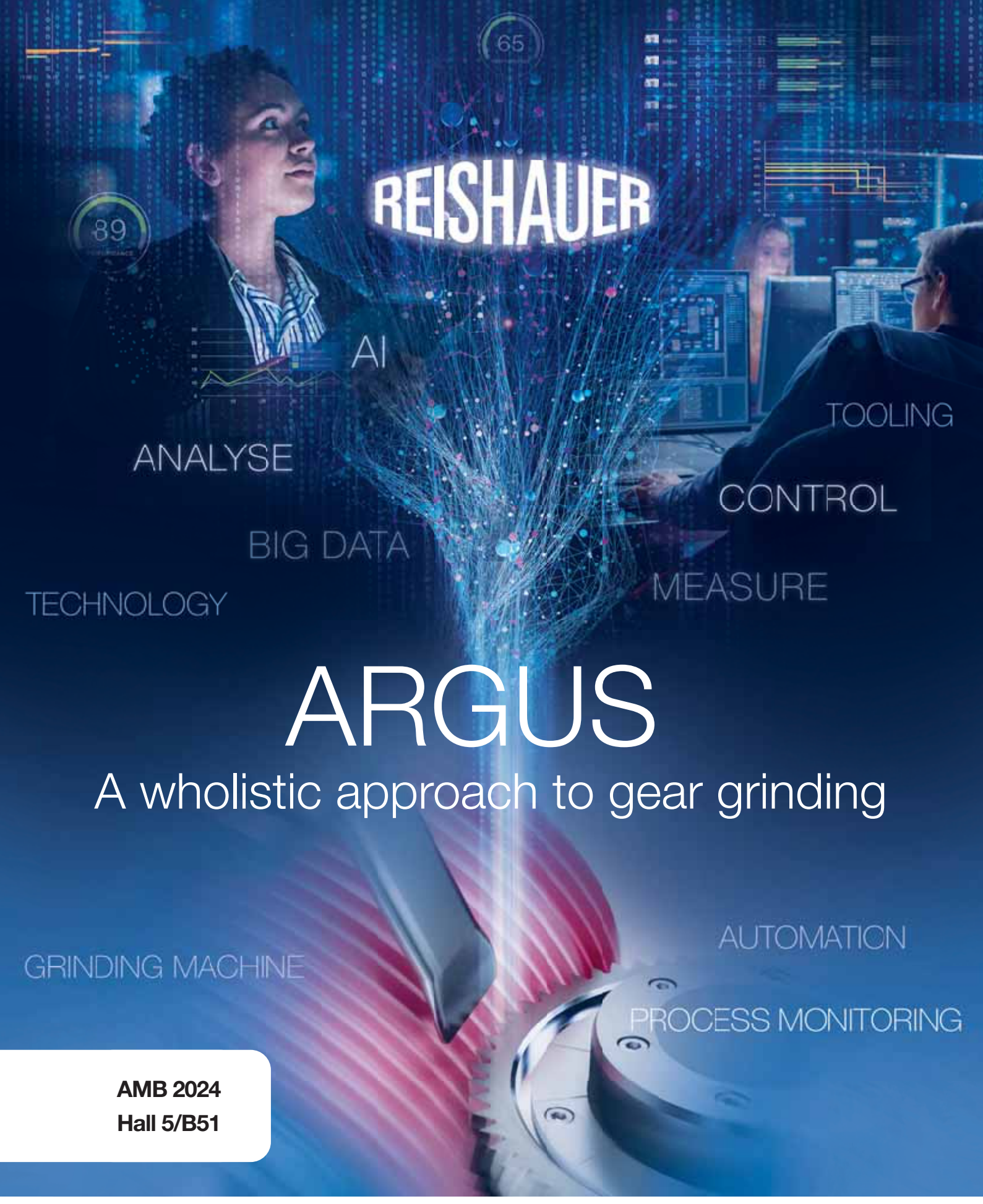
Hall 5 - Stand 5B12



ARGUS

A wholistic approach to gear grinding

AMB 2024
Hall 5/B51

REISHAUER
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Grinding solutions from Klingelnberg at AMB

Klingelnberg will be presenting its latest developments at AMB. Its stand will feature the Höfler Speed Viper cylindrical gear grinding machine, the Höfler R 300 cylindrical gear roll testing machine and the Klingelnberg P 40 precision measuring centre, among others.

Höfler Speed Viper cylindrical gear grinding machine

Focusing on high-volume, large-scale generating grinding, the Höfler Speed Viper cylindrical gear grinding machine is available in three different machine models to suit individual requirements: Speed Viper 300 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 ensures minimal non-productive time, fulfilling the productivity requirements of the automotive industry.

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 Gear Operator machine software and a process-oriented navigation system via wizard technology make operation easy, even in the most complex applications. Last but not least, ultra-modern drive and control technology guarantees maximum energy efficiency.

Höfler R 300 cylindrical gear roll testing machine: The Gear Noise Finder

The metrology on the Höfler R 300 cylindrical gear roll testing machine provides a reliable way to determine the root causes of gearbox noise. Due to the short measuring time, it can be easily integrated into any manufacturing process and enables 100 percent quality control of the gears produced. The R 300 is designed for all roll testing processes that are relevant for evaluating the running behaviour and noise behaviour of gears. These include the single-flank test, the structure-borne noise test and the torsional acceleration test.

The double-flank test can also be performed if needed. Depending on its equipment, the R 300 enables testing of gears and shafts, a particularly important factor for components from an electric vehicle drivetrain system (eDrive). For testing the eDrive intermediate shaft,

Klingelnberg will demonstrate a process for roll testing both gears on the shaft in one test cycle. This saves the time that would otherwise be required for a second loading and unloading and for re-tooling the machine and reduces test costs.

Klingelnberg P 40 precision measuring centre with hybrid metrology

Klingelnberg will also be presenting the tried-and-tested P 40 precision measuring centre with advanced hybrid metrology.

Klingelnberg hybrid metrology is a smart combination of tactile and optical metrology. Using optical sensor technology developed specifically for gear measurement, it is now possible to quickly measure not only pitch, but also waviness on the tooth flanks.

Quick changeover between the tactile 3D NANOSCAN stylus system and the HISPEED OPTOSCAN optical sensor enables economical operation and is the basis for flexible, fast and highly accurate measurement under all conditions.

Klingelnberg invites all interested attendees to visit the company in **Hall 5**, **Stand B22** to experience the advantages of the products first hand. The Klingelnberg team of experts is looking forward to stimulating discussions and exchanges.

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Hall 5 - Stand 5B22

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AMB 2024
Hall 5, Booth 5B22
September 10 – 14
Stuttgart, Germany

Highlights at the AMB 2024

Hybrid Metrology – Discover advanced features to reduce inspection times up to 40%

R 300 – Cylindrical gear roll testing machine to make gear noise visible

Speed Viper – High-productivity generating grinding

Subject to changes

WWW.KLINGELNBERG.COM

Highlights from Liebherr

Liebherr will showcase its solutions in gear technology, gear cutting tools, measuring devices, and automation systems at two fairs simultaneously

LC 280 DC gear hobbing machine

At AMB, Liebherr will present the advanced LC 280 DC gear hobbing machine, equipped with an innovative chamfering device which can be used for ChamferCut and/or FlexChamfer. In this new series of gear hobbing machines, it has increased overall performance by an impressive 20 percent, making it possible to machine workpieces with a module of 6 mm. But that's only the start as the machines offer perfect chip removal, virtually eliminating troublesome deposits, as well as unrestricted access for setting up both machining processes. As an innovative alternative, it offers the new FlexChamfer technology, where standard end mills can be used for lightning-quick and extremely efficient gear machining. Every movement of the tool is fully and precisely NC-controlled, guaranteeing consistently high reproducibility and chamfer quality. Visitors to the Liebherr booth can explore the world of precision technology. Experience up-close the fascinating potential of its gear hobbing machine during live demonstrations.

LK 280 DC gear skiving machine

The key to successful gear skiving is the robustness of the machine: a solid machine bed and rigid workpiece spindle structure easily absorb all process forces. An innovative bearing system in the machining head ensures remarkable spindle rigidity. This also means that longer tools can be used without any problems, a decisive advantage, especially for precise machining of internal gears. Furthermore, the LK is easily equipped with a steady column for workpiece clamping, yet another advantage for skiving shaft-type workpieces.

In addition to the machine, having the right tool is crucial in ensuring a stable

process. As Liebherr develops and manufactures its own tools, it can design the ideal tool for any workpiece. This requires a thorough understanding of the gear skiving process. When designing the tools, it always takes the envisaged process into account. Intensive research and development and through tests on customer workpieces enable it to continuously optimise the gear skiving results. As a result, it can offer Skiving³, a complete solution encompassing the machine, tool and process.

Digitalisation solutions

Customised digitalisation solutions for your requirements

With a combination of data profiles, protocols and the LHWeb Platform, Liebherr provides an infrastructure for the acquisition, transmission, storage, processing, provision and display of machine, operating and production data. In the basic app LHMachine Info, users can see the live status of their machine tools at a glance and observe changes in real time. The LHSignalInfo app visualises the recorded signals, taking into account all measuring points and their exact time stamp. The LHReportInfo app enables you to improve your controlling process and increase the productivity of your system by analysing pre-prepared, continuously updated reports and statistics that help you make data-driven decisions.

Are you looking for a solution to ensure quality and increase productivity in gear manufacturing?

The 4-axis measuring instruments of the WGT series have high-precision mechanics and electronics, which are controlled by smart and user-friendly software. They meet all accuracy requirements regarding gear measurement and comply with VDI guideline VDI/VDE 2613, group 1. In addition to the gear inspection machine options available as standard, customer-specific solutions are also available, such as adjusting the travel range on the Z-axis, longer tailstocks to accommodate long shafts and rotary tables adapted to the payload. An automatic sensor changing system ensures uninterrupted measurement of the workpieces and also offers the highest levels of convenience for the user. The extensive software features make the machines suitable for measuring all types of gears, such as spur gears, bevel gears, worms, worm gears, shafts, gear cutting tools and other rotationally symmetrical parts.

Gear cutting tools

Design-optimised gear skiving tools

Due to its process-specific kinematics, gear skiving is a complex and demanding procedure with no margin for error. Even the slightest changes to the tool design parameters can have unwanted results. As a supplier of the complete package of technology, machinery and tools for gear skiving, and with more than 30 years of experience, Liebherr can use simulations to identify and exploit possible tolerances in the process kinematics in order to extend the tool life.

Liebherr-Verzahntechnik GmbH
Tel: 0049 831 3285
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Hall 5 - Stand 5C51

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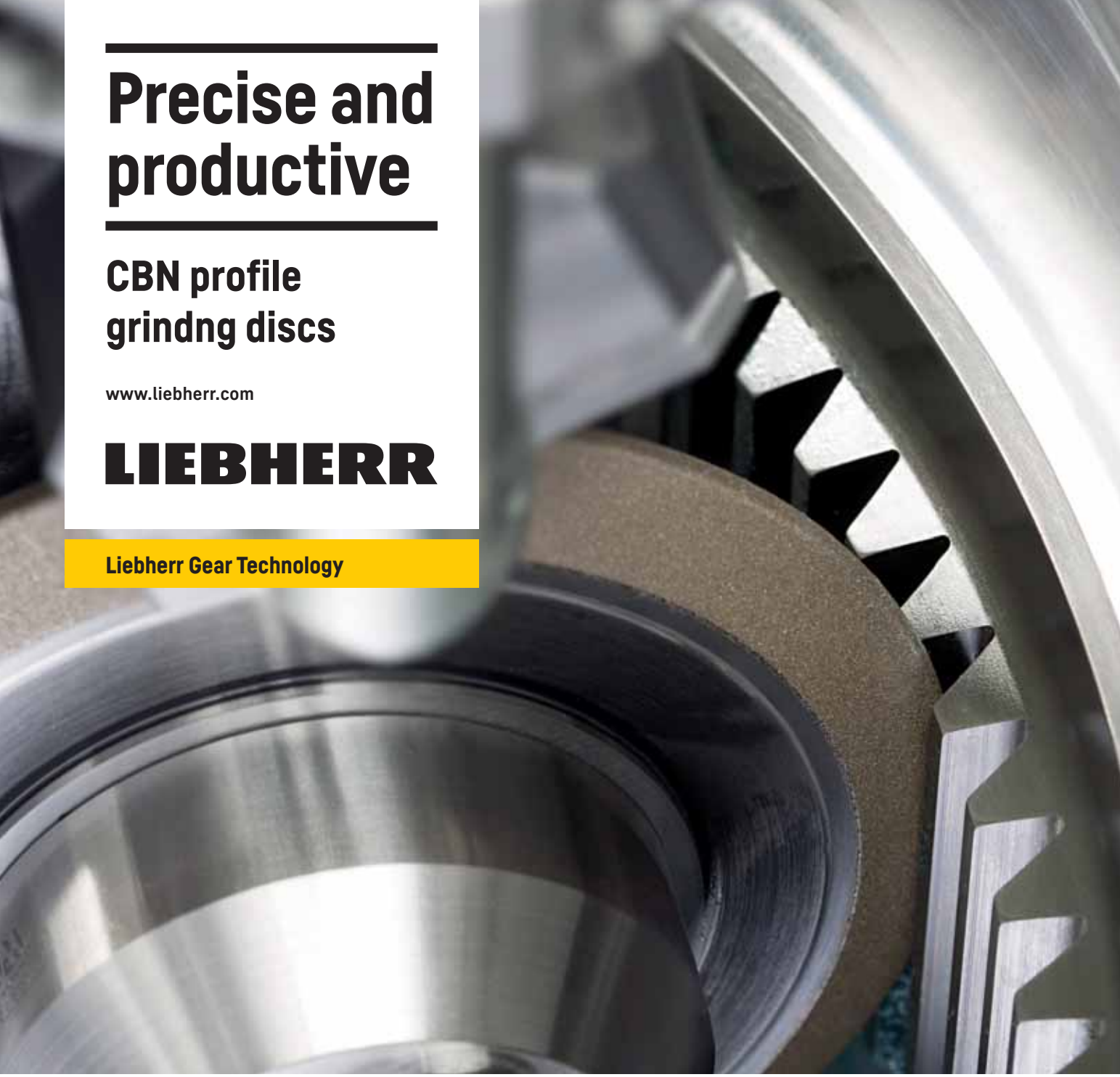

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September 10 - 14
Stuttgart, Germany
Hall 5, Booth C51

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Okamoto grinding technology at AMB

Grinding components even more productively, sustainably and precisely at top speed

Complete abrasive portfolio for complex grinding applications

In order to be able to grind quickly and economically, high-performance grinding technology is required in view of extreme tolerance fields and requirements for quality, cost-effectiveness and sustainability. The grinding machine manufacturer Okamoto will be showcasing its technology at AMB.

This year, Okamoto will be showcasing, among other things, the new rotary table grinding machine with vertically arranged grinding spindle from the VRG series.

The machine on display, VRG 6DX, has a Ø650 mm electro-permanent magnetic

chuck, magnetic diameter 600 and a working height of 290 mm with a new grinding wheel. This vertical spindle machine uses a segmental grinding wheel, with 12 segments as standard and these are quick and easy to change. Optionally, however, a CBN or Diamant cup grinding wheel can also be used.

This rotary table vertical spindle machine is designed for fast material removal, featuring only one vertical feed axis as well as a powerful 11 kW spindle motor. As is typical for Okamoto, the entire structure of the machine is extremely robust and stable to ensure consistent accuracy for a long time. The footprint is kept as small as possible and all external units are placed behind the machine for easy access for maintenance purposes.

The control system is purely conventional, so that it is possible to adjust and operate the machine quickly, easily and flexibly. All functions are set via selector switches and the feed movement can be adjusted during grinding. The system is based on the control technology that has been proven thousands of times over by the GX surface grinding machines. Grinding is carried out in two steps, course and fine grinding, with spark-out to finish. The infeed can be set to be continuous or to feed in pulses. By default, the target size is set as the stock removal value from the workpiece. An InSitu measuring system is optionally available, which guarantees the finished size whilst automatically compensating for wheel wear. With a grinding column that can be adjusted at three points, it is possible to create either a cross-hatch surface finish or a spiral finish, as required. This adjustment also makes it possible to grind slightly convex or concave surfaces. The VRG 6DX is recommended whenever a high removal rate with high precision is desired and when a fine surface roughness is not the most important criterion.

Grinding applications include gears, spacer rings, hydraulic parts and rotary cutters. Rotationally symmetrical components made of brittle-hard materials such as ceramics, carbide or glass, which are used in the semiconductor industry, among other things, are also no problem for the VRG 6DX.

The new generation ACC-42SAiQ surface grinder

The latest version of Okamoto's well-known and popular ACC 42 SAiQ surface and profile grinder is now equipped with a AC servo-motor driven ball-screw table drive, the latest FANUC control with faster response time and clearer crisper graphics.

The new generation ACC-42SAiQ retains and improves the unique table position control and fast reciprocation features of the previous generation. The switch from hydraulic control to a ball screw table drive together with improved software to use five different sets of table reversal positions in the same cycle, further improves the overall utility and accuracy of this popular surface and profile grinding machine. The double V slideways with minimal overhang in both X and Z axes and cast-iron construction for optimum stiffness, ensure the highest precision.

The Okamoto graphical touch screen operator user interface featured on the iQ range of surface grinders has proven to make machine setup quicker and easy. Graphical representation of common user-friendly grind patterns and wheel shapes are quickly set up directly on the touch screen view pane with the help of the iQ function.

The versatile and compact moving saddle design for surface and profile grinding continues to be a popular toolroom grinding machine. The Okamoto iQ touch screen control and it's easy to use software, coupled with an inherent mechanical accuracy, allows everyone to achieve impressive results.

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Hall 5 - Stand 5B16

Process reliability and high availability

With the KELLENBERGER 10 universal cylindrical grinding machine, Kellenberger is presenting a standard machine that can be customised with a wide range of options and offers excellent value for money. With a centre height of 200 mm, centre width of 1,000 mm and generous X and Z axis strokes of 365 mm and 1,150 mm, the machine covers a wide range of workpieces weighing up to 100 kg. The machine is characterised by high availability, process safety, reliability, productivity and flexibility, as well as easy workpiece setup.

The low-maintenance, high-precision linear guide in the X-axis and the V-flat sliding guides in the Z-axis are equipped with linear path measuring systems. The B-axis is designed as an automatic indexing axis, 1° Hirth serration, with high positioning accuracy and +30°/-210° swivel range. For high productivity and flexibility, the universal grinding head can optionally be equipped with two external grinding wheels with diameters 500/400 mm. Powerful grease-lubricated high-frequency internal grinding spindles with direct drive are available in two speed ranges 4,000-40,000 rpm and 6,000-60,000 rpm. The KELLENBERGER 10 is equipped with the cost-optimised FANUC 0i-F Plus control with 19" touch screen and the innovative BLUE Solution software, which enables even inexperienced operators to program quickly and intuitively.

With its advanced technology, state-of-the-art research & development centre and focus on nurturing talent, Kellenberger is set to greatly advance the precision engineering and manufacturing landscape of grinding on a global scale. As Kellenberger continues its legacy of excellence, the world can anticipate groundbreaking solutions and products that epitomise precision and craftsmanship.

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Rollomatic lean philosophy

The LEAN philosophy has been deeply ingrained within Rollomatic for numerous years, forming an integral part of its corporate culture and permeating the design of all its products. Reducing throughput times, eliminating operations with no added value and optimising processes are just some of the challenges facing its customers.

GRINDSMART 660XW

The solution for high-performance rotary tools with diameters from 0.1 to 12.7 mm

The ultra-compact GRINDSMART®660XW 6-axis high precision grinding centre has been designed to produce rotary cutting tools with diameters ranging from 0.1 to 12.7 mm and includes a high-capacity tool loader and ultra-fast wheel changer. Its unique and innovative design provides superior accuracy and reliability. This machine has been designed for the production of large or small series of high-performance cutting tools.

6-axis kinematics

The machine features 4 linear and 2 rotary axes. The unique aspect is the workhead which is mounted on a CNC linear axis. With this feature, the tool grinding and the well-known Rollomatic peel grinding process are combined together into a single machine model. The benefit of the travelling workhead for peel grinding operations is that the grinding wheel is always on top of the steady rest while the workhead axis is pushing the tool through the grinding wheel, providing excellent process stability. This CNC workhead axis is also a great benefit for drill applications, as an innovative steady rest design combines optimal tool support for fluting and for pointing.

Advantages:

- The lean grinding process provides significant reduction in cycle times.
- Integrated ultra-compact tool loader, 1,360-part capacity.
- 6-position high-speed wheel changer.
- Exceptionally short setup times with the help of the Smart Setup Assistant.
- Low energy consumption.

SHAPESMART NP50

The solution for preparation grinding of cutting tool blanks and for grinding punches

This high-precision 5-axis CNC pinch and peel grinding machine is designed for preparing cutting tool blanks and grinding punches in a range of diameters from 0.025 to 25.4 mm.

The SHAPESMART®NP50 is equipped with a 3-axis automatic loader and a newly designed automatic wheel dressing device. The new comprehensive ShapeSmart®Pro software platform includes functions for autonomous production such as the capability to grind up to ten different geometries in a single setup.

SHAPESMART NP50 is equipped with a roughing and a finishing station for simultaneous grinding. Rollomatic is the original inventor of this innovative pinch and peel grinding process, which guarantees superior surface finishes and accuracies below 1 or 2 microns.

To further expand the range of applications, the new SHAPESMART machines feature a pivoting system that allows the configuration of the roughing wheel to be changed from 0° to 10° and 90° in just a few minutes, saving a huge amount of time and increasing flexibility. Another special characteristic of the SHAPESMART NP50 is the Z axis. The latter, used in multi-pass or single-pass mode, enables a workpiece to be ground at a distance from the V-block, offering greater flexibility while maintaining a very high level of precision. For large amounts of material to be removed, the multi-pass process combines roughing passes followed by a final pinch rough/finish pass, enabling the material to be removed progressively and thus preventing wear on the roughing wheel.

Advantages:

- Pinch/peel grinding of circular and non-circular punches.
- Grinding flats and threads.
- Grinding capacity from Ø0.025 to Ø25.4 mm
- Setup time less than 15 min.
- Capability of accurately grinding blanks. with a diameter-to-length ratio of 400 x D.
- Run-out of less than 0.002 mm can be achieved with the V-block shank guiding system.
- Dimensional accuracy and repeatability during unattended production of less than 0.002 mm.
- Automatic grinding of both ends of the part.
- Up to 10 different geometries can be programmed and produced in a single setup without human intervention.
- Fast, reliable workpiece loading system integrated into the machine.

STRAUSAK

As an integral part of the Rollomatic group, it significantly broadened the spectrum of tool grinding solutions, as showcased by its flagship model STRAUSAK ONE. This latest-generation 5-axis grinding machine has been designed for the production of special tools, inserts and resharpening. The STRAUSAK ONE seamlessly integrates precision with unparalleled efficiency.

STRAUSAK ONE is a versatile 5-axis CNC grinding machine tailored for the high-quality production or resharpening of cutting tools up to 32 mm in diameter. The NUMROTO programming software ensures user-friendly and intuitive programming and offers an array of limitless possibilities. 3D simulations are characterised by their exceptional accuracy and performance predictions are particularly reliable.

- Direct drives on all axes.
- Cast iron frame with active cooling.
- Compact design.
- Outstanding ergonomics, wide door access, adjustable control panel and mobile control unit.
- Ultra-powerful 24 kW grinding spindle.
- Integrated tool loader.
- Integrated wheel changer.
- Integrated automation.
- Options such as robotised tool loader, wheel changer, automatic pallet magazine and more can be seamlessly retrofitted at any stage throughout the machine's lifecycle.

Enhanced precision for long tools

The new travelling steady rest on the Strausak ONE machine enables stable and precise production of long tools. Mounted on an additional interpolated axis, it ensures a support that is constantly positioned under the grinding point, as well as stable geometry over the entire length of the tool. Combined with a self-centring steady rest, it also provides rigid support when grinding conical geometries.

Its automatic positioning also saves considerable time when producing batches of tools of varying lengths or cross sections. Finally, this support automatically retracts under the chuck when an operation requires omnidirectional access to the tool.

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Taking the stress out of surface finishing compressor blades

Precision surface finishing of aerospace engine components plays an increasingly vital role as manufacturers seek to deliver evermore fuel-efficient systems without compromising engine performance. Achieving this is key to meeting targets for reducing CO_2 emissions and the needs of airlines to minimise costly maintenance downtime.

Fintek and surface finishing machine partner OTEC Präzisionsfinish GmbH are at the forefront of automating surface finishing of turbine and compressor blades. There are many areas where the repeatable precision of automated surface finishing helps manufacturers. In this article Fintek highlight two of these. First, is the edges of turbine and compressor blades, especially the leading edges. Second, is surfaces before PVD coatings are applied and again after coating.

Precise edge radiusing

Edges of turbine and compressor blades contribute significantly to engine performance, durability and efficiency. Precision edge radiusing is therefore a crucial aspect of aerospace jet engine component manufacturing.

Sharp edges can cause turbulent airflow and more drag, leading to inefficiencies. By precisely radiusing the edges, air is able to flow more smoothly over the blades, reducing aerodynamic losses and improving the overall performance of the engine. This also gives better fuel efficiency and increased thrust.

Another problem sharp edges bring about is that they can concentrate stress forces. This makes them susceptible to cracking and premature failure. Edge rounding distributes these stresses more evenly along the blade edges, reducing the likelihood of cracks and their propagation. This enhances the fatigue life of the blades, leading to longer service intervals and reduced maintenance costs.

The blades in a jet engine operate at extremely high-temperatures. Radiused edges help to eliminate hotspots that can occur at sharp corners and edges, leading to oxidation and degradation of the blade material. By ensuring a uniform radius, the thermal and oxidation resistance of the blades is improved, extending their operational life and reliability.

Sharp edges also contribute to increased vibration and noise during engine operation. The smoother airflow brought about by edge radiusing helps to mitigate these effects. This enhances passenger comfort and also contributes to the overall structural integrity of the engine by lowering vibrational stresses.

The application of hard coatings by Physical Vapour Deposition (PVD) is essential to turbine and compressor blades. Amongst the many benefits they bring, these coatings significantly increase the wear resistance of the blade, making them more durable. This allows engines to remain on wing for longer, extending service intervals to reduce operational costs.

Before applying the PVD coating, the surface of the components must be meticulously finished to ensure proper coating adhesion. Surface irregularities, such as roughness or contaminants, can prevent the coating from bonding. A smooth, clean surface gives an optimal substrate for the coating to adhere uniformly. Inconsistent surfaces can lead to uneven coating thickness, creating areas of weakness that may fail under operational stresses.

Surface finishing prior to coating also removes micro-cracks and other imperfections where stresses could form. This step is vital to ensure that the PVD coating can enhance the component's resistance to fatigue and failure.

After the PVD coating is applied, additional surface finishing is often necessary to achieve the desired surface characteristics. This may include polishing to enhance the coating's smoothness and reduce friction.

Post-coating finishing also helps to remove any minor defects or irregularities that may have occurred during the coating process. Chief among these are hard-droplets that could break off during engine operation leading to damage and maintenance down time.

The magic of stream finishing

Due to the exacting tolerances demanded by aerospace engineering, conventional hand finishing is proving imprecise, inconsistent and time-consuming,

especially when trying to meet required edge radius targets.

The game changer has been the introduction of highly controllable stream finishing systems by OTEC Präzisionsfinish GmbH. This has allowed Fintek, who represent OTEC in the UK, to develop processes to improve the quality, efficiency and safety of surface finishing engine blades.

Smoothing and edge rounding the turbine blades takes place in a single stream finishing operation. Smoothing the air foil, the blade body, has a positive effect on blade efficiency. Depending on the required result, the surface can be smoothed in a new generation stream finishing machine to required values of Ra < 0.2 µm in just a few minutes, however, an Ra < 0.1 µm or less is commonly achieved. During the process, a minimal amount of material is removed evenly from the surface.

The blades are clamped into the OTEC stream finishing machine and lowered into a container of abrasive media. Processing is carried out by both the controlled rotation of the container and the precision movement of the blade in the media flow. The flow to the blades in the machine is clocked so that the alignment angle of the blade changes at frequent intervals. This means processing can be precisely aligned to specific points on the blade, achieving a smooth surface and precise edge radiusing, simultaneously, without altering the blade profile, especially on the leading edges.

Another important benefit is the short processing times compared to conventional finishing methods. In one real-world example, depending on the size and initial condition of a blade, an aerospace manufacturer was taking 40 to 50 minutes to hand finish a single blade. Working with Fintek to achieve the optimum process parameters, the rate of blade finishing was reduced to as little as three minutes per blade. Furthermore, the manufacturer found that the process could eliminate three previously needed CNC operations. For smaller blades, one manufacturer reported this could potentially save the deployment of eight machines on the shop floor.

Clamping the blades individually in a stream finishing machine also mitigates any risk of damage occurring during the processing and all steps are carried out in the one machine, minimising handling. The OTEC SF5 stream finishing system, for

example, processes up to five compressor blades at once, ensuring high output and cost efficiency. An additional benefit is that the process is effective at removing engineering machining lines and reducing residual stresses produced by previous manufacturing stages. This helps create a more durable blade that is less prone to stress cracking.

The stream finishing process is the ideal surface preparation before hard coating are applied to components. Also, it can be run post coating to remove any residual hard droplets, such is the precision and ability to minimise material removal.

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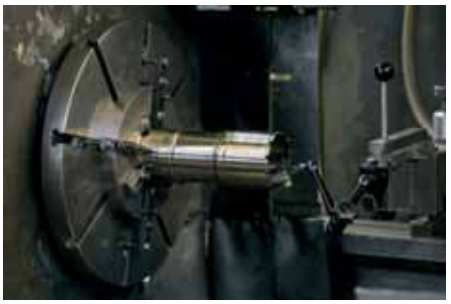
Precision grinding and repair services for critical aerospace components

Duval Precision Grinding has decades of experience in aerospace component grinding. The company was founded in the aviation industry, where extreme precision is required to produce aerospace components to specification and this approach became the backbone of its approach to every job. From landing gears to complex engine seals, Duval's precision grinders have the ability to grind and finish the aviation parts you need.

Aerospace OEM grinding partner program

Duval Precision Grinding has been a trusted grinding partner for countless aerospace OEMs. By developing a planned grinding partnership, aerospace manufacturers leverage the expertise of Duval's process engineers to collaboratively develop a program work schedule that will consistently meet production and delivery goals.



Turbine and jet engine seals

The size, complexity, handling requirements and necessary tolerances of turbine and jet engine seals make them some of the most complicated aerospace components to produce. Duval's team of expert grinders are experienced in tight tolerances and complex geometry. Trust Duval for precision grinding any turbine or jet engine seal to your exact specifications.

Engine seals are some of the most challenging parts to grind due to their large size, unique shape, necessary tolerances and handling requirements. Before the engine seal reaches the grinding stage of production, it is typically treated with a plasma coating, hardening treatment, abradable coating and/or shot peening.

Precision grinding services that meet your deadlines

Grinding is usually the last process before the part is delivered to the customer. This means two things: First, turnaround time is tight. Second, the part is high-risk because the grinder is now entrusted with a part that is already worth quite a bit in material and labour. Any mistakes at this stage of the process can be tremendously expensive.

Duval Precision Grinding has sustained its reputation for excellence by always doing what it takes to return a good part. When it comes to engine seals, its grinders will ensure that you receive a perfectly finished piece on time, every time.

Landing gears

In the aviation industry, everything depends on sticking the landing. Landing gears must be strong, flexible, and resistant to corrosion. Duval's team of grinding experts is able to produce landing gear components with high-quality coatings as well as provide heat treatments to increase the performance of certain alloys. For seventy years, Duval Precision Grinding has been committed to providing aerospace OEMs with the highest quality products possible. All forms of aviation depend on landing gears that are safe, reliable, and resilient. The company

accommodates these stringent requirements by embracing technologies such as cutting-edge Coordinate-Measuring Machines (CMMs) and fostering the growth of its highly qualified and experienced team.

Qualified and experienced in aerospace component grinding

"Precision is our only product" is more than just a company catchphrase at Duval. Every employee is committed to meeting the growing demand for landing gears and other flight-critical components. As the quality of aircraft components is so crucial, Duval engages a full team of adept operators, machinists, technicians and programmers. This experience paired with versatile equipment allows Duval grinders to grind a wide spectrum of products with tight tolerances. It provides grinding services such as Inner Diameter (ID) grinding, Outer Diameter (OD) grinding, surface grinding and jig grinding, which allows it to meet exacting specs on a variety of complex, high-performance components with exceptional precision.

Customer satisfaction is of paramount importance at Duval Precision Grinding. It is always available to customers to communicate the status of parts and provide quick and responsive service. Manufacturing landing gears and components often leads to delays, often due to engineering changes. By expanding its capacity, the company can expedite its operations and help OEMs get the job finished on time, even if it is already behind schedule.

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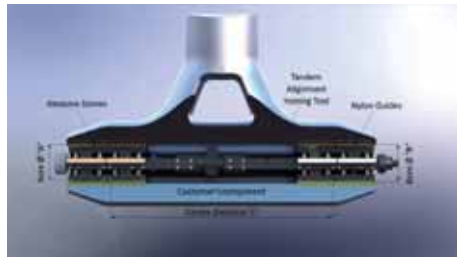
delapena takes flight

Revolutionising aerospace repair with innovative honing tools



delapena, a leading name in the honing industry, is making waves in the aerospace sector with its revolutionary Tandem Alignment Honing Tools. These ingenious tools are rewriting the rules of aircraft landing gear maintenance, offering a faster, safer and more sustainable approach to aircraft repair.

The aerospace sector is increasingly tightening the requirements for components to achieve lighter weight and greater performance from end products: higher power densities, more precise control, tighter sealing, less noise and vibration.

Traditionally, maintaining the intricate and often difficult-to-reach components of aircraft involved time-consuming and expensive disassembly of key parts like landing gear and engine cylinders. This not only disrupted operations but also drove up maintenance costs significantly.

delapena's Tandem Alignment Honing Tools are a gamechanger. These innovative tools allow for In-Situ honing of critical twin bores, eliminating the need for disassembly. This translates to faster turnaround times, reduced costs, enhanced safety through perfect alignment and extended component life as well as more sustainable practices through reduced waste.

The tool body is made such that its length matches the centre distance of the two 'in-line' bores. One end of the tool is fitted with abrasive stones and the other with nylon guides.

When the tool is inserted into the bores the nylon guides are expanded to pilot the tool in one bore while the honing stones are expanded to increase the diameter of the bore to be honed. When the first bore has been honed to the correct size the tool is removed and inserted from the opposite end so that the nylon guides are piloted in the honed bore while the stones increase the diameter of the second bore. If access is restricted and the tool cannot be inserted from each end of the tandem bore, then the position of the honing stones and nylon guides are reversed in the tool after the first bore has been honed.

The impact of delapena's tools extend far beyond mere convenience. They represent a paradigm shift in how aircraft landing gear components are maintained, prioritising efficiency, safety and sustainability. As air traffic continues to grow, these tools play a vital role in ensuring the smooth operation and longevity of our global fleet.

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Studer success story in Barcelona

The Spanish TEMSA Metallurgical Group is one of the world's leading manufacturers of special tools for cold forming. The company has also been using cylindrical grinding machines from Studer in its production for many years.

Wearing a white work shirt, Alfonso Vivar walks through a large hall that radiates a sense of order, despite its multitude of machinery, workstations with monitors and focused employees. Everything has its place, every work step is carefully planned and at its heart is a yellow robot arm working away methodically. Located in an 8,000 sq metre, 86,000 sq ft, high-tech plant to the west of Barcelona, Spain, production manager Alfonso Vivar knows every corner of the plant. His shirt bears the bright red logo of his employer, TEMSA Metallurgical Group, a leading global specialist in the production of high-precision tools for cold forming and an expert in powder metallurgy, sintering and fine cutting.

With cold forming, metal below the recrystallisation temperature is forced into a specific shape using high compressive and tensile forces. Compared to metal-cutting operations, this allows for shorter processing times per workpiece, thereby reducing costs in series production. Cold forming also allows for high strength, complex geometries, and excellent surface properties. Components produced using this method include those for high-tech industries such as aerospace and automotive. All of which this can only be accomplished with the right special-purpose tools and skills, which is exactly where TEMSA comes into play.

"Our team can manufacture special tools in a tolerance range of just a mikron, 0.000,040"," explains Alfonso Vivar, proudly. TEMSA's site in Barcelona has around one hundred employees, all working to manufacture tools to exacting customer requirements. "Our expertise also helps us to accomplish short lead times. But that's only because we use the very best machinery," he adds.

Confidence in the technology

"This is our new Studer S100, which we acquired earlier this year, together with a favoritCNC." Alfonso Vivar says pointing to the CNC universal internal cylindrical grinding machine, painted white with blue accents. This colour combination is typical of Studer's cylindrical grinding machines and is a familiar sight at the TEMSA plant. The company has been using the Swiss manufacturer's machinery in its production facilities for many years. It operates several Studer machines for grinding tasks, including the S131, a new-generation CNC universal machine for internal cylindrical grinding. "We have confidence in the technology and value the positive relationship we have with the manufacturer," explains Alfonso Vivar of the decision to invest. In addition, the high level of precision, reliability and ease of operation offered by Studer machinery machines help to ensure that production is as efficient as it can be.

As an example, the S100 is a great all-rounder offering maximum precision thanks to its numerous options for internal, face, and external grinding. The machine facilitates the production of a wide range of workpieces up to 550 mm, 21.65, in length. The favoritCNC is a CNC universal cylindrical grinding machine for individual and batch production of medium-sized workpieces with a length of up to 680 mm, 26.8. Both machines have an exceptional price-performance ratio, while at the same time offering premium technology, such as the machine bed of solid mineral cast Granitan® and optimal hardware-software interplay for ease of operation. The S131 for internal cylindrical grinding with patented StuderGuide® guide system, turret wheelhead with up to four grinding spindles and an additional C-axis is ideal for high-precision manufacture of flanged parts and smaller workpieces in a wide range of applications.

Investing in the future

TEMSA's success story goes back more than 30 years when the fledgling company produced high-precision tools from tungsten carbide and steel. Through consistent investment in employees, expertise and state-of-the-art systems, the Spanish company has quickly been able to establish an excellent reputation around the world.

Today, the company is a leader in special tools for cold-forming processes. "I am extremely proud of our team; we are one big family. We have many second-generation employees working with us and at Christmas, we always have a meal together with the first generation," concludes Alfonso Vivar, a TEMSA veteran of 25 years.

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Second PTG Holroyd rotor grinding machine for leading North American air compressor maker

Sullivan Palatek, one of North America's premier manufacturers of air compressors, has taken delivery of a new, ultra-precise TG350E CNC helical rotor grinding machine from UK-based rotor milling and grinding machine tool manufacturer, PTG Holroyd.

Helping double Sullivan Palatek's rotary screw compressor manufacturing capability, the TG350E joins a previous generation PTG Holroyd TG350 rotor grinder and a PTG Holroyd 3EX-R rotor milling machine, both of which have been in reliable daily operation at the air compressor manufacturer's production facility in Michigan City, Indiana, since 2009.

Together, the three PTG Holroyd machines will be used to manufacture helical rotors in a range of diameters from both dura-bar and cold rolled steel. They will also help confirm Sullivan Palatek's status as a leading provider of rugged, dependable and highly efficient air compressors, ready for when the new minimum efficiency standards for air compressors come into force in the United States next year.

With plans to increase the size of its Michigan City manufacturing facility by 50 percent and an order book that has almost doubled in size since 2023, Sullivan Palatek will be making full use of its new TG350E rotor grinding machine as well as its older PTG Holroyd TG350 and 3EX-R models. "As finish grinding each compressor rotor typically takes twice as long as the milling process, having two rotor grinders in operation will increase our productivity considerably," says Sullivan Palatek's director of plant operations, Scott Newcomb.

"With the two PTG Holroyd rotor grinding machines, we will also be able to manufacture both male and female rotors simultaneously, something that will further boost our efficiency. While to further streamline our rotor manufacturing processes, PTG Holroyd will also be upgrading the CNC on our older TG350 rotor grinder to the latest standards. We have a great relationship with PTG Holroyd. They provide the highest levels of service and support and will always do whatever it takes to get the job done."

Installed during the fall of 2023, Sullivan Palatek's new TG350E is actually its sixth PTG Holroyd machine. The air compression machinery manufacturer's relationship with PTG Holroyd goes back to the 1960s, when the business invested in two Holroyd rotor milling machines and a cutter sharpening machine at its original rotor manufacturing facility in Claremont, New Hampshire.

"We moved from Claremont to Michigan City in the US mid-West during 2009 to consolidate our operations and maximise the performance of the new rotor milling and rotor grinding machines we would need at the new combined facility," adds Scott Newcomb. "More than satisfied with the reliability of the old 1960's Holroyd machines we'd used in Claremont, we quite naturally turned to PTG Holroyd for the 3EX-R rotor miller and our first TG350 rotor grinder. Fourteen years later, in 2023 and still impressed by the performance, accuracy and reliability of those machines, we reached out to PTG Holroyd again for our new TG350E helical rotor grinding machine."

"It has been an absolute pleasure to provide Sullivan Palatek with our rotor milling and rotor grinding technologies over the years," adds PTG Holroyd sales director, Mark Curran. "As there can be no better testimony to the quality of a company's products than repeat orders, I am delighted to say that on each occasion Sullivan Palatek has chosen to invest in a new PTG Holroyd machine, that decision has been based on our deep understanding of their manufacturing requirements, the reliability of our machines and the support we provide."

PTG Holroyd's TG Series machines, such as those used by Sullivan Palatek, are widely recognised as providing the industry benchmark for high speed, high accuracy, efficient stock removal. Advanced automation means reduced setup time, while a significant amount of production time can be saved due to the fact that each machine's diamond dressing disks are continuously dressed during the semi-finish grinding cycles. 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 in length, with models offering stepped increases in capability up to the production of helical components measuring 520 mm in diameter and 2,750 mm in length.

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Details make perfection and perfection is not a detail

(Leonardo da Vinci)

It is a principle that we have been applying to all our grinding machines for over 100 years. We design customized centerless grinding solutions that stand out for their innovation and great attention to details. We always guarantee grinding processes to the “micron”, and perfection is not a detail.

GHIRINGHELLI
Centerless Solutions

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Hall 11
Booth D04

Milling and grinding to single-figure micron accuracy on one machining platform

Gerhard Rauch GmbH in Trasdorf, Austria, machines complex mechanical components and assemblies to tight tolerances. Its services encompass planning, prototyping and subcontracting through to toolmaking and the production of customised machines and lines, especially for foil stamping in the food industry. Other sectors served include aerospace, Formula 1 and the medical industry.

For high precision prismatic machining, the company has standardised on the use of milling centres from German firm Roeders. Its machines are sold into the UK and Irish markets exclusively by Hurco Europe, High Wycombe, which describes the applications being carried out by the principal's customer in Trasdorf.

Founded in 1970, Gerhard Rauch uses a wide range of production techniques on its shop floor, including milling, grinding, spark erosion, turning, hard turning and laser marking as well as precision electrochemical machining.

CEO Anton Buresch comments: "We produce punching tools to extremely high accuracy. For example, mass production of aluminium foil yoghurt pot lids requires tools with gaps that are as fine as 2 µm in some cases. This requires a tolerance of less than ± 1 µm for both the punch and the die."

In the past, multiple operations were needed to manufacture such tools. First, they were pre-milled in a soft state, after which they were hardened, which resulted in a certain amount of distortion. The tools were then milled and ground to their final dimensions. This multi-stage process was required because previously the machining centres in use struggled to process hardened steel.

The solution was to invest in prismatic machining centres from Roeders, which are both rigid and precise enough to machine even extremely hard materials to the required accuracy, including tungsten carbide. They can now be clamped and machined to final dimensions by milling and jig grinding on the same platform. It results in enormous savings in terms of personnel, throughput time and cost.

One-hit processing eliminates the additional work involved in building multiple fixtures, performing several clamping and unclamping operations and interrupting the workflow due to shipping the component for hardening. The additional administrative expenditure for packaging, transportation and the ensuing quality control of incoming goods are eliminated.

Raphael Schloffer, machine operator and CAM programmer at Gerhard Rauch says: "When we received our first Roeders machine in 2015, we initially felt a little uneasy because until then we had worked with HEIDENHAIN controls.

"Fortunately, the proprietary Roeders control system quickly proved to be easy to use. The integrated technology database offers several support options for jig grinding. HEIDENHAIN cycles can also be integrated into the programs."

Today there are five 5-axis Roeders milling centres on the shop floor in Trasdorf: three RXP 501 DSs and two RXP 601 DSHs. All are automated with an RCE 1 pallet storage system. Depending on the pallet type, it can hold between eight and 45 workpieces.

All machining centres have linear motors which, in combination with 32 kHz drives in all axes, enable highly dynamic, high precision machining. With this elevated correction frequency, a significant reduction in machining time is achieved, while at the same time surface quality is optimised. High resolution optical scales provide positional feedback in all axes. In addition, the Z-axis is fitted with a patented, friction-free, vacuum weight compensation system.

The machines feature sophisticated temperature management to ensure thermal stability. The temperature of the medium flowing through all the main components is controlled to an accuracy of ± 0.1°C. Another feature is the dedicated control system based on the Windows

producing threads in tungsten carbide.

In another application, a carbide punching tool measuring 300 x 200 mm featuring seven individual punches was produced, as well as the corresponding die. A gap width of 3 µm had to be maintained for this tool. Numerous smaller precision tools and mould components are also produced on the Roeders systems, partly from tungsten carbide and also from tool steels. Here too, extreme precision is often required for the gap dimensions, for example when machining injection moulds for producing components from low-viscosity materials such as silicones.

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operating system, the functionalities of which are precisely tailored to the specific tasks of high speed, high precision milling, jig grinding and other grinding operations.

Anton Buresch points to a high accuracy flange that is produced in one of the cells from high strength steel having a hardness of 58 HRC. It is machined in its soft state and hardened, then surface ground on one side before being transferred to the Roeders. There is a tapered bore in the centre of the component and a cylindrical bore on either side with a diameter tolerance of -0/+5 µm. In addition, the distance of their centres to the axis of the tapered bore must be within ±5 µm.

Machining on the Roeders comprises hard milling and jig grinding in one clamping. The two smaller bores are roughed and ground to size. The taper in the main bore is then ground to a mirror finish in a particularly demanding operation involving a 5-axis simultaneous cycle provided by the Roeders control. The resulting surface finish is less than Ra 0.15 µm.

Machined workpieces are frequently made from tungsten carbide. In certain cases this is less expensive than a solid steel tool, as a base of tool steel has a comparatively thin top layer of tungsten carbide. Only this latter layer needs to be machined to the required high precision. The strategy is made possible by the fact that the Roeders machines are suited to

Centreless grinding rethought

Innovative machining concept for thin-walled round workpieces

When bearing manufacturers are looking for a machining solution that delivers maximum precision with repeat accuracy and is also economical, all roads lead to Switzerland. One of the companies based there is the grinding specialist Kellenberger, whose production concept on a VOUMARD 1000 has completely won over leading companies in the bearing industry.

When it comes to precision machining of thin-walled sleeves or rings that are to be ground internally and externally in a single clamping operation, an intelligent clamping solution is required above all. This is because thin-walled workpieces, such as roller bearing rings, must not be deformed during clamping. At the same time, the clamping system must ensure absolute concentricity of the outer diameter to the inner diameter during machining.

The most obvious clamping solution is of course a magnetic chuck, which serves to fix the workpiece on the face side and generates the workpiece speed. However, especially with thin-walled rings with a very small contact surface to the magnet, it can be difficult to build up the necessary static friction so that the workpiece is not pushed out of position by the grinding forces. The workpiece must also be centered on the chuck, which takes quite some time and requires operator intervention.

To counter this, two adjustable support shoe devices are used to keep the workpiece centered in rotation during the grinding process. They also counteract the grinding force exerted by the grinding wheel and the force of gravity. This variant of centreless grinding is known as "shoe-type centreless grinding", but is casually called "shoe grinding".

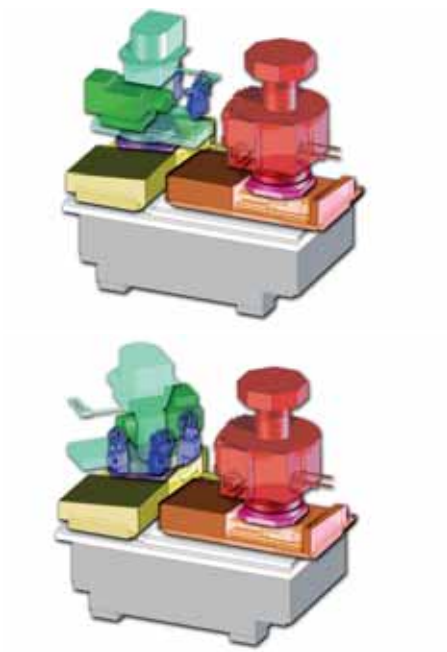
Shoe-type centreless grinding is a special variant of centreless grinding. It enables, for example, precise machining of the outer and inner form surfaces of bearing rings in a single clamping operation. In this process, the magnet forms the stop for the workpiece in the axial direction, as in normal work with the magnetic chuck. In the radial direction, the workpiece is supported by shoe fixtures, which enable very precise positioning and support. The workpiece can therefore be inserted without alignment. The rotation of the workpiece during machining results in a stable position.

The front shoe, support shoe, supports the workpiece in front of the grinding area and absorbs the weight forces. The rear shoe, measuring shoe, supports it after the grinding area and defines the component diameter. This additional support enables greater dimensional accuracy and surface quality. It also allows the workpiece to be changed quickly, which can also be done automatically.

Like the KELLENBERGER machines, the VOUMARD 1000 has hydrostatic guides in all axes. These highly dynamic linear axes are backlash-free for positioning accuracies in the nano range. This means

that workpieces can be ground extremely precisely with maximum repeat accuracy and machine availability over the entire service life of the machine. Minimal maintenance costs, improved machine availability and greater contour accuracy and process reliability are further advantages.

The special features of the VOUMARD 1000 are the two high-precision hydrostatic B-axes: B1 axis with spindle turret, B2 axis with table turret. The two swiveling B axes also carry out all the necessary movements of the dressing and measuring devices. The spindle turret on the B1 axis is equipped with a uniquely compact grinding spindle head with a flexible grinding spindle arrangement. Spindles and measuring sensors can thus be optimally positioned and allow the machining of almost any workpiece shape as well as the execution of several internal and external grinding processes in a single clamping. When grinding roller bearings, the grinding head is equipped with an external grinding wheel, an internal grinding spindle and a measuring device.



The required dimensional accuracy in the outer diameter is D100 ± 2 µm/D40 ± 1.5 µm, in the inner diameter D100 ± 2.5 µm/ D40 ± 2 µm. Required roundness inside and outside <0.7 µm and cylindricities of <1 µm.

Tests at Kellenberger resulted in form accuracies during dressing, without radius dresser, of <1.5 µm, form accuracies of the bearing running surfaces of <2 µm, with forming roller, <1.5 µm, with radius dresser and a coaxiality of <2.3 µm, thus fully meeting the requirements for the geometry.

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Data-driven gear grinding in a production environment

ZF Brandenburg showcases modern manufacturing processes by integrating digital technologies into gear grinding, utilising the Argus Monitoring System from Reishauer. In this article, Reishauer AG shares insights from its long-term collaboration with ZF Brandenburg, emphasising the transformative impact of digitisation in the machine tool sector. ZF Brandenburg is a leader in producing manual and dual-clutch transmissions for high-end German sports cars, leveraging advanced digital tools to maintain its competitive edge.

The ARGUS system by Reishauer is an innovation that monitors processes and workpieces at ZF, enabling precise evaluation and optimisation of grinding quality. This system also meticulously tracks machine components and grinding tool wear. The collaboration between ZF and Reishauer aims to combine specialised production expertise with the innovative power of digital solutions, fostering continuous improvement and creating a mutually beneficial partnership.

The future of gear production in the digital age

At ZF Brandenburg, 100 percent of gear components are monitored continuously and in real-time, ensuring unparalleled quality in modern gear production. The ARGUS system detects and removes potentially defective workpieces during machining, preventing quality issues in subsequent assembly stages. This proactive approach enhances process reliability and significantly reduces costs in later production phases. Thanks to real-time monitoring, process planners can immediately address unexpected issues, such as frequency excitations. ARGUS provides detailed insights into how each component is ground, identifies machine conditions and detects problems as they occur. Faulty components can be removed from the process flow before gearbox installation, preventing defects that previously led to costly dismantling.

ARGUS also excels at detecting grinding worm breakages caused by local overloads and identifying rare, significant breakages due to collisions.

One of the primary reasons ZF adopted the ARGUS system was to tackle challenging vibration issues. Shortly after implementation, with Reishauer's expertise, ZF could detect potential vibration sources in specific grinding worm areas. Process monitoring calibration was optimised to remove components that could cause unwanted noise (NVH) in transmissions. This calibration resulted in higher product quality and enhanced overall production efficiency.

Production before ARGUS

Before introducing ARGUS, quality problems were often only discovered during end-of-line testing, leading to significant follow-up costs. Faults were detected too late after faulty gears had already been installed in gearboxes. Identifying the source of a defect required extensive, time-consuming testing, often involving blocking entire production lots and inspecting all components. While such incidents were rare, they incurred substantial costs, especially compared to the more efficient process enabled by ARGUS, which identifies and removes potentially faulty parts earlier.

Data evaluation, analysis and operability

Today, the ARGUS web application allows planners to monitor the production process in real-time from any location, on the shop floor, in the office, or on a mobile device. One production planner noted: "The system enables us to think more deeply about the process and make more targeted decisions. With ARGUS, we can identify and avoid harmful frequencies to ensure process safety and quality." Data analysis helps identify error patterns, allowing immediate corrective actions directly on the machine. This analysis often leads to quick and effective process optimisation. In ARGUS, technology parameters can be easily linked to measurement data, revealing opportunities where small adjustments can significantly enhance effectiveness. The system's inherently high reliability backs this process.

Enhanced machine condition monitoring with ARGUS

Beyond process analysis, ARGUS excels at monitoring machine conditions. Automatic Component Diagnostics (ACD) continuously monitors and evaluates machine signals to identify potential failures. Autonomous test cycles, completed in just a few minutes, collect extensive data daily. These cycles, equipped with sensors, detect machine faults quickly, with cloud-based algorithms presenting the data through a simple traffic light system where a red light indicates that immediate action is needed.

Conclusion

ZF reports significant production improvements since adopting ARGUS. The system's precise limit values have increased the quality of manufactured parts, effectively identifying and sorting defective parts before further processing. ARGUS has reduced the number of rejected parts and wasted production time. The cost savings from decreased EOL returns are substantial, as the number of returns has markedly dropped since ARGUS's implementation. Furthermore, ARGUS provides detailed insights into tool conditions, allowing tools to be used to their full potential without premature removal based on inaccurate assumptions about their lifespan.

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Grinding with galvanically bonded CBN tools

There's life in the old dog yet. This could be a summary of the last decade in terms of gear and profile grinding with non-dressable galvanically bonded tools using Cubic Crystalline Boron Nitride (CBN) as a cutting material.

When considering dressable grinding processes, there are of course advantages in correcting profile errors quickly, as well as reconditioning the cutting performance of the grinding wheel. In addition, it is of course also possible to carry out a profile optimisation there and then. These are all clear advantages compared to galvanically bonded non-dressable CBN wheels. But still, the CBN wheel maintains its place in day-to-day gearbox manufacture. Especially where there is only a limited amount of space for the grinding wheel for reasons of geometry or where special profile modifications are required, where changing the tool diameter by dressing is not an option due to collision-related or component-specific reasons, where it is absolutely necessary that quality remains high and constant and where it is important that grinding burn is avoided, the galvanically bonded CBN wheel is still the undisputed leader.

The basis of non-dressable CBN wheels is a high-precision hardened steel base body, into which the active grinding profile of the tool is incorporated. This means that in addition to the grain equidistance, the required gearing modifications such as profile corrections and tooth root form must be taken into account in the steel base body. Galvanic processes are now used to coat this base body with a single CBN layer, which provides a highly accurate reproduction, micrometre range, of the required profile in the subsequent machining process. This coating is non-dressable. This means that the tool diameter remains constant during machining for the entire operating life of the wheel, as it is not reduced by wear. Once the grinding process has been set up with such a wheel, it remains dimensionally stable throughout the entire service life. As a result, CBN grinding wheels meet industry demands for a constant and traceable machining process of the highest quality.

Since 1980, KAPP NILES has been a trailblazer in the market with the development and manufacture of profile grinding wheels with the CBN cutting material. For 40 years now, the KAPP NILES tool specialists have routinely dealt with the most complex components, a wide range of profiles and the highest quality requirements. In the meantime, simpler CBN grinding task have been replaced by more cost-efficient dressable solutions, in particular in the automotive industry. Nevertheless, there are a wide range of application areas where non-dressable CBN solutions are indispensable. An example of this is the robotics industry and specially the cycloidal drive used there, which is being machined in Figure 1 on the KX 300 P Gear Centre. Here, the relevant criteria are above all the high positioning accuracy, the static and dynamic robustness of the drive and the low wear behaviour under high load.

Figure 1: External cycloid machining on the KAPP NILES Gear Centre KX 300 P.

These special requirements for cycloidal drives can only be guaranteed if the rotating components are ground with extremely high precision. The corresponding profiles of the cycloidal internal and external gears must precisely follow the decisive pin diameter during rotation. The smallest deviations in the rolling behaviour can ultimately result in important angle positions not being reached precisely during operation, increasing wear in the drive and thereby reducing its service life.

The decisive criterion for the component quality is the precisely ground profile curve of the cycloidal external and radius-shaped internal profiles. For high-quality end products, shape deviations over the entire profile curve are expected to be significantly less than 5 µm in series production, as can be seen in Figure 2. Of course, this is not only required for the first ground part, but also over the entire course of the guaranteed tool life of the grinding wheel, which can reach well over 1,000 workpieces depending on component geometry. A time-consuming

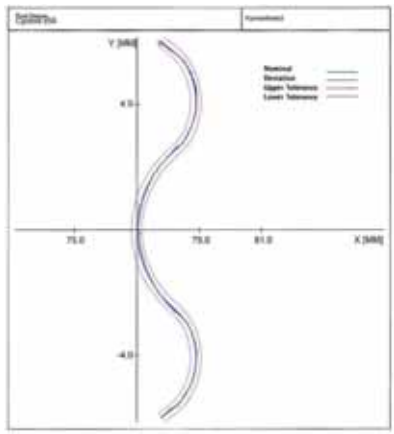

Figure 2: Profile curve of a cycloidal external gear with a tolerance band of 5 µm.

dressing process for sharpening and profiling the grinding wheel is no longer necessary. As a tool manufacturer, KAPP NILES guarantees the quality of the profile through the precisely manufactured profile shape of the galvanically bonded CBN wheels.

Additional examples of application areas for CBN tools include grinding tasks in the aviation industry:

- The machining of the gears for double helical cut planetary stages which are located between the slowly rotating main rotor and the quickly rotating turbine, ensuring improved efficiency and thus higher performance. As shown in Figure 3, the distance between the two gears is only a few millimetres for so-called herringbone gearing of the planetary transmission, leaving little room during machining for the

Figure 3: Machining of a double helical cut planetary gear.

overrun of the grinding wheels. As a result, the maximum possible external diameter of the tools is significantly limited, to prevent them from grinding into the second gearing during grinding strokes.

- With internal gearings, the maximum external diameter of the CBN wheels is limited by the available clearance in the

Figure 4: Comparison of the different external wheel diameters.

component. This can range from sufficiently large, as is the case with ring gears of the planetary transmission, to very small in case of splines. Figure 4 shows the comparison of the different external wheel diameters.

- The landing flaps on the wings of a plane are used to increase lift during take-off and landing. When they are retracted and extended, the flaps are controlled using so-called actuators, which are driven via a joint central gearbox using tandem motors. This also involves the use of triple pinions in the gearbox. The left and right gearings on the pinion are identical. The gearing in the centre differs from both in terms of gearing data, e.g. the number of teeth. Figure 5 shows that here too, only grinding wheels with a very small external diameter can be used, due to the small size and the interfering contours from the respective adjacent gearing. The high dimensional stability of the CBN wheels ensures excellent grinding quality throughout the entire tool life despite the small tool diameter.

Figure 5: Machining of a triple pinion.

Depending on the required precision as well as the quality of the upstream production chain in relation to profile errors, line errors and especially runout errors, the CBN grinding process can either be carried out in a single stage or in several stages. Two-stage processes are typically used today, using coarsely coated roughing and finely coated finishing wheels. Their sequential use makes it possible to achieve both a high material removal rate and a high final quality of the ground gearing (see Figure 6).

Figure 6: Galvanically bonded CBN wheels in roughing and finishing version.

Experience in recent years has shown that a high quality, yet economical production process is only possible if all parameters are taken into account. In addition to high-quality galvanically bonded CBN wheel, this also includes the corresponding grinding technology.

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Optimising bonded cut-off and grinding wheel performance

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Cut-off wheels and grinding wheels are versatile abrasive products used across many applications in fabrication, manufacturing, foundries, construction and numerous other industries. These consumables can have a significant effect on the overall productivity and efficiency of the operation.

Cut-off wheels are a precision product used primarily for making exact cuts, whether on structural steel, pipe, or plate. Grinding wheels are used when applications call for removing a large amount of material or to clean up welds.

These abrasive products are available in different grains and bonds. Grain types include aluminum oxide, zirconium, ceramic and silicon carbide, with each type offering different characteristics. For example, aluminum oxide provides toughness and good performance for cutting steel. Zirconia alumina is a self-sharpening, tough, durable grain that holds up well in a range of demanding applications. Ceramic grain is self-sharpening and offers cool cutting that does not require as much pressure from the operator. Products made with ceramic grain achieve maximum performance with high-power machines. It's important to consider the needs of the application, the type of base material and the power capabilities of the tool being used when choosing the appropriate grain.

Benefits of cut-off and grinding wheels

Cut-off wheels are all about efficiency. Choosing the proper thickness and dimension of a cut-off wheel for the job depends on the workpiece shape, dimension and tool available. For larger profiles, larger

wheels are recommended. For thinner materials, thinner products are the best choice. Thinner wheels make a quick and cleaner cut. The thinner the wheel, the faster the cut. Thicker wheels are more stable and side load resistant.

Grinding wheels are thicker and contain coarser grains. Their main purpose is to be used over larger surface areas when there is a lot of metal to remove and they offer a long product life.

Cut-off and grinding wheels deliver numerous benefits, including increased productivity. With cut-off and grinding wheels, there is often a trade-off between product life and cutting speed, but some products on the market today, like the Metalynx 2.0 product line from Weiler Abrasives, are designed to optimise both so operations no longer have to choose. These wheels increase wheel life by up to 40 percent and match industry-standard cutting speed, allowing operators to increase time spent cutting and grinding and reduce changeover.

Understanding wheel life

So, how do operators know when a wheel should be changed? Typically, it's time for a changeover when the product stops performing well or doing the work efficiently. Also, the diameter of the wheel gets smaller as it is used. When a cut-off wheel gets so small that it cannot get through the workpiece anymore, that's a sign for a wheel changeover.

Not using a wheel to its fullest life can cost money both directly and indirectly. It's throwing money away in the form of a usable product, which increases an operation's consumable spend. But it also increases downtime for the operator when changeover happens more frequently than necessary. From a sustainability perspective, it generates more waste to throw wheels away too soon.

The Metalynx 2.0 cut-off and grinding wheels from Weiler Abrasives include a visual indicator to ensure that every operator is getting the optimum product life out of every wheel. This marking diminishes as the product is used, finally wearing down to arrow indicators so the operator knows

the product has been used to its full efficiency and can be changed. This takes the guesswork out of knowing when to change the wheel.

Tips for efficiency and optimised results

In addition to making sure the operator is using a cut-off or grinding wheel for its full useful life, following some best practices can help ensure consistent results and save time and money in the operation. Consider these tips for wheel use:

- Put safety first: Be sure to follow all proper safety procedures for using cut-off and grinding wheels. All next-generation

Weiler Abrasives cutting and grinding wheels will have a QR code printed on them that operators can scan for safety information.

- Choose the right product: First and foremost, be sure to match the speed and size of the wheel to the speed and size of the tool. Be sure the rpm rating of the tool doesn't exceed the rating of the wheel. A cut-off wheel with a depressed centre (Type 27) can resist more side pressure and provide safety benefits. But a flat Type 1 wheel will allow the operator to perform deeper cuts.
- Use wheels for the application they are designed for: Don't grind with a cut-off wheel because the product was not designed for that. Grinding with a cut-off wheel can lead to product breakage. Grinding requires a grinding wheel or a combination wheel. When switching between cutting and grinding applications, choosing a combination wheel will remove the time taken to switch between a cut-off and grinding wheel.
- Watch the angle: Grinding wheels offer optimal performance when they are used at an angle of 25 to 35 degrees. Operators that grind at too flat of an angle often struggle. When too low of an angle is used, the bonds of the grinding wheel can break down, resulting in pieces chipping off. To provide a solution to this common challenge, Weiler Abrasives has developed an advanced formula for its newest wheels to prevent chipping.
- Apply proper pressure: When using a cut-off or grinding wheel, there isn't a need to push too hard. Use light pressure and let the abrasive do the work.
- Keep it moving: Don't dwell with the abrasive in one spot for too long; this will heat the product up and can cause it to glaze over. Keep the wheel moving back and forth with a gentle motion to make the most efficient use of the product.
- Use the correct guard: Always use the guard designed for that product type. For example, when using a Type 27 wheel, be sure to use a Type 27 grinding guard and when using a Type 1 cut-off wheel, always use a half-moon cutting guard.

Value of consistent performance

Choosing the right cut-off and grinding wheel for the job and following best practices for using the wheels will improve results. Technologies available on wheels today can also help ensure safe and efficient wheel use, to save operations time and money and increase productivity.

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3M abrasive wheels

Grinding, deburring, cutting and polishing

From light buffing, deburring and finishing to heavy cutting and grinding, 3M offers a complete selection of abrasive wheels. Its range includes cut-off wheels, grinding wheels, deburring and flap wheels that are engineered to handle the harsh conditions and hard metals of heavy industrial applications.

Increase durability and productivity

3M abrasive wheels are designed for maximum durability. Many feature our revolutionary Precision-Shaped Grain, which acts like a cutting tool, slicing through surfaces like a knife. It grinds faster and with less friction, minimising heat build-up in the workpiece and lasting many times longer than conventional grain. The durable design of our abrasives helps reduce worktime which improves productivity and increases safety.

Reduce hand-arm vibration

Hand-Arm Vibration Syndrome (HAVS) is an industrial injury caused by continuous exposure to vibrations from handheld tools or machinery. Prolonged exposure can damage the blood vessels, nerves and tendons in the fingers, hand and wrist. Vibration related injuries can lead to permanently reduced sensitivity, strength and dexterity.

3M abrasive wheels work faster than conventional alternatives. The smooth cutting action requires less operator pressure and completing the job faster enabled by the faster cutting abrasive will lead to reduced operator time on the wheel, helping prevent hand-arm vibration.

3M Abrasives are oSa certified for safety and quality

3M is a founding member of the Organisation for Safety in Abrasives (oSa). They audit abrasive manufacturers to EN standards guaranteeing the highest level of tested safety for cutting and grinding tools. 3M engineered abrasives are all oSa certified, fully meet EN safety standards and regularly undergo audits with certified quality management throughout the manufacturing process. Therefore, the wheels are less likely to break during operation, minimising the risk from accidents.

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Borazon CBN grinding pins and internal grinding wheels

G-MX Borazon CBN grinding pin, 6 mm ø, in a collet chuck.

The development started in 1969, exactly 55 years ago, for the first time, General Electric, back then a manufacturer of super abrasives, offered Borazon as an abrasive for the development of so-called boron nitride CBN grinding wheels and pins to the abrasives industry.

Borazon, advertised as abrasive of a new era, with its extraordinary hardness and heat-resistance made it possible to grind hardened steels, starting from 58 HRC, faster and more efficient than ever before.

LACH DIAMANT developed resin-bond Borazon CBN grinding wheels under the branding K-MX and tressex® for the grinding of HSS and hardened steels were, from the very start, so successful that they quickly took the place of conventional ceramic wheels, e.g. for tool grinding.

One grinding task was immediately taken over by Borazon, internal cylindrical grinding. LACH DIAMANT developed G-MX grinding pins and internal grinding wheels with electroplated bonds turned out to be an immediate success, especially for the manufacturers of "collets".

To this day, LACH DIAMANT provides a large portfolio of Borazon CBN grinding pins and internal grinding wheels for all collet manufacturers, all immediately available from stock. Customers can acquire the latest G-MX 500 programme for internal grinding. Also in stock are diamond-coated internal abrasives for carbide machining.

Depending on the application, all internal abrasives, diamond and CBN, as well as all LACH DIAMANT produced grinding wheels, can be delivered in special resin, metal and ceramic bonds.

This shows how the first Borazon abrasives were labelled by General Electric.

LACH DIAMANT will be exhibiting at two major trade shows in September: AMB in Stuttgart, Germany and IMTS in Chicago, USA.

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Reducing the risk of hand arm vibration syndrome with Tyrolit Power

Tyrolit Power is a handheld sander machine, providing Hand Arm Vibration Safety (HAVS) solutions for the surface preparation of composite and non-ferrous materials.

Across all industries, the need for new materials with the ability to withstand high pressure while supporting the current trend for light weight design are highly in demand. As a result, the need for efficient ways of machining is becoming more and more evident. Tyrolit now offers its customers the tools to create faster processing times.

Naturally, innovative materials like aluminium, glass, carbon and aramid fibres entail new challenges. Due to the complex material composition, conventional tools often lose their sharpness and form quickly, which leads to loss of time and monetary resources. The Tyrolit Power range is specifically designed and tested for the use on composite and non-ferrous materials. It offers an impressive lifespan and highly efficient machining processes.

Helping you with technical issues and process optimisation, through its light weight, durability and freedom of design,

Tyrolit Power systems generate less dust and create minimal vibrations, considerably improving the health and safety of operators.

There are many Orbital Sanders available on the market, but none with the benefits of that of Tyrolit Power. The innovative design of Tyrolit Power totally redefines the sanding of large and complex surfaces.

A standard Orbital Sander provides vibrations of 6.9 m/s² HAVS with maximum daily usage of that at 1.5 hours. The Tyrolit Power reduces the vibrations to 1.7 m/s² HAVS, enabling +8 hours trigger time in daily usage.

These vibrations mean that with conventional machines, excessive and prolonged use can result in Hand Arm Vibration Syndrome (HAVS), a permanent and painful numbness or tingling in the hands. To reduce the risk, the use of conventional machines is generally limited to a few hours a day or even less. With Tyrolit Power there are little or no vibrations resulting in unrestricted use of the machine and no risk to the operator.

Maximising process up time, longer product life cycle and significant cost savings while reducing the risk of health issues are just a few of the huge benefits of Tyrolit Power which opens up huge advantages for a vast range of markets.

Interested in seeing the benefits of Tyrolit Power for your business? Get in touch with Tyrolit today.

Tyrolit UK Ltd
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A Practical Guide to Precision Grinding

This book has been written for the people who, figuratively speaking, put their noses to the grindstone every day. The book distills what the author, Walter Graf, learned during over 40 years in the abrasive industry: Travelling the industrialized world, optimising customers' grinding processes, and giving grinding seminars.

372 pages, divided into some 20 chapters covering, among others, OD & ID cylindrical grinding, centreless grinding, surface and creep-feed grinding, gear grinding, how to run grinding tests, diamond dressing, giving practical advice on effectively running these processes. Excessive wordiness was consciously avoided and counterbalanced by graphics and simple formulas to make the contents understandable, digestible and actionable.

Anyone wishing a summary of the contents, with the first page of each chapter, please send a request to **info@adgrind.com**

Costs per copy: £71.00 with free delivery

The book is now on stock in the UK at:

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Waterwells Business Park
Gloucester, GL2 2A

Window manufacturer sees clearly with Filtermist

As a leading manufacturer of steel windows, Crittall Windows manufactures a vast range of bespoke windows, doors and screens that range from residential and commercial applications to everything from new buildings to architecturally significant historical buildings. With a proud history that dates back to 1849, the Essex company applies the latest manufacturing technologies to deliver products that are the envy of the industry. In the new machining department, the FX Series of compact oil mist collection systems from Filtermist has made a dramatic impact.

Crittall Windows has a fascinating history that includes producing windows for the fateful Titanic, manufacturing munitions during World War 1 and prefabricated truss bridges for World War 2. However, innovative window manufacture has always been the core business at Crittall and its production processes incorporate a series of hot-dip galvanising and polyester powder coating to strict BS and ISO: 9001 standards that differentiate the quality and prestige of this brand over its rivals.

The Witham-based manufacturer that exports worldwide has implemented a series of modernisation strategies that have seen Crittall upgrade its machining division. Discussing this, Darren Joyce, production director at Crittall Windows says: "We manufacture complete windows and doors, we do everything here. We cut the steel, machine it, weld it, galvanise it, powder coat and ship our products around the world. We are having a transitional period where our older machinery, which was very heavy-duty and made to stamp big slots and holes in steel sections, is now being replaced as the old method isn't following how we manufacture things nowadays. We now require a lot more one-offs rather than hundreds of parts made to the same size. So, we have moved to more modern and flexible CNC machining to deal with one-offs a lot easier."

The transition to new manufacturing systems and machines is an ongoing project that has taken a few years but is paying dividends for the company celebrating its 175th anniversary this year. One issue the company recognised from transitioning to CNC machining from older punching and stamping technology was coolant mist and

The Filtermist FX5002 system with monitoring at Crittall Windows.

fumes from the machine tools. This is where Filtermist stepped in to solve the problem. Recalling the situation, Darren Joyce continues: "One of the biggest challenges we faced when we moved over to CNC machining was that steel profiles are not like aluminium or PVC. Steel takes longer to process and there is a lot of machining that goes on. This needs a lot of coolant and this gave us an issue with the creation of fumes and in particular oil-laden fumes. We rapidly found that the factory was starting to mist up. This wasn't a good workplace environment for our staff. Additionally, there was far too much coolant on our parts which are being welded further downstream and this creates even more fumes.

"We wanted to revise the way we work with coolant and cutting fluid on our machines. One of the biggest challenges was trying to move away from paper-type filters that are used on our type of machine tools. We needed to find something that would take the oil out of the air. If we could take the oil out of the air inside the machines, then when the machine doors open, you don't get puffs of oil-laden air. This gives you a cleaner working environment."

Referring to how the company started working with Filtermist, Darren Joyce recalls: "We did a lot of investigation work and we spoke to a lot of machinery manufacturers, which brought us to Filtermist. Filtermist effectively manufacture what is a drum that centrifugally spins and removes the oil out of the air and filters it out. We thought it sounded too good to be true, but it works. We have now installed them in all of our CNC machining centres. The Filtermist FX5002 unit successfully spins the oil out of the air, but we have taken that a step further. We have modified further, so we are recycling that oil and using it on our flood-based coolant machines, extending the service life of the oil."

Darren from Crittall Windows with Filtermist extraction systems on specialist machines to the right as well as on CNC machines in background.

The company has also applied its innovation to several other areas. As Darren Joyce explains: "We have also made changes where the door of the machines open. Now, after a 10-minute time-lapse the machines will cut off, not wasting electricity on equipment that is not being used. We are delighted that we found Filtermist, it's a fantastic product that does 'exactly what it says on the tin'."

Crittall has gone from not knowing the Filtermist brand to having 12 of its FX5002 units installed in less than a year. Furthermore, Crittall has specified the Filtermist units with an F Monitor 2 that gives customers live readings of the Filtermist systems' efficiency level, notifying staff when service and maintenance is required.

The Filtermist FX5002 is a popular model that is powered by an extremely efficient 1.5 kW 60 Hz motor that generates an airflow rate of 2,000m^3/hr at 60 Hz. Exceptionally easy to install, operate and maintain, the Filtermist FX5002 is a compact 357 mm diameter unit with a height of just 613 mm, 751.50 mm, with an after-filter unit.

Commenting upon the evident changes the Filtermist systems have made to the working environment at Crittall, Darren Joyce continues: "Not long after installation, we could see the difference. We could see the mist clouds dissipating. The health & safety and well-being of employees have always been our number one priority. In a steel window manufacturing plant where you also have welding operations and pre-treatment processes, there are evidently fumes, so we have large extraction facilities to manage this. However, the localised filtration of oil out of the air by Filtermist was so important and that is where we have seen the biggest improvement. There is no longer any oil on employees' clothes, on their hands, faces or on the workpieces and it's not on the floor. So, it's a much nicer environment and a healthier place for our staff to work in. We have also seen a significant improvement in the air quality checks that we do every year. That has come through in numbers and is based on facts which is even better for our business."

Filtermist extraction systems sitting neatly above the Crittall Windows machine tools.

The Crittall Windows shopfloor that is moving to CNC machine tool technology.

Of course, the Filtermist systems can add so much more than an improvement to the working environment.

Commenting upon this, Darren Joyce concludes: "We have also found economic benefits from the Filtermist systems. We take the oil from the Filtermist systems, recycle and use it on other machines. Coolants and cutting fluids are not cheap, especially as we have moved to a water-based coolant as opposed to an oil-based coolant. We have to get the water and oil solubility mix correct, so it can burn off without creating too much fume. All in all, if you package all of those things together, you end up with a much healthier working environment. We have also cut down on our oil consumption and expenses. Additionally, the Filtermist filters are cutting in and out to coordinate with our machine usage as opposed to constantly running like extraction units, so we are also seeing energy savings. All of this really does make the Filtermist extraction systems a 'no-brainer'."

Established in Shropshire in 1969, Filtermist's ethos is to protect people by ensuring cleaner, safer, more productive working environments. The company, part of the Swedish Absolent Air Care Group, provides an extensive range of products and services designed to ensure the air in production facilities is free from contaminants such as oil mist, oil smoke, dust, fume and VOCs. If left in the atmosphere, airborne particles can be hazardous to health and can pose a fire and slip risk.

Filtermist is best known for manufacturing a range of compact, quiet and efficient oil mist filters which are trusted by world-leading manufacturers in more than 60 countries. In the UK, Filtermist offers a turnkey service that includes initial consultation and project planning, extraction system design, specification, equipment manufacture and supply, installation and commissioning.

An active acquisition programme means that in addition to Filtermist oil mist filters, the company also manufactures Dustcheck process filters, venting filters and dust collectors and Kerstar industrial vacuums, including ATEX-rated models. Filtermist is also the UK distributor for sister company Absolent AB.

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Filter technology for grinding

As many components are expected to offer ever better surfaces, the finest grinding and polishing work is increasing. This produces an increased number of tiny particles that contaminate cooling lubricants and grinding oils.

At GrindingHub in May, KNOLL Maschinenbau demonstrated how filter solutions can be customised for a wide variety of grinding applications with the universal HydroPur hydrostatic filter, the two-stage MicroPur® superfine filter with KF-E compact filter and UniPur canister filter as a bypass system.

High-quality grinding results always require optimum cleaning of the grinding oils or other cooling lubricants. However, as the chip load varies in terms of size and shape depending on the material being processed and the respective abrasive, the user should also configure their filter technology accordingly.

KNOLL offers the HydroPur hydrostatic filter as an all-round filter solution. This modular universal filter comprises a tank and filter upper part with a fine filter fleece, which when combined with the hydrostatic principle separates fluid and chips. It is suitable for a wide range of applications but is particularly suitable for grinding due to the flat discharge angle. The basic tank and filter components can be supplemented with pumps and coolers as required, from the simplest equipment to the full version, which then fulfils even the most demanding requirements.

While the HydroPur hydrostatic filter previously offered was limited to a size with a flow rate of 400 l/min, in future there will be other models covering the performance range from 200 to 1,000 l/min.

The non-plus-ultra solution: the superfine filter MicroPur

The KNOLL superfine filter MicroPur is designed from the outset for ultra-fine filtration. It is perfect for the tool grinding of carbide metal and HSS. But it also delivers optimal results in the machining of castings. The MicroPur achieves a filter fineness less than 3 µm and manages without filter consumables thanks to its special design, which makes a significant contribution to its high degree of efficiency and sustainability. At GrindingHub 2024, KNOLL showcased the standard MicroPur 240 model including an integrated desludge concentrator in a two-stage filter system. This means that the ultra-fine filter is supported by a KF-E compact filter, which removes coarser contaminants from the coolant and thus relieves the MicroPur.

Such a solution is ideal for grinding and polishing HSS tools or other steel components. This is because these materials produce not only ultra-fine particles but also longer, fibrous chips, which must be separated in advance to ensure a long service life of the MicroPur. One growing area of application for such two-stage filter solutions is gear wheels for electric mobility, for example. In order to minimise running noise, these are polished after grinding, creating the aforementioned ultra-fine particles. Another application example is the grinding of hard-coated brake discs, a trend topic at GrindingHub. The hard material layer consists of stainless steel with embedded carbides. Grinding produces both larger grinding chips and very fine particles, which are reliably separated from the cooling lubricant by a two-stage MicroPur superfine filter.

Bypass filtration for better cooling lubricant quality

The UniPur canister filter is a cost-effective, manual alternative to self-cleaning filters. It is versatile, in the main or secondary flow, as an additional filter, additional filter stage, bath treatment, police filter, or as a standalone filter for small volume flows. KNOLL offers various filter cartridges and bags for different applications, which guarantee a filter fineness range of 1 µm to 100 µm. The maximum volume flow per housing is 500 l/min.

The UniPur is ideal for use as a bypass filter for grinding applications that do not require full-flow filtration of the finest chips. Equipped with a MicroPur filter cartridge, it is able to remove even the finest particles from the cooling lubricant in standalone operation, for example downstream of the HydroPur hydrostatic filter. This means that bath treatment is also possible at times when there is little staff, for example at weekends.

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What is oelSmart?

Being oelSmart is all about taking a proactive and whole-system approach to the management of metalworking fluids and associated systems, to make sure they're working in synergy for optimal performance, productivity and machine operator protection, in a way that is right for you.

Why is synergy important?

Well, one small change in any key element, fluid, filtration, mist extraction, or maintenance, can impact overall system costs, productive operating hours, regulatory compliance and product quality.

For instance, did you know that the performance of synthetic fluids is directly affected by your filtration method, or that the right mist extraction system can recycle filtered oils for reuse, that it is a legal requirement for LEV systems to be tested every 14 months, or that it can be more economical to clean your system with coolant, rather than machine cleaner.

oelSmart impacts the bottom line and, by getting it right, oelheld has seen its customers:

- Resolve HSE notices
- Increase tool life by up to 300 percent
- Improve efficiency by 25 percent
- Reduce machining times by 50 percent

How can you be oelSmart?

The good news is your systems may already be well on the way to being oelSmart. oelheld is working on some handy tools you can use to assess your current oelSmart level and you'll soon be able to book a complementary oelSmart consultation with one of its experienced engineers who will work with you to assess your system's performance, productivity and worker protection levels, or address specific challenges you might have. In the meantime, refer to our oelheld's freely accessible oelSmart resources for technical information, H&S guides, troubleshooting, How-To manuals and downloadable templates. The company will be adding more soon, so check back or follow it on LinkedIn to hear about new oelSmart news, tips and resources as they're released.

An oelSmart approach balances the system elements to create a performance level and cost that suits your processes and budget and that doesn't always mean the most expensive option. Its technical team is happy to act as a sounding board and talk through any planned changes you might be considering or provide advice if you are experiencing any issues related to your fluids, filtration or mist extraction.

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Choosing the right cooling lubricant

Precision grinding can generate high temperatures. To prevent thermal damage to the workpiece, this heat must be sufficiently dissipated by an effective coolant. Both oil-based and water-soluble coolants can be used for this purpose. Both types of coolant have their pros and cons. We asked Tom Cappadona from Blaser Swisslube to find out which coolant type best suits different methods of precision grinding. He used to work for Studer and now lends his expertise to one of the leading cooling lubricant manufacturers.

The huge importance of coolant in precision grinding

The following applies to production: when the temperature changes, the size of the manufactured parts also changes. In precision grinding where microns are important, the temperature must remain constant. The chips generated during grinding must also be effectively removed by flushing them out with coolant.

Using clean, high-performance coolants has additional benefits, such as extending the working life of the grinding wheel, ensuring the surface quality of manufactured parts remains consistent and reducing the maintenance work required on the machine.

Advantages of water-soluble coolants

Water-soluble coolants are ideal If you are looking for a simple and cost-effective solution. Water-soluble coolants can be blended with additives and some concentrates come ready-mixed with inhibitors that prevent bacterial and fungal growth. When changing the coolant, Blaser uses a cleaner that kills biofilms for 7 to 10 days. During this period one can continue to grind. Bacteria often form when the coolant is stationary and not being circulated. This is reflected in increasing pH values. Blaser runs training courses on the maintenance of its water-soluble coolants.

Advantages of oil-based coolants

While it is true that oil-based coolant is more expensive because additional peripheral equipment is required, it also lets machinists achieve high material removal rates and

excellent process reliability. "Oil cools better than water because less friction and heat is generated," says Tom Cappadona. "So, when machining materials such as carbide or HSS, better removal rates can be attained by using oil-based coolants."

A high-quality base oil with a high flash point is important. The flash point indicates the temperature at which vapours ignite.

One disadvantage is that oil-based coolants require a fire suppression system and a cooler to keep temperatures low. Fire protection is essential when using oil-based cooling lubricants.

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How to deburr stainless steel

Rust-free, hygienic and with an elegant appearance, there are good reasons to use stainless steel for certain applications.

However, the material has its own requirements when it comes to processing. Whether sinks in the kitchen, storage containers for the chemical and food industry, fittings on furniture or medical technology in hospitals, stainless steel is encountered in many applications. The term "stainless steel" covers both alloyed and unalloyed steels that have a certain degree of purity. Nickel, cobalt, molybdenum, manganese, tungsten, vanadium, chromium and titanium are used as alloying elements. This also makes it clear that stainless steel can have many different properties depending on the grade.

What advantages does stainless steel offer?

As a material, stainless steel has a number of positive properties that make it the first choice for certain applications:

Corrosion resistance
The alloying elements, above all chromium, ensure that a thin passive layer forms on the surface in combination with oxygen. This protects the stainless steel from further corrosion.

Temperature resistance
Like other metallic materials, stainless steel can withstand higher temperatures well. These vary depending on the alloy and the intended use.

Chemical resistance
Stainless steel can withstand not only water but also weak acids.

Conductivity
Similar to steel and other metals, stainless steel is a good conductor of both heat and electricity.

Easy processing
Depending on the alloy, stainless steel is easy to weld, forge, deep-draw or machine.

Hygiene
Stainless steel objects are easy to clean because the material is resistant to water and mild acids while having a smooth surface. This makes the material idea for hygiene-critical applications.

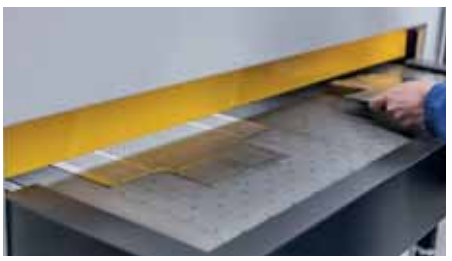
Aesthetics
The corrosion resistance ensures that stainless steel retains its appearance. This makes it possible to create beautiful-looking objects in the long term.

Which cutting processes are used for stainless steel?

There are various processes for stainless steel in the metal fabrication industry. However, they do not differ significantly from the processes for other metals. When cutting stainless steel parts, the most important processes are laser cutting, punching and plasma cutting. Flame cutting, on the other hand, is not suitable for stainless steel.

Burrs often occur when cutting stainless steel. In addition, the sheet edges are often very sharp after the cutting process. How pronounced the burrs are depends on the alloy. The cutting process and the thickness of the stainless steel parts seven sheets also play an important role. Sheet metal workers have to remove these burrs for several reasons:

- Burrs on stainless steel sheets and parts can disrupt further processing, such as bending and welding.
- As the burrs are sharp and pointy, employees and end users can injure themselves on the burrs. This also applies to the edges of the stainless steel sheets and parts, which need to be rounded.
- With stainless steel in hygiene applications, dirt and material residues can accumulate on the remaining burrs. Burrs also interfere with cleaning. Deburring is therefore particularly important for some stainless steel products.



How to deburr stainless steel?

Several processes are available for deburring stainless steel sheets and cut parts. The most important mechanical processes are vibratory tumbling, for very small parts, deburring via block tools or grinding belts is ideal for parts larger than a business card. Which deburring machine is best for stainless steel depends on several factors, for example:

- Thickness of the stainless steel sheet or part.
- Dimensions, width and length
- Number of parts.
- Condition and size of the burrs.

So, there is no such thing as the best deburring machine for stainless steel, only the optimal machine depending on your specific requirements.

What is important when choosing a deburring machine for stainless steel?

An important point when choosing a deburring machine for processing stainless steel parts or sheets is the easy of cleaning. The reason: stainless steel and other materials such as aluminum or steel must remain strictly separated. However, material cross contamination can only be ruled out if the deburring machine is cleaned out thoroughly.

A good wet dust extraction system also helps to avoid cross contamination. It also increases the safety of the deburring process.

Another criterion is quick-change system for the deburring tools. This is because a separate tool set must be kept for different materials to avoid cross contamination. A deburring machine with a quick-change system for the tools saves on setup times and therefore costs.

The quantity of parts, the position of the burrs and the dimensions of the materials must also be taken into account. This criteria can be used to decide whether a single-sided or double-sided deburring machine would be suitable. Apart from the material separation, deburring stainless steel is not significantly more complex than deburring steel. The right combination of machine, material and tools can be determined during a comprehensive deburring test at the suppliers location.

ARKU offer machines and services with high value retention. In doing so, it ensures process reliability and efficiency for customers all over the world. Its machines and systems form this foundation. To successfully handle tomorrow's challenges, the company is positioned to meet the demands of the future. Yet it also remains true to its origins, precision is its promise.

For decades, it has been a technology leader for precision levellers. Innovative deburring technology expands its industrial expertise.

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Vollmer takes the 'edge-off' with new ultrasonic deburring system

Following the remarkable success of the ultraTEC A25, A100 and B10 ultrasonic deburring systems, Vollmer UK has now launched the exciting new A25S. Setting new standards in deburring, ultraTEC is part of the Vollmer Group and it has won a string of awards for its patented new ultrasonic deburring technology that only uses water.

Only formed in 2019, ultraTEC has taken the industry by storm with its unique technology that utilises an ultrasonic horn that oscillates to generate sound waves as well as cavitation to clean and deburr external and internal edges with complete process reliability. The environmentally friendly solution uses water to provide sharp-edged burr-free parts that often cannot be processed via alternate methods. More impressive is the use of water as opposed to chemicals, making it a viable and validatable process in a variety of industry sectors.

Perfect for small to medium-sized components, the ultraTEC ultrasonic A25S creates a formation and dissolution/implosion of bubbles in the water that releases intense energy during the implosion. This is created by an ultra-high oscillation of 20 kHz, 20,000 oscillations a second, with an oscillation width of +/-80 -120 microns, which far exceeds the amplitude of ultrasonic cleaning, cutting and welding technologies. An ultrasonic horn that is fully submerged in water is set into resonant vibration via mechanical oscillations to transmit extremely high forces into the water tank. With horn diameters from 1.2 to 17 mm, the ultrasonic horn is positioned in the water tank and components are robotically moved around the ultrasonic horn that creates a cavitation jet from 250 to 270 m/s that breaks burrs from the parts.

The A25 and A100 models have been extremely well received since their market introduction, however, the new A25S model builds upon this already formidable reputation and delivers a far superior experience compared to its predecessors. The new A25S takes the innovation of ultraTEC's previous models and offers more rigidity, vibration dampening and thermal stability with a welded steel machine base filled with mineral concrete. This base creates a more robust platform, ensuring enhanced machine kinematics, component quality and repeatability.

This improved stiffness and heavier base is the foundation block for a welded steel machine frame that replaces the aluminium frame on previous models. Once again, this upgrade adds even greater levels of rigidity, thermal stability and vibration dampening than ever before. Simultaneously, the new steel frame improves operator access and ergonomics whilst creating a streamlined and futuristic machine appearance. This structure also incorporates a new PE500 confetti structure insulation that supersedes the previous machine insulation to yield improved noise insulation and extend machine life with its water-resistant characteristics while also using recycled and fully sustainable material.

From an automation perspective, the new A25S is available with three loading drawers as standard with the optional choice of six drawers. This upgrade gives the end user more loading capacity than ever before. This is complemented by a new drying system that offers flexible hoses with a choice of end pieces that increase flexibility and ensure water is blown from the parts before storage, resulting in lower humidity levels in the machine.

As for the deburring process that eliminates common challenges such as deformation, discolouring and changes to the oxide layer on the component, this has also been upgraded. Like the previous A25 variant, the A25S has two ultrasonic horns as standard with a third horn as an option. However, the A25S positions the horns at different angles with one horn offering height adjustment. Combined with a new water tank that requires less water, the reconfiguration allows one horn to approach holes and special features to enhance performance and increase flexibility.

Working in conjunction with the new water tank design is a new filtration system that uses filtered water as opposed to ionised water. The water is descaled and cleaned to provide a less aggressive solution that removes mechanical impurities from as small as 10 µm and it can use the same water to process a multitude of different materials. This makes the ultraTEC ultrasonic A25S completely flexible.

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Coborn exhibits new PL150 at GrindingHub

Coborn Engineering introduced the new PL150 Planetary Lapping Machine at GrindingHub in May. Coborn's Planetary Lapping machines are designed to polish the top surface of PCD discs to a flat, mirror finish. They can also be used to polish CVD discs/wafers.

Key features include:
- Variable speed fixture rotation.
- Ø 150 mm PCD/CVD discs may be processed.
- Programmable pressure with up to five different forces during the program.
- Enclosure, enhanced safety feature for secure working environment.
- User-friendly interface for easy operation and monitoring.
- Built-in OPC server for remote monitoring of machine performance and wear. Wireless and cloud options available.

PG6 optional software packages

The Coborn PG6 is an automatic, ultra-high precision polishing machine that is designed specifically for processing natural or synthetic Single Crystal Diamond (SCD) tools. The PG6 software is user-friendly where straightforward programming blocks can be built step-by-step to produce the tool forms and geometries you need.
Coborn offers a number of optional PG6 software packages, for example:
- Contour Block: To produce a single concave radius with lead in/out using the 'point' of a shaped wheel.

Adaptive Acoustic Tracing Software: Enables the PG6 to adaptively control the pivot and infeed axes. This allows the axes to adapt to each individual tool and tool cycle.

Coborn Engineering has been actively involved in many aspects of machine tool design and manufacture for over 80 years. Established in 1942, the company initially manufactured high precision spindle motors and balancing machines. In 1962 this developed into manufacturing Scaife Spindles and Planetary Grinding (PG) machines for the gem and single crystal diamond industry.

Then, with the introduction of polycrystalline diamonds in 1978, Coborn designed and manufactured the Reciprocating Grinding (RG) machines. In 2002, Coborn also introduced a laser cutting machine for PCD.

Coborn continually strive to improve its products and service. The company works closely with its customers and this contributes greatly to product development and performance enhancement. Coborn uses the latest machine tool technology, combining in-house hardware and software design with the best equipment available from around the world.

It has a history of producing engineered solutions for industry starting with the Gyro

Balancer designed by Sam Innocent which was stipulated for use in the aeronautic industry until c1960. The business evolved into making machines for the diamond industry and Coborn has been at the forefront of providing new technology and new processes for this global business since the 1960s. The use of diamond tools has grown steadily since the introduction of PCD in 1980 but with the use of aluminium in the automotive and smart phone market the growth has increased significantly, especially in China. The latest development in the industry is the introduction of synthetic diamonds, which is opening up many new potential applications for the use of diamonds. Coborn is working closely with its global customer base and with industry partners and academic partners to ensure that the necessary machine developments and innovations are being addressed. Its aim is to provide 'Engineered Solutions to the Diamond Industry.'

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Compressor plate repair, maintenance or reconditioning

Lapping compressor plates with Kemet lapping plates and diamond finishes is a meticulous process that yields superior flatness and surface quality. By following a controlled procedure and utilising the appropriate equipment and materials, it is possible to achieve consistent and high-quality results. The benefits of this process include enhanced performance, increased durability, and cost savings, making it an invaluable technique in the maintenance and manufacturing of compressor plates.

Lapping compressor plates using the Kemet lapping plates and diamond finishes provides numerous advantages:

- Lapping ensures that the compressor plates achieve a high degree of flatness, which is crucial for the efficient operation of compressors. This results in better sealing and reduced leakage.
- The use of different grades of diamond slurries allows for a range of surface finishes, from coarse to ultra-fine, improving the overall surface quality of the plates.
- The controlled process ensures that each plate is uniformly lapped, resulting in consistent quality across all plates.
- By achieving a smoother surface, lapping reduces the friction between moving parts, thereby extending the life of the compressor plates and the compressor itself.
- Improved efficiency and longevity of the compressor plates lead to lower maintenance costs and reduced downtime, providing economic benefits over time.

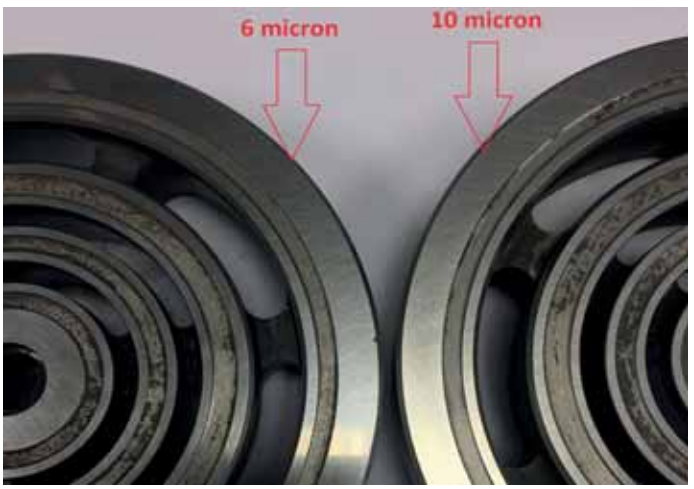
Process breakdown

To achieve optimal results in lapping compressor plates, the following equipment and materials were employed:

- Kemet 36" lapping/polishing machine: A robust and precise machine designed for high-performance lapping and polishing.
- Kemet Copper SP2 lapping plate: A specialised plate used for fine lapping applications.
- Kemet Iron lapping plate: A durable and versatile plate suitable for various lapping tasks.
- Kemet flatness gauge: An essential tool for measuring the flatness of the lapped surfaces.
- Diamond slurries: Different grades of diamond slurries were used to achieve the desired finish: 3, 6, 14 and 25 micron type K std.
- Dycem faced hand weight: A tool used to apply consistent pressure during the lapping process.
- C042 cleaning fluid: A cleaning agent used to remove residues after lapping.

The process of lapping compressor plates involves several carefully controlled steps to ensure precision and consistency. Each compressor plate was placed inside a control ring on a flat Kemet composite plate. The lapping machine was cycled for a duration of 5-15 minutes, depending on the size of the compressor plate. Diamond slurry was applied using a diamond dispenser at a ratio of two seconds of spray every 45 seconds until the surface was cleaned up. The compressor plate was then flipped over and the process was repeated to ensure both sides were evenly lapped, when applicable. The parts were cleaned with C042 cleaning fluid and inspected for flatness using the Kemet Flatness Gauge.

Compressor plate before after processing.



Compressor plate lapping with diamond.

Left: Compressor plate maintenance reconditioning.
Right: Compressor plate maintenance.

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Surface roughness measurement and applications

A question sometimes asked is "At what point does surface roughness become waviness?" This is almost impossible to answer. The change from the concept of roughness to that of waviness often depends on the size of the workpiece.

For example, the irregular spacing which would be regarded as roughness on a machine spindle would be regarded as waviness on a watch staff. The number of waves in the functional length also has some influence on how we classify the irregularities. One wave on a watch staff might be considered as curvature, but a larger number of waves on a longer shaft may be accepted as waviness.

It is better to separate roughness, waviness and form according to their cause, as this also relates to the performance factors. So, we can define surface roughness, waviness and form as follows.

What is surface roughness or roughness?

Surface roughness or roughness is defined as the irregularities which are inherent in the production process e.g. cutting tool or abrasive grit. Surface roughness is quantified by the deviations in the direction of the normal vector of a real surface from its ideal form. If these deviations are large, the surface is rough. If they are small, the surface is smooth.

What is waviness?

Waviness is part of the texture on which surface roughness is superimposed. It may result from vibrations, chatter or work deflections and strains in the material. It is also impossible to specify precisely where waviness stops and the shape becomes part of the general form of the part.

What is form?

Form is the general shape of the surface, ignoring variations due to roughness and waviness.

Roughness, waviness and form

These distinctions are therefore qualitative not quantitative yet are of considerable importance as defining them this way is well established and functionally sound. Surface roughness is produced only by the method of manufacture resulting from the process rather than the machine. Marks can be left by the tool or grit itself, these will be of a periodic nature for some processes and more random in others.

There is also a finer structure formed by tearing of the part during machining, the build-up of debris at the edge and small blemishes in the tool tip. Waviness, however, is attributed to the individual machine, imbalance in the grinding wheel, lead screw inaccuracy and lack of rigidity.

Form errors are often caused by the part not being held firmly enough or a slideway not being straight, or heat generated during the process that can cause a surface to bend.

It should be emphasised that these three characteristics are never found in isolation. Most surfaces are the result of a combination of the effects of surface roughness, waviness and form.

How to measure surface roughness?

Since the individual surface roughness irregularities are too small to see with the naked eye, a surface roughness measurement tester is required. A small stylus is drawn across the surface at a constant speed for a set distance. An electrical signal is obtained and amplified to produce a much-enlarged vertical magnification.

High precision surface roughness measurement

This signal result is displayed in a graphical output, together with numerical values that characterise the surface texture or surface roughness.

The ISO standard for surface roughness measurements is a 60° or 90° conical stylus with a spherical tip of 2 µm radius. However, this is quite a delicate stylus and needs a surface roughness measuring instrument with excellent mechanical properties to achieve this.

The Surtronic® Duo II Surface Roughness Measurement Tester is designed to measure surface roughness and can be utilised in conjunction with the HSE Slips assessment tool software to check flooring surface roughness.

In addition, the Surtronic S-100 Series Surface Roughness Measurement Tester offers a versatile solution for all your surface finish measurement requirements.

What are the surface roughness measurement parameters?

In order to predict the behaviour of a component during use or to control the manufacturing process, it is necessary to quantify these surface characteristics by using surface texture parameters. Surface texture parameters can be separated into three basic types: Amplitude Parameters, vertical characteristics, Spacing Parameters, horizontal characteristics and Hybrid Parameters, combination of spacing and amplitude parameters.

Examples of typical surface roughness measurement parameters can be seen below:

Ra - The universally recognised and most used, international parameter of roughness. It is the arithmetic mean of the absolute departures of the roughness profile from the mean line.

Rv - The maximum depth of the profile below the mean line within the sampling length.

Rp - The maximum height of the profile above the mean line within the sampling length.

Rt - The maximum peak to valley height of the profile in the evaluation length.

Rz - The maximum peak to valley height of the profile within a sampling length.

What are the applications of surface roughness?

In many applications surface roughness is closely allied to function, for instance where two surfaces are in close moving contact with each other their roughness will affect their sealing or wear properties. This might suggest that it is a case of "the smoother the better", but this is not always true as other factors may be involved.

Where lubrication is involved it has been found that roughness valleys are required to hold oil. Also, the financial aspect must be considered: it costs a lot of money to produce very smooth surfaces and the expense of this exercise can add to the bill considerably without gaining a great deal of performance.

Applications of surface roughness

However, when two surfaces in relative motion (e.g. a shaft and its bearing) are lubricated, some wear will occur. If the surfaces are rough, they will soon become smoother as the peaks wear away. Since this removes metal there will be a quicker change in the fit of the two parts than if the finish was at the optimum from the start. On the other hand, some parts such as clamping devices or a pin with an “interference fit” depend on friction for their functionality.

Another application where surface roughness can have an influence on performance is the use of lip seals to prevent the escape of hydraulic fluids. If the finish is too smooth it is difficult to maintain a fluid film between the shaft and the seal. If the finish is too rough it can cause abrasion and consequent breakdown, leading to failure. Inspection of the texture left on a component after machining will often reveal tool defects, incorrect tool settings or wrong tool speeds and feeds.

The appearance of a surface can be of some importance. For instance, sheet steel used for motor car bodies must have a finish which will allow paint to bond to the surface without any "orange peel" effect and with an even appearance. Anybody who has tried to paint onto a glass surface will appreciate the difficulty in getting a firm bonded finish. Metallic parts are not the only components to require control; both paper and plastic parts need the same degree of repeatability.

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Global spearhead in the calibration of reference standards using RONDCOM

The DAkkS-accredited laboratory of eumetron GmbH in Aalen, Germany, offers DAkkS calibrations traceable to national standards with an extremely high level of accuracy that is unrivalled worldwide. The experts use special procedures to calibrate plug gauges, setting rings, calibration spheres and hemispheres as well as test specimens and other reference standards or reference workpieces. Standards are used to adjust, calibrate, check and set dimensional measuring systems and are therefore important tools in quality assurance. When it comes to roundness measurement, eumetron GmbH relies on two RONDCOM form measuring devices from ACCRETECH. In doing so, eumetron GmbH achieves measurement uncertainties of just ten nanometres.

Quality assurance is indispensable for practically all industries. Length measurement technology is at the centre of quality assurance in most manufacturing industries and their service providers. Exact dimensional accuracy in accordance with specified tolerance values must be guaranteed to ensure perfect usability, function, reliability and durability of the workpieces. Testing and compliance with tolerances, taking measurement uncertainty into account, is the task of quality assurance using a wide variety of length measuring devices, which must be subjected to a calibration process on a regular basis. Deviations due to geometric errors, thermal influences or deviations in shape and position cause measurement deviations that are different at every point in the measurement volume. By comparing current production with reference workpieces, changes in the production process can be recognised at an early stage.

Such dimensional measuring systems include, for example, coordinate, form, contour, height and surface roughness measuring devices, as well as profile and measuring projectors, but also measuring microscopes, computer tomographs, laser trackers, fringe light projection and photogrammetry systems.

Reference standards are used for setting, checking, adjusting and calibrating, which can be used to reliably and traceably assess the deviations and therefore the accuracy of the measuring systems. Measuring mandrels, setting rings, calibration spheres and calibration hemispheres or test specimens consisting of several reference standards must therefore be calibrated regularly. Calibrated reference workpieces are necessary in many cases to determine the measurement uncertainty of test characteristics occurring on site at the user's premises.

Certified by the German Accreditation Body (DAkkS), eumetron GmbH in Aalen, Germany, is one of the world's leading calibration laboratories for reference standards. The approximately 35 employees carry out traceable DAkkS calibrations with very low measurement uncertainties, which only a few accredited laboratories worldwide can offer. Its customers include extremely renowned manufacturers and users in the field of tactile and optical measuring systems as well as manufacturers of reference standards, calibration laboratories and measuring service providers. The company, run by the two managing directors Klaus Banzhaf and Theo Hageney, has several Class 1 precision measuring rooms, i.e. the highest category. This classification allows only minimal deviations from the reference temperature of 20 °C, essential for correct measurement results. Temperature and expansion are significant factors influencing the measurement uncertainty.

In their measuring rooms, the calibration experts use two form measuring devices from the RONDCOM product line of the Japanese measuring technology specialist ACCRETECH, which are popular with quality assurance experts all over the world for their stability and reproducibility as well as their powerful and user-friendly software. During one of the regular assessments, auditors from the Physikalisch Technische Bundesanstalt (PTB), the highest body in the national calibration hierarchy, paid great respect to the devices after a test measurement on a test specimen. Finally, the RONDCOM used was able to determine the exact value with a deviation of just a few nanometres.

Eumetron GmbH is able to offer the highest accuracy standards with its equipment and its enormous measurement technology expertise. This expertise includes stable and proven procedures with minimised measurement uncertainty for the DAkkS calibrations performed. For example, the multi-layer method for roundness measurements. The test standard is measured at different points and with different orientations. This sophisticated process allows systemic and random deviations to be almost completely eliminated. "This enabled us to reduce the

measurement uncertainty from 100 nanometres to just ten nanometres," explains eumetron GmbH technician Andreas Pierro. "Only a few laboratories in the world achieve this," adds Klaus Banzhaf. For the measurement of roundness deviations in setting rings and mandrels, inner and outer cylinders as well as balls and hemispheres, eumetron GmbH has achieved a highly impressive, expanded measurement uncertainty of U = 0.01 µm + 0.05 x10-6 x RONt, roundness deviation of the part to be calibrated. Around 180 test parts pass through the RONDCOM devices at the German company every month.

One nanometre corresponds to 10-9 metres, i.e. one millionth of a millimetre or one billionth of a metre, an order of magnitude that can only be grasped by comparison for human understanding. For example, one nanometre is to one metre as the diameter of a one-cent coin is to the diameter of the globe.

With an accreditation, DAkkS confirms that organisations such as calibration, testing, inspection or certification bodies perform their activities in accordance with internationally valid standards. Regular audits by DAkkS ensure this in the long term. DAkkS calibrations are the highest calibration level below the national standards. Traceability to national standards is directly guaranteed with these calibrations. Only accredited laboratories carry them out in accordance with DIN EN ISO 17025. The laboratories calculate the exact measurement uncertainties and assign them to each measurement result. DAkkS laboratories must prove for all calibrations that the measurement uncertainties specified in the calibration certificate issued are adhered to or fallen below. This is ensured on an ongoing basis by a QM system in accordance with DIN EN ISO 17025.

Accredited DAkkS calibration laboratories, such as eumetron GmbH, thus guarantee the safety of products, processes and services.

ACCRETECH SBS UK Ltd Tel: 024 76 651774 www.accretech.eu

Small measuring device for a large range of applications

With the MarSurf M 510, Mahr presents a new mobile surface measuring device equipped with a tactile free probe system. It impresses with its lightness and manoeuvrability. The compact all-rounder, which is equipped with a tactile free probe system, is available in three measuring lengths. So, you can be sure that you will always find the right measuring device for your individual applications.

The MarSurf M 510 offers a measuring range of 1 mm with three variants in measuring lengths of 15 mm, 50 mm and 75 mm. You can use it to reliably and precisely determine the roughness and waviness of technical surfaces of workpieces of all kinds, for example shafts, camshafts, breather sealing lips, cylinder bores or metal sheets. You can easily install and set up the device yourself, as Mahr delivers it fully configured.

Suitable for use in the production environment

Other features ensure that the MarSurf M 510 can be used for a wide range of applications. Thanks to its vibration resistance, you can use the device in a production environment or in machining centres without any problems. The motorised lifting and lowering of the wand makes it a reliable and flexible companion for measuring surfaces. Another particularly practical feature is that it adheres to ferrous metal surfaces with the optional magnetic holder, allowing you to position and fix it as required.

Customers benefit from many other advantages with the MarSurf M 510:

- The measuring device is the smallest free probe system on the market.
- Due to its small size and weight, the MarSurf M 510 is easy to handle and convenient to use.
- It offers standard-compliant measurement of waviness and large roughness values over a measuring length of up to 75 mm.
- You can test P, R and W parameters easily and conveniently with just one device.
- With more than 1,000 measuring programs, it can be used comprehensively.
- Thanks to Windows compatibility, the software can be flexibly controlled with a PC or laptop.
- Extensive accessories ensure even more application possibilities.

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MecWash Duo component washing system delivers for RDL Technologies

RDL Technologies has significantly enhanced its operations by acquiring a MecWash Systems industrial parts washing machine. The three-stage, general purpose system reliably cleans and dries over 350,000 contaminated components at the factory each month, consistently delivering outstanding results. It wanted a parts washing machine that was capable of improving the productivity and efficiency of component cleaning at their CNC specialist factory in Leicester.

Lewis Lockwood, production manager at RDL Technologies, says: "As a leading subcontract manufacturer in the UK, we require a reliable and efficient cleaning system. Our previous ultrasonic tank was inefficient and laborious, so we went to market in search of a more complete system. After thorough research, we decided MecWash was the way to go.

"The MecWash Duo is an outstanding washer. We have benefitted from the quality and reliability of our MecWash Duo system, it provides consistent results, leading to excellent customer satisfaction. We have built our company on the ability to react at a moment's notice to our customers' demands and short lead times. This has been possible thanks to our large plant list and the efficient MecWash aqueous cleaning system, backed up with a friendly and reliable aftersales department," explains Lewis Lockwood.

Based in Leicestershire, RDL Technologies specialise in CNC machining, offering a full range of subcontracting services. For over 20 years, RDL has produced high volumes of precision turned parts, a process that needs an effective cleaning procedure to meet the requirements of top manufacturers and the regulatory standards of industry.

Paul Jarratt, sales manager, says: "The team at RDL Technologies wanted a parts washing machine that could effectively clean a high volume of components and increase productivity. After thorough discussions regarding the application, they chose the MecWash Duo, which is a highly versatile aqueous cleaning system, suitable for both large components and dense baskets of small parts.

"The flood and spray washing cycles are powerful enough to provide detailed cleaning with all component surfaces, followed by a re-circulating heated spray rinse then a hot air dry. This process provides high standards of surface finish by removing any residues. The MecWash Duo saves RDL Technologies both time and manpower whilst improving the level of cleaning," adds Paul Jarratt.

For three decades, MecWash has specialised in the design and manufacturing of aqueous parts washing and degreasing systems for blue-chip companies across the globe. John Pattison, managing director of MecWash, comments: "We were pleased that RDL Technologies chose the MecWash Duo. It is a compact and efficient interstage cleaning system that can effectively clean the high volume of components required. Investing in a powerful and consistent cleaning system is proven to reduce downtime and increase productivity for manufacturers.

"For 30 years, our team has built parts washing machines for customers across the aerospace, automotive, hydraulics, defence and medical sectors. This gives us absolute confidence in meeting and exceeding, the specific needs of manufacturers. The industrial parts washing systems made by MecWash are capable of cleaning metal and plastic engineering components, even with the most complex of geometries. We embrace each customer application as a challenge to solve," states John Pattison.

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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ActOn Finishing announces strategic partnership with BRIO Ultrasonic for UK distribution of advanced ultrasonic cleaning technology

ActOn Finishing, a leading provider of surface finishing solutions, is thrilled to announce an exciting new partnership with BRIO Ultrasonic. This collaboration appoints ActOn Finishing as the exclusive distributor of BRIO's state-of-the-art ultrasonic cleaning technology in the United Kingdom. This strategic alliance is set to revolutionise cleaning, descaling and stripping processes across various industries, including automotive, aerospace, energy, electronics, food, graphics, jewellery, manufacturing, marine, mould cleaning, medical and optical sectors.

Revolutionising cleaning with ultrasonic technology

Ultrasonic cleaning is a highly efficient finishing process that utilises ultrasound waves generated in a liquid medium, typically water or a chemical solution, to thoroughly clean components. The technology operates by placing parts into an ultrasonic tank filled with the liquid solution. An ultrasonic generator and emitter then create high-frequency sound waves, which agitate the liquid, producing millions of tiny bubbles. These bubbles implode upon contact with surfaces, effectively removing contaminants such as dirt, rust, grease, oils and other unwanted materials.

Benefits of BRIO Ultrasonic cleaning technology

BRIO Ultrasonic cleaning technology offers several distinct advantages tailored to a wide range of cleaning applications:

• High power for tough dirt, 20-30 kHz and

low power for mild dirt, 30-60 kHz. This ensures comprehensive cleaning regardless of the level of contamination.

• Superior cleaning efficiency: The technology reaches 100 percent of parts' geometry, cleaning components of any shape within minutes.

• Cost-effective and eco-friendly: The system is designed for autonomy and low consumption, saving water and energy, making it both cost-effective and environmentally friendly.

• Customised solutions: Tailored to each client's specific application with specialised chemical solutions.

• High-quality ultrasonic tanks: Featuring optimised design, maximum insulation and superior durability.

• Unique ultrasonic emitters: Providing superior cleaning and reduced processing times with maximum energy efficiency.

Diverse range of ultrasonic cleaning solutions

ActOn Finishing and BRIO Ultrasonic offer a

comprehensive range of models to cater to diverse industrial needs:

• The Lab Series: Compact desktop equipment ranging from 3 to 30 litres, ideal for laboratory settings and small-scale sanitisation in sectors like clockwork, medical, optical, veterinary and jewellery.

• Work Table Series: Desktop solutions for small parts in workshops, factories, and industrial environments, available in volumes from 6 to 30 litres.

• The Manual Series: Models from 60 to 8,000 litres, equipped with touch screen or analogue control panels for precise cleaning time and temperature control.

• PRO Standard Models: Sizes ranging from 150 to 8,000 litres, featuring advanced functionalities such as a lift with load grid, sway system, OPS (Oil Push System) and intuitive touch screen.

• Automatic Multi-Stage (AMS) Series: Fully automated systems tailored to client specifications, suitable for seamless integration into continuous production lines.

• BR-MOLD Series: Custom-built for the mould industry, offering stages like ultrasonic washing, rinsing, anti-corrosion protection and drying.

• ANILOX Series: Specifically designed for cleaning rollers and sleeves, ensuring optimal maintenance and performance.

• BR-FOOD Line: Engineered for the food industry to deliver maximum cleaning, Sanitising and disinfection, meeting the highest safety and hygiene standards.

• Special ultrasonic equipment: Customised solutions for unique cleaning needs, including specialised systems for holding, transporting parts and integrating into customer facilities.

For more information about ActOn Finishing and the new BRIO Ultrasonic cleaning technology, visit **www.acton-finishing.co.uk**

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Growing together in productivity and precision

Founded 50 years ago as Carbide Grinding Company in Waukesha, Wisconsin, USA, you could say the firm really shook the jungle when second generation owner Kevin Cranker introduced the variable helix, variable index, Gorilla Mill in 2005. The tool was such a hit that the whole company has taken its name.

Gorilla Mill is now a three-shift operation in a thoroughly modern 24,000 sq. ft. facility, with dozens of 5-axis tool grinders, a full blank prep department, sophisticated QC equipment and centralised coolant filtration and mist extraction, with all utility lines running in trenches underneath the production floor. But how could they make such a revolutionary tool back in 2005?

The answer, says third generation operations manager Nathan Cranker, was ANCA: "In a lot of ways, it was thanks to ANCA that we were able to develop the Gorilla Mill. Because even back on our RGX and TG7 machines, which are ancient, their software had the capability to manufacture the parts we dreamt up."

He also points to ANCA's frequent upgrades to the software: "So that we can make tools faster, which is invaluable. I really appreciate them for the work they do on that. When we found ANCA, it just stuck immediately. The software was very user friendly, so we were able to understand it quickly. To this day, other machine manufacturers still struggle to make a Gorilla Mill. There are other end mills on the market with similar features, but the Gorilla Mill's geometry is patented and remains a challenge for other grinders."

Holding microns with ease

With a few frustrating exceptions, since it first switched to CNC, Gorilla Mill has built its business on ANCA machines and it has embraced new ANCA technology as it comes. The new MX7 Ultra is the latest such example.

Gorilla Mill already had a stable of MX7 Linear machines, which continue to perform well. So why the Ultra? "We have aerospace customers who demand plus zero and minus five ten-thousandths of an inch on the diameter and end form on ball nose tools," Nathan Cranker states. "The tolerances are getting tighter, it seems the MX7 Ultra was designed for situations like this. Tools fluctuate maybe a tenth or two here or there and only over a long period of time. It's a game changer and the guys on the shop floor absolutely love it."

How is the MX7 Ultra able to hold such tight tolerances over long production runs without operator intervention? First, explains Nathan Cranker, the machine's control resolution is one nanometre, which is 10 to 100 times finer than competing machines, including the MX7 Linear. Another bit of magic is the new control algorithm, which capitalises on the improved control resolution to move through contours with greater speed and almost perfect precision. The Ultra also has Motor Temperature Control (MTC), a patented system that varies the current to the motor, rather than relying on liquid run through a chiller, to keep the spindle to within 0.5°C. This minimises spindle growth even as grinding conditions change.

"The original MX7 is a fantastic machine, but it requires a little more hands-on

maintenance from the operators to make tight tolerance tools in high volume," observes Nathan Cranker. "They'd have to check the machine more frequently, but we were able to throw these tough, tight tolerance jobs right on the new Ultra and a lot of our problems went away. It's producing tools more consistently, whether it be to the tolerance, or just overall from job to job. ANCA has come out with a next level product that has made it even easier for us."

Real-time compensation

It should be noted that ANCA offers options for improving grinding precision on all of its models, features that Gorilla Mill has taken full advantage of. For example, automatic runout compensation uses the standard Renishaw probe to check the tool blank in three planes, digitises the actual centreline of the tool and then compensates the entire machine kinematic to grind relative to that centre, rather than the centreline of the work head. The resulting grind is nearly flawless and the feature adds just 25 seconds in cycle time.

ANCA also offers an internal non-contact tool measuring system called LaserUltra, which uses a Blum DIGILOG laser to perform either digital or analogue scans of a tool profile. LaserUltra can scan an entire tool profile in about 10 to 12 seconds, compare the measured profile to the nominal and within roughly five seconds, automatically adjust either the wheel file or the grinding program, as required, to bring the tool to within specifications. Nathan Cranker says that on an Ultra machine, such systems enable Gorilla Mill to grind ball nose end mills all night in an unmanned shift to within 0.0001", ±2 microns.

Nathan Cranker also recounts that when ANCA introduced linear motors to its MX line of machines, it made an immediate improvement in surface finishes. Tools ground with a standard 320 grit wheel suddenly appeared as if they were ground with a 400-grit wheel, for example. He says the higher resolution of the Ultra machine has made yet another improvement, such that a 320 grit wheels perform as if it's a 600 grit: "It's huge. Considered at the micro level, the machine's smoothness really lets the wheels do what they need to do. It makes the finish even better, like a mirror, with very little effort. That's what I really like about that machine."

He credits this capability with giving them another competitive advantage in the marketplace. "Not only that, but it also provides peace of mind as a lot of customers have strict demands for the highest end tooling. When we show them their tooling is going on these state-of-the-art machines, they absolutely love it."

Blank prep upgrade

Like many tool manufacturers in the 2000s, Gorilla Mill relied on TRU TECH machines for OD blank grinding. But when ANCA introduced the CPX Linear pinch peel grinder in 2018, Gorilla Mill jumped at it. Nathan Cranker adds: "The key factor and it's one of the main things we love about ANCAs in general, is that they get started from the bottom up and really made good, usable software. I feel confident that any of the operators running our cutter grinders could run the CPXs with a week of training. It's that kind of plug and play."

What's next?

Gorilla Mill is driven to pursue continued growth. To do that, says Nathan Cranker, it aims to expand its drill lines and boost sales with other new products, like thread mills, which it introduced five years ago and chamfer mills, just a year ago.

It also plans to push technology in things like coatings. For example, Nathan Cranker says, the proprietary GMS2 PVD coating is an improvement on the original Gorilla Mill options, such that they dubbed the end mills with GMS2 the Super Bitchin' line. But that's now been surpassed by their new WTF coating: "This one's a real game changer. It's on some of our highest performance tools and people have been seeing a lot of success with it. It can eat high temperature alloys like nothing. It wants to be run hard."

production shops like us. Their years of knowledge on loader systems and automation really shows in the CPX."

Alongside the MX7 Ultra, the CPX Linear has both linear motors and MTC. The roughing spindle boasts 43 kW (58 HP) for high throughput. A rigid steadyrest bolted into the polymer concrete base helps deliver micron level precision. Nathan Cranker also praises ANCA's approach to the software: "They didn't compromise and try to make their original tool grinding software work for OD. You could tell they

Nathan Cranker concludes: "Their automation capabilities are second to none, as far as I'm concerned and that's really helped us grow." Likewise, he praises ANCA's ability to deliver machines when needed. "We've got to work with a company that's as nimble as we are.

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Vollmer keeps it clean with new VFS 400 filtration technology

At the GrindingHub 2024 exhibition, Swabian sharpening specialist VOLLMER launched its new VOLLMER Filtration System 400 (VFS 400). Receiving its world premiere, this new cleaning system simultaneously enables ultra-fine filtration of cooling oil or dielectric fluid from up to two VOLLMER sharpening machines.

The purity of cooling oil or dielectric fluid is critical in the manufacture of cutting tools. It enhances the sharpness of the cutting edges of drills, milling cutters and reamers while improving precision and surface finishes. Furthermore, well-maintained fluid quality prolongs the service life of the machine and its peripheral equipment.

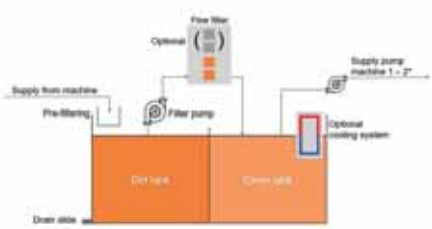
With the VOLLMER Filtration System 400 (VFS 400), Biberach-based sharpening specialist VOLLMER is offering a cleaning system for ultra-fine filtration of cooling oil or dielectric for the first time. Space is saved thanks to the compact design of the VFS 400, as it only requires a small amount of floor space. Depending on the application, it can be connected to one or two grinding machines for circular saws or to a VHybrid 260 grinding and erosion machine. Two VOLLMER machines of the same type that can grind circular saws on tooth faces, tops as well as side angles can be combined in each case. This includes combinations of the VOLLMER CP and CPF 650 machines or the CHC and CHF 840/1300 as an example.

Purity determines precision

The filtration of cooling oil or dielectric is important because even the smallest particles can impair the sharpening process when grinding or eroding tools. With the VFS 400, particles up to 5 µm in size can be filtered out. The contaminated cooling oil or dielectric fluid is pumped out of the sharpening machine with the VFS 400 and fed into the dirt tank via a pre-filter. The reusable pre-filter ensures that the main filter has an especially long operating life. A filter pump feeds the cooling oil from the dirt tank to the ultra-fine filtration system. Solids are separated from the liquid in two or optionally four filter units with small filter elements where each filter element has a waste capacity of around 3.5 kg.

Simple and robust filter technology

The clean tank can optionally be equipped with a cooling system to set the oil or dielectric fluid to the optimum operating temperature. The filtration capacity when running with two filters is 50 litres per minute and with four filters, it is 100 litres per minute. The VFS 400 has a drainage outlet opening and a fill level indicator with automatic fill level monitoring that simplifies maintenance. In addition, any necessary filter changes are reported to the user via the flow rate indicator.



"With the VFS 400, it is important we can offer simple and robust filter technology with standardised filter elements that keep operating costs low," says Andreas Böhm, CEO of the VOLLMER Group. "This also includes simple servicing and cleaning access, as well as a modular design that can be easily expanded from one to two machines. Only a hand pallet truck is needed to transport the cleaning system."

With its comprehensive range of machinery, the VOLLMER Group, which has sites in Germany, Austria, Great Britain, France, Italy, Poland, Spain, Sweden, the USA, Brazil, Japan, China, South Korea, India and Russia, enjoys global success as a tool machining specialist in terms of both production and service. The technological leader's range of products contains the most advanced grinding, eroding and machine tools for rotary tools, circular saws and band saws in the wood- and metalworking industries. In offering this, VOLLMER relies heavily on the company's tradition and its strengths: Local contacts for efficient communication channels, quick decisions and rapid action by a family-run company.

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PTG Holroyd reveals new large capacity helical profile grinding machine

A quarterly regional meeting of The Advanced Machinery & Productivity Institute (AMPI) provided the perfect opportunity for a sneak preview of PTG Holroyd's soon-to-be-launched, large-capacity HG500 ultra-high-performance helical profile grinding machine.

Held at PTG Holroyd's Rochdale-based machine tool technology centre in May, the AMPI event included networking opportunities and an update on the institute's flagship industry and academic-led projects which support manufacturers in the development of world-class machine tool technologies.

After lunch and with AMPI business concluded, more than 30 delegates commenced a tour of PTG Holroyd's production facilities with the highlight being a demonstration of the company's new HG500 helical rotor CNC grinding machine.

"Following the recent, highly successful launch of our smaller HG350 gear grinding centre, the first UK machine tool to use Siemens SINUMERIK ONE future-proof CNC, we realised that a very real need also existed for a new large-capacity helical rotor grinding machine," says PTG Holroyd's engineering director, Paul Hinchliffe.

"As you can imagine, however, the challenges involved in developing two new machine tools in close succession are considerable, particularly for a UK-based manufacturer operating in the vastly competitive global sector," he adds. "We were therefore delighted that after reviewing the impressive environmental credentials and performance capabilities of our proposed new HG500 model, AMPI agreed to help support us during the development stages of the machine.

As a result, we will be able to launch the HG500 much sooner than would have otherwise been possible. As proud founder members of AMPI, an organisation focused on helping UK companies address their machinery manufacturing challenges, we are grateful for the assistance we have received and are committed to supporting British machine tool manufacturing wherever we can."

Full details of PTG Holroyd's new HG500 ultra-high-performance CNC helical profile grinding machine will be available when the machine is officially launched later this year. Utilising Siemens SINUMERIK ONE CNC system, integrated with the Holroyd Profile Management System (HPMS), the HG500 will accommodate workpieces of up to 500 mm in diameter and up to 1,500 kg in weight. Rapid setup of same component batches will be provided via the machine's data and program files. Operating with two diamond dressing disks, the CNC-controlled dressing unit will provide automatic wheel profile calculation for each dress cycle along with programmable dressing feed rates for roughing and finishing cycles. While in-cycle profile measurement and correction will be delivered using Renishaw's high-speed, high-accuracy OMP60 scanning probe with SprintTM technology.

"Choosing the SINUMERIK ONE CNC has brought significant user benefits to our HG500 machine, including class-leading integrated safety and failsafe features, enhanced reporting of machine health and performance data and uncompromising levels of encrypted security," continues Paul Hinchliffe. "Added to that, it has also allowed us to equip the HG500 with Siemens 'Create MyVirtual Machine' and 'Run MyVirtual Machine' software capabilities. Used in tandem with our own internal machine design packages, these features have enabled our teams to build virtual 'digital twin' HG500 machines on the desktop, then grind virtual rotors all while observing entire manufacturing cycles and testing safety and failsafe capabilities. The software also makes acceptance testing exceptionally straightforward, as our customers will be able to sign off on their new HG500 machine before it has even been built. Then, following installation, they will be able to carry out 'virtual' helical grinding cycles to ensure right-first-time results."

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

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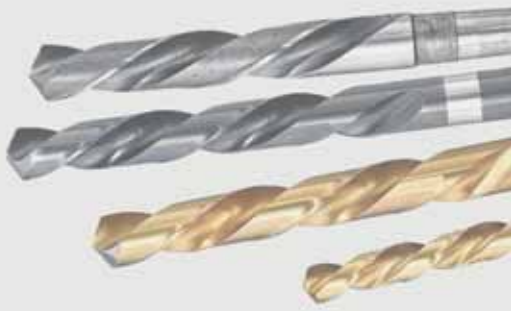

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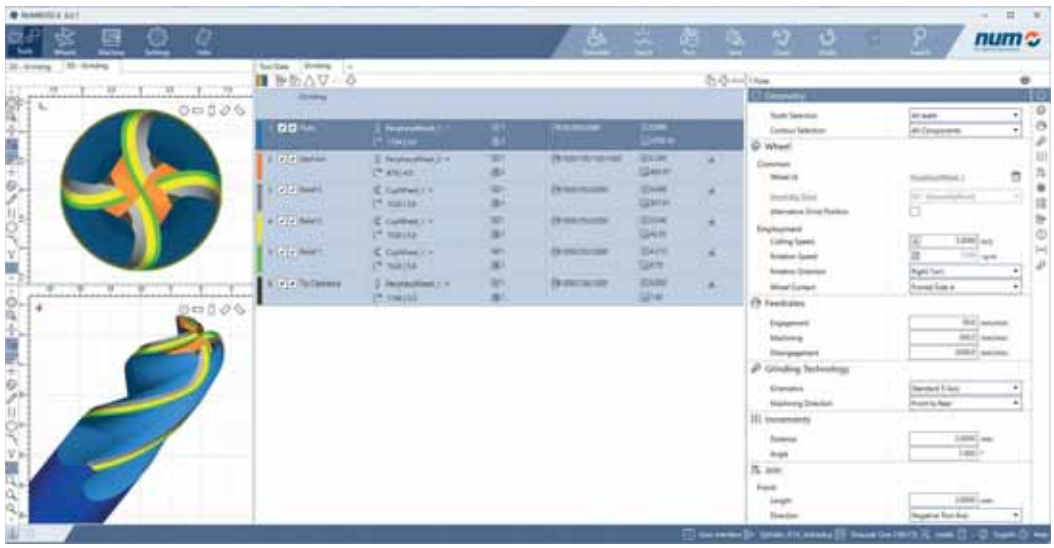
NUMROTO X

NUM sets new standards in flexibility and precision for tool grinding



With NUMROTO X, NUM AG has unveiled the future iteration of its renowned CNC software package, NUMROTOplus, tailored for tool production and resharpening. This extensively revamped software stands out for its enhanced flexibility, precision and user-friendliness.

For over 60 years, NUM AG has been at the forefront of providing customised automation solutions for the machine and tool industry, establishing itself as a premier CNC company for high-end applications. Renowned for its continuous innovation in hardware and software solutions, NUM has become a preferred partner for international machine manufacturers worldwide.

Timed perfectly for GrindingHub 2024, the second edition of the grinding technology industry gathering that took place in May, NUM AG introduced the new NUMROTO X product line to the public for the first time. This brand-new software, meticulously crafted by NUM to oversee tool manufacturing and resharpening processes, harnesses the latest technologies to modernise the trusted NUMROTO brand, preparing it for the challenges of tomorrow.

Similar to NUMROTOplus, NUMROTO X is a desktop application accessible both on the grinding machine and a workstation PC. Leveraging established concepts like multi-user databases, 3D simulation, collision checking and product documentation with NUMROTO-Draw, NUMROTO X elevates the user experience to new heights. The focus during NUMROTO X's development initially centred on production of complex standard milling cutters. This goal is achieved with excellence, thanks to flexibly configurable geometry elements and innovative options for production and process planning. The introduction of sequences, enabling the organisation of individual work steps, facilitates the straightforward configuration of intricate yet clearly displayed production processes.

Furthermore, NUMROTO X seamlessly integrates a newly developed, integrated job manager. This feature empowers users to modify and expand job lists both during work preparation and 'on the fly' at the machine, ensuring uninterrupted production under any circumstance.

In crafting the new user interface, NUMROTO X places a strong emphasis on intuitive user-friendliness and clarity. Through real-time tool visualisation, users can promptly and accurately observe the effects of any parameter adjustment in pixel-perfect detail, even at various zoom levels. While default values streamline the creation of new workpieces, users retain the flexibility to tailor these settings to their specific needs at any juncture.

Introducing a new feature in NUMROTO X, the kinematics module takes charge of calculating machine movements, now extending support to 6-axis movements. This advancement brings about enhanced efficiency and optimises axis control during transition movements between grinding operations.

To bolster precision further, NUMROTO X implements new algorithms, ensuring optimal results, for example in flute calculation, even under particularly demanding conditions.

"NUMROTO X will successfully lead the production of complex standard milling cutters into the future," explains Massimiliano Menegotto, CEO NUM Group. "NUMROTO X and NUMROTOplus will remain available in parallel so that our customers can always use the optimum range of functions during the continuous further development of the new software."

Following its debut at GrindingHub, the new software will be used in pilot projects by machine manufacturers with selected customers. Once this trial phase concludes, the software will be gradually rolled out to broader audiences.

In 1961, ten years prior to NC control finding wide acceptance among users, NUM developed the first CNC controller. With a commercial launch in 1964, NUM was one of the first CNC providers in the world. Since then, it has maintained its position as a technology leader in this segment and is eager to extend on this success.

Its market strategy is to help current and future customers to construct a better machine and thereby securing them a competitive advantage on the market. As can be seen from its logo, the company perceives itself as a CNC high-end application company and is focusing on selected market niches, where it has something extra to offer.

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Walter's new state-of-the-art ATP system offers users unrivalled efficiency in tool handling

With its new Automated Tool Production (ATP) system, Walter offers an innovative automation system for highly effective tool handling in the manufacture and inspection of precision cylindrical cutting tools. This effectively networks tool production and measuring machines not only from Walter, but can also upstream and downstream machines from other system partners.

Available from Walter Ewag UK, manufacturer of high-quality CNC grinding, erosion and measuring machines, state-of-the-art ATP provides a higher degree of automation and therefore users unrivalled higher levels of efficiency.

ATP does not require additional floor space and can be integrated into existing tool manufacturing systems independently of current automation providers and without the need to change system layouts.

System control is based on the OPC-UA data model Flames and comprises at least one robot cell accessible from the front, ATP Robocell, for automatic machine loading/unloading plus at least one autonomous, mobile transport robot, ATP AMR, for transporting workpiece pallets and individual parts between storage and processing stations. OPC-UA also includes a standardised communication model between the machines and ATP AMR, as well as a control system for higher-level data and process control.

Walter's ATP system with the Helitronic Vision 400 L tool grinding machine and the Helicheck Plus measuring machine, both with ATP Robocell, as well as the ATP AMR mobile transport robot.

The ATP Robocell offers three access gates and therefore additional buffer spaces for production without waiting times or even downtime. A separate removal station for the in-process exchange of individual tools between the measuring and production machine enables automatic correction and, as a result, closed-loop processing.

A multi-range gripper in the ATP Robocell contributes to the system's high flexibility. The gripper covers a large workpiece diameter range and can exchange collets at the same time.

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Precision grinder speeds production of high-performance magnetic seals

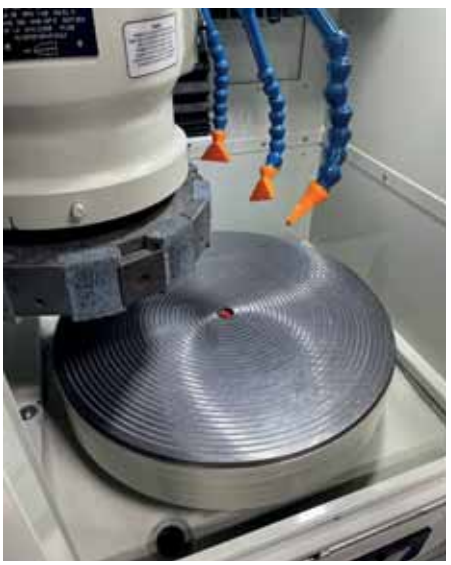
Advanced rotary surface grinders provide the precise flatness, parallelism and finish needed for industrial parts subjected to high pressure and rotation, all at a reduced cost and cycle time.

In manufacturing, it is often necessary to grind metal and alloy parts to very precise specifications in thickness, parallelism and surface finish. This is particularly important when the parts are subjected to extreme rotational forces and must mate face-to-face, or parallel, to other surfaces.

Rotary shaft seals are a perfect example

These crucial components seal the rotating parts of machinery, prevent lubricant leakage and ensure impurities do not infiltrate the inner workings of engines, gearboxes, and pumps. Mechanical seals, specifically, are utilised for high pressure applications demanding robust sealing capabilities. Consequently, the seal assembly components must be ground to exceptionally precise levels of flatness and parallelism to operate as effective leak-proof seals.

Unfortunately, the grinding process can be lengthy, labour intensive and costly with conventional methods. So, when production requirements increase, manufacturers frequently turn to more advanced, automated rotary surface grinders that can achieve the precise specifications in much less time, with less operator intervention and skill.



DCM Tech IG 282 closeup.

Exceptional seal fit and performance

For rotary shaft seals, various factors affect seal selection, such as shaft speed, pressure, temperature, lubricant type and environmental conditions.

Traditional designs typically involve three main elements: a metal case that provides rigidity and structural support; a rubber sealing lip that creates a tight seal around the rotating shaft and a spring that ensures constant pressure is maintained by the sealing lip against the shaft.

However, these seals may not perform as expected at very high pressure or RPMs, where traditional seals can begin to struggle to maintain contact with the shaft, track, due to radial runout. In these cases, the spring is often unable to maintain a tight seal with the shaft.

"The seals may be rotating at 40,000 rpm and if there is an imbalance because a part was not ground to size or parallel, then it is going to throw off the whole system. The seal can become compromised and eventually it will begin to leak," says Jared Desrosiers, manufacturing process and technology manager, MAGSEAL, LLC, a supplier of specialty magnetic seals for critical systems that is celebrating its 70th anniversary this year.

In this type of scenario, magnetic seals create a strong attraction that eliminates the need for a spring in face seal designs.

"Magnetic seals are engineered to perform in high speed, high vibration, high altitude conditions and are excellent replacements for seals that are subjected to high torque, runout, and axial movement," says Jared Desrosiers.

The OEM's magnetic seals, called MAGSEALs, provide 100 percent positive face-to-face sealing and are designed to operate in air, gases, water, steam, refrigerants, lubricants, fuels and hydraulic fluids. The MAGSEALs are typically custom designed in a variety of sizes from a quarter inch to over 6 inches.

According to Jared Desrosiers, MAGSEALs are comprised of a magnet, stator with a seal case, rotor. When fully assembled, the attraction force of the magnet pulls the seal case assembly into itself to create a tight seal.

DCM Tech IG282 with MAGSEAL technician.

The magnet is made from Cast Alnico V, a combination of aluminum, nickel, cobalt, and iron, to create the seal. The seal case is made from a ferromagnetic material, 416 or 410 stainless steel, 17-4PH for maximum corrosion protection, or 42 Alloy steel for low thermal expansion. A carbon graphite ring is installed in the seal case to complete the assembly. The carbon ring purposely protrudes out of the seal case to a specified nose height which is meant to interface with the magnet.

Each of these components, the magnet, seal case and graphite ring, requires precise grinding to specific dimensions, parallelism and surface finish.

Although the seal case does not have to be as precise, the carbon rings that are pressed

into it are ground, lapped, and polished to achieve the specified nose height. The carbon seal ring surface flatness should be within two helium light bands, 0.0000232 in, 0.000589 mm, prior to use, according to John Westgate, MAGSEAL manufacturing engineering technician.

For the magnet, MAGSEAL starts with a rough casting and grinds all the sides and surfaces. Secondary lapping steps are required to achieve the necessary surface finish. Currently, the OEM estimates it grinds 1,500 to 2,000 magnets each week.

In the past, the OEM utilised conventional reciprocating grinders on the magnets. Although reciprocating table grinders can be precise, the material removal rate is slow since the workpiece travels back and forth under the grinding wheel, so many grind passes are required.

However, as production requirements increased, the OEM decided to replace a slow, aging reciprocating rotary surface grinder that often needed to be repaired with advanced rotary surface grinders from Winona, MN-based DCM Tech.

"We were able to achieve the precision and surface finish that we were looking for with the conventional method, but it took significantly longer to grind the same number of parts," says Jared Desrosiers. "With the DCM rotary surface grinder, we knew we could achieve significant time and efficiency gains."

Today, rotary surface grinders are designed with much more advanced sensors and controls that automatically maintain very tight tolerances, removing material down to within one ten-thousandth of an inch of the final thickness. Digital technology allows for an interface with easy-to-use touch screen controls.

To expedite the grinding and finishing process for the magnet line, the OEM recently upgraded from a conventional rotary surface grinder to a more automated, IG 282 SD grinder from DCM Tech with a 24" variable speed table and 20HP variable speed spindle.

"We have found that nothing achieves the necessary flatness, height, and parallelism as fast as the DCM Tech rotary surface grinders. The required parallelism is particularly important to prevent vibration at high speeds of rotation," says Jared Desrosiers.

The new model includes advanced features that automate the initial contact between the abrasive wheel and the part. With this updated option, advanced sensor

DCM Tech MAGSEAL magnetic seal for online.

technology detects vibration and can automatically fine-tune not only the pressure of the spindle motor but how quickly it moves the wheel down onto the part. When the machine senses the abrasive wheel has contacted the part, it automatically begins the grind cycle.

Automatic part detection eliminates the need for the operator to do time consuming, error-prone 'manual touch offs,' where they would manually feed the grinding machine until it just touches the surface of the part before backing off and restarting it.

"The DCM Tech grinder simplifies the skillset needed and makes training a new operator a lot easier," says MAGSEAL manufacturing engineering technician John Westgate.

One of the reasons advanced rotary surface grinders are much faster than conventional reciprocating grinders is because the units can get much closer to the required dimensions before any finishing steps. In some cases, secondary steps can even be eliminated.

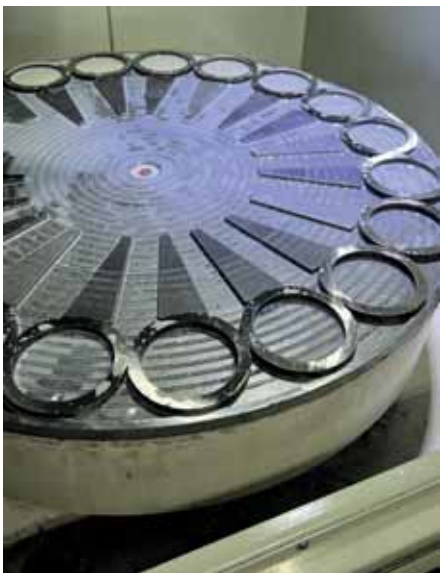
According to Jared Desrosiers, the increased automation and ease of use has helped to dramatically improve magnet production.

"We increased manufacturing capacity with reduced setup, loading/unloading and cycle time. We decreased the cycle time by more than 300 percent" says Jared Desrosiers, adding that by reducing or eliminating the need for subsequent finishing processes, the company was able to achieve ROI in about three months.

MAGSEAL also appreciated the rotary surface grinder's enhanced safety and cleanliness features. Automated grinders contribute to a cleaner shop environment because the grinding is accomplished inside an enclosed shroud that contains the debris and prevents it from entering the work area. The shroud, which is a sliding door with a built-in window for viewing the process, encloses the grinding area. This has the added benefit of reducing the noise produced by the machine.

In addition to a shroud, grinders like the DCM IG series provide an integral air mist

DCM Tech MAGSEAL magnetic seal left view for online.



DCM Tech MAGSEAL production.

collection system that draws particulate matter from the air and moves it away from the operator to enhance the cleanliness and safety of the work environment.

"For us, safety is paramount. The advanced rotary surface grinder is a fully enclosed machine with door interlocks. This configuration is significantly safer and cleaner than a conventional service grinder," says Jared Desrosiers.

He notes that MAGSEAL has already ordered another advanced rotary surface grinder to replace an aging reciprocal grinder used for the initial "rough" grind of the magnets.

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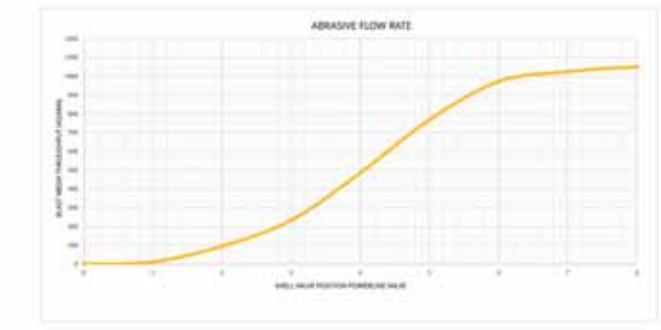
The first blast media flow control based on AI

By automatically optimising shot blasting processes an "intelligent" shell valve significantly improves cost efficiency.

With its innovative PowerLine valve Rösler achieves a substantial improvement in turbine shot blasting operations. The recently developed "intelligent" shell valve ensures that the blast intensity of the turbines is automatically adjusted to different shot blasting requirements. This ensures optimal operating conditions. The adjustment takes place independently from the turbine RPM and without time consuming manual adjustment of the blast media flow. Therefore, equipment malfunctions and operator errors are more or less completely eliminated and the overall process and equipment safety is significantly improved. This process optimisation, along with a lower blast media consumption and lower energy input, results in a high cost-efficiency of the shot blasting process.

The turbines are without doubt the centrepiece of shot blast machines and determine to a large extent the blast performance, the required cycle times and the costs of a shot blast process. Until now, during the commissioning of a new blast machine, the creation of workpiece specific programs, a blast media change and during maintenance work, time consuming adjustments of the blast media flow were required to achieve optimal operating conditions. In this respect the turbine speed plays an essential role. If, for whatever reason, the turbine speed is reduced, it decreases the amperage draw and the blast media throughput. The new, "intelligent" shell valve from Rösler allows the automatic, optimal adjustment and control of the blast performance independently from the turbine RPM. The partially manual and error-prone adjustment of the shell valve is, therefore, a thing of the past.

With the new Rösler PowerLine valve the setting of the shell valve opening takes place automatically. Time-consuming manual adjustments are no longer necessary.



The individually adjustable software allows the automatic creation of separate programs for each turbine within a few minutes.

AI makes the first self-teaching blast media flow control possible

At the heart of this new, patent pending system is an innovative shell valve. Through special sensors the valve opening is automatically adjusted to the specified blast media flow. For the determination of the opening a special software was developed that takes the parameters amperage draw, throwing speed and blast media flow into consideration. One feature of this software is that, with the menu "setting of the blast media flow", it allows the automatic creation of separate programs for each turbine within a few minutes. Manual adjustments are no longer required. All the operator has to do is enter the optimal operating parameters for the respective shot blast process, such as throwing speed, blast media flow or amperage draw, at the operating panel. If, for example, a high workpiece throughput is required, the operator can simply increase the blast media flow and the throwing speed. At the same time, for processing delicate workpieces, it is possible to reduce the media flow and throwing speed to a value that prevents damage to the workpieces.

Faster, more stable shot blasting processes with lower energy input

In everyday shot blasting operations, the new Rösler PowerLine valve results in shorter cycle times. The complicated and time-consuming adjustment of the shell is no longer required. Equipment malfunctions and operator errors have practically been completely eliminated and the shot blasting processes run with a higher degree of stability and consistency. Therefore, unplanned equipment downtimes can to a large extent be prevented. At the same time this "Intelligent" solution produces significant energy savings. Moreover, individual shot blast programs for new workpieces can be easily created and saved in the PLC. Finally, complex shot blast processes requiring different blast media flow quantities can be quickly implemented without any problems. For example, for the desanding of castings the process usually starts with a relatively low blast media flow, which is then gradually increased. This ensures that the sand carried into the blast machine with the castings is safely and effectively separated from the blast media and the castings are properly cleaned.

Compared to traditional desanding operations, where some turbines are sequentially turned on and off, the PowerLine valve helps to significantly decrease the cycle times. The Rösler system also offers substantial advantages for shot peening operations with short cycle times by drastically reducing the setup times for the respective peening process. An additional benefit is the automatic monitoring and documentation of the blast media flow. It provides proof that a given shot blast process has been run with precisely defined parameters. The new Rösler PowerLine valve is available as a separate option and is also available in the Smart Solutions package.

The ideal operating parameters for a shot blasting process are simply entered through the operating panel. Operator errors and equipment malfunctions are completely eliminated. To a large extent this prevents unplanned downtimes.

For over 80 years, the privately owned Rösler Oberflächentechnik GmbH has been actively engaged in the field of surface preparation and surface finishing. It offers a comprehensive portfolio of equipment, consumables and services around the mass finishing and shot blasting technologies for a wide spectrum of different industries. The range of about 15,000 consumables, developed in its Customer Experience Centres and laboratories located all over the world, specifically serves customers for resolving their individual finishing needs. Under the brand name AM Solutions, Rosler offer numerous equipment solutions and services in the area of additive manufacturing/3D printing. Last but-not-least, at its central training centre the Rösler Academy offers practical, hands-on seminars to the subjects' mass finishing, shot blasting and additive manufacturing. The Rösler group has a global network of 15 locations and approx. 150 sales agents.

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Wheelabrator specialises in the design and fulfilment of forward-thinking surface preparation solutions. Whatever your application, even if it has never been achieved before, it's the kind of challenge that makes the company stand out from the crowd. Its complete solution delivers high quality results and can include consulting, concept engineering, project implementation, outstanding customer service, proven technologies and software.

Its technology centres share expertise and covers industries such as aerospace, automotive, foundry, shipping, construction and medical. Each centre has a group of highly qualified engineers dedicated to delivering the right machine to fit your detailed requirements and to deliver the finish and performance you require.

Wheelblast equipment

Wheelabrator offers the largest variety of wheelblast machines and parts worldwide. Its 15,000 customers are testament to its success in delivering the right solutions. It offers a complete range of standard designs available for batch or continuous/in-line processes as well as custom-designed solutions to fit your specific application.

With its global engineering and production facilities, combined with years of expertise, it is able to provide locally built machines that serve your needs, your application, your specification and your budget. Its facilities in North America deliver "imperial" machines, its European factories provide "metric" solutions and its manufacturing centres in China and India provide technology solutions tailored to local markets.

It understands your market, your pressures, your needs and it speaks your language. It also provides equipment support services, spare parts, maintenance and upgrades, in more than 100 countries worldwide.

Roller conveyors

Wheelabrator offers a range of roller conveyors from small simple machines to construction blasters, heavy duty machines and complete preservation lines.
Its extensive experience in this field caters for all component sizes as well as customer specific solutions. Working speeds from 0.5 m/min for a small roller conveyor machine to 20m/min for a heavy skew roll machine are achievable.

For the specific treatment of large quantities of scale, to chip separation systems for structural steel companies, Wheelabrator has a complete range.

Hanger shot blasting machines

Hanger type machines are the most flexible machine types. They are split into batch type machines where one batch of parts moves in, starts rotating, gets blasted and moves out, and continuous type machines where the machines are equipped with a monorail system that moves the parts continuously through the machine.

Batch type machines

Batch type machines are used for desanding pieces susceptible to breakage or impact damage and also for descaling and reconditioning in the metalworking industry. Small, medium and very large parts can be economically cleaned.

Typical machines include:
- Spinner-hanger blast machines
- HB overhead rail blast machines
- Overhead rail blast machines for heavy duty applications

Continuous type machines

Continuous type machines automate production sequences and improve the work environment, resulting in an efficient and cost-effective blast cleaning process. The reduced use of space, shorter transport distances and no intermediate stocking requirements can result in substantial reductions in manufacturing costs.

Typical machines include:
• Continuous overhead rail blast machines.
• Continuous overhead rail blast machines for heavy-duty applications.

Tumblast shot blasting machines

A cost-effective solution for tumble-proof parts, tumblast and polygon-drum systems are available with a range of shot blast and workpiece handling technologies.

Among the essential advantages of a tumblast system are the compact design, proven operating principle, high cleaning capacity and the gentle tumbling of parts, as well as the complete exposure of all surfaces to the blasting stream.

Solutions for desanding castings and for descaling forgings or heat-treated workpieces include machines in various designs, with steel or rubber conveyors.

Polygon drum-type machines allow for intensive and gentle shot blasting at high capacity in a polygon-shaped trough rocking back and forth. Automatic loading and unloading provides an almost continuous process with consistent high performance.

Automated blasting systems

Wheelabrator offers two distinct categories of automated blasting systems - Batch type tumblast machines process parts batch by batch, in a stop-start operation and continuous tumblast machines pass the parts through the machine and onto the next process in the operation.

Continuous material flow with consistent blasting performance

With their clearly arranged and space-saving designs, through feed systems provide smooth workflow and short transport distances without intermediate storage of the parts or operator interaction and can therefore offer the potential to reduce operating costs.

Throughfeed systems are designed to cope with product flows of changing volumes and automatically adapt to different throughputs. They are ideally suited to integration in fully automatic plants starting at the moulding line and culminating in the finished and clean castings.

Robot gripper and manipulator

Automatic and flexible blast cleaning

Manipulator-type and robot blast systems are highly efficient and stand out for their excellent blast cleaning results. Even difficult to access interior surfaces are properly cleaned without the accumulation of abrasive.

Often used in the production of vehicle and engine components, these highly flexible machines offer a wide range of programmable options to achieve different cleaning and shot peening applications.

The robot gripper system unites the advantages of two technologies to deliver precisely targeted surface treatment at high efficiency. The combination of an industrial robot and an efficient wheelblast machine provides programme-controlled accurate movement of the workpiece to achieve a high blast performance.

Robot manipulator systems are primarily designed for deburring and surface finishing of aluminium and magnesium castings. These systems work in combination with an industrial robot equipped with a double gripper assembly to place and withdraw uncleaned and cleaned castings in or from the parts fixture in the shot blast machine.

This system allows simultaneous operations: during shot blasting, other processes such as shot evacuation, pick-up or delivery of castings can be performed by the robot, this reduces process time or allows the extension of individual cycle phases (e.g. blasting time).

Manipulator shot blast systems were introduced in the 1980s to blast finish and clean large series powertrain castings or forged parts. Today they are an indispensable part of the latest production technology in foundries and forges. Manipulator blast cleaning systems meet the highest production demands and are renowned for their excellent blast cleaning performance, even interior surfaces which are difficult to access, are properly cleaned without accumulating abrasive. Wheelabrator's broad range and layout features, loading/unloading, offer a variety of possibilities to solve different production tasks efficiently.

Wheelabrator can combine complementary manufacturing tasks and materials handling tasks and realise complete installations, to eliminate any interface risks. The automation of operation sequences can increase productivity and economic efficiency. The DS machines comprise single or multiple manipulators rotating horizontally. The DV machines comprise multiple manipulators rotating vertically.

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