

GRINDING & SURFACE FINISHING

APRIL 2022

GrindingHub
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hall 9,
booth A50



At GrindingHub in Stuttgart, two STUDER innovations will also be unveiled at the UNITED GRINDING Group joint booth. Visit us on the first day of the trade fair, May 17, 2022, at 10 am.

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- Honing & Bore Finishing

Simple operation, small footprint

With the roboLoad, STUDER presents a new type of loading system for CNC radius internal cylindrical grinding machines.

Loading systems for CNC radius internal cylindrical grinding machines were not so easy until now. The special characteristics of these machines, such as the height of the workhead and the associated geometric restrictions, made the development of a handling solution a major challenge. STUDER has now developed a system that not only meets the geometrical requirements but also has a comparatively small footprint and an unbeatable price-performance ratio. The STUDER roboLoad can be operated without any programming knowledge, enables great flexibility in production and a high degree of operating comfort.

In the STUDER S121, S131 and S141 radius internal cylindrical grinding machines, the automatic B-axis has a swivel range of -60° to +91°. "That's why the automation has to get out of the machine to give it the freedom to swivel," explains Daniel Schaefroth, Systems Division manager at STUDER.



Large storage capacity

The STUDER roboLoad is an external loader that, with a width of 1.5 m (59.06"), is only half as wide as the machine itself. "This is not insignificant," emphasises Daniel Schaefroth, "because the floor space in modern production halls has to be used efficiently." In this comparatively small space, the roboLoad offers plenty of room for workpieces on six trays, each measuring 1,080 x 320 mm (42.52 x 12.6").

The trays are loaded manually. "We are not talking about large-scale production here but about unmanned production during the night shift, for example, or making good use of breaks in other production processes," explains Daniel Schaefroth. Any grinding program can be called up for the workpieces. The STUDER roboLoad processes these and places each workpiece back in the same place after machining.

The unique selling point: simple operation

The decisive factor in the development of the STUDER roboLoad was the simplicity of operation. The setup wizard developed by the automation specialist WENGER from Winterthur does not require any programming knowledge from the setter or machine operator. "The steps are graphically supported on the 19" large, intuitive display," explains managing director Michael Wenger.

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"Grinding community to meet in Stuttgart"

GrindingHub 2022: Dialogue between top researchers and high-tech industry

by Nikolaus Fecht, freelance specialist journalist, Gelsenkirchen

"Stuttgart is set to become the international hub for grinding technology and superfinishing from 17 to 20 May 2022" according to how the GrindingHub, organised by the VDW (German Machine Tool Builders' Association) in cooperation with Messe Stuttgart and Swissmem, defines itself. The dialogue with scientists and researchers will play an important role at the trade show in general and in the GrindingSolutionPark special exhibition area in particular. Professor Berend Denkena, managing director of the Institute of Production Engineering and Machine Tools (IFW) at Leibniz University Hannover and spokesperson for the General Committee of the WGP (German Academic Association for Production Technology), together with Dr Sebastian Barth, senior engineer and head of the Technology Planning and Grinding Technology Department at the Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University, explain why a visit will be more than worthwhile:



Dr Sebastian Barth, senior engineer and head of the Technology Planning and Grinding Technology Department at the Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University

What motivates renowned university institutes like yours to participate in the GrindingSolutionPark?

Sebastian Barth: A key reason for us is the professional exchange between top-level research and the high-tech industry. The

joint booth in the GrindingSolutionPark provides a great opportunity to discuss how our current research can be implemented in the industrial environment. My team and I are particularly motivated by the opportunity to discuss current challenges facing the industry. This will allow us then to target our research more effectively.



Professor Berend Denkena, managing director of the Institute of Production Engineering and Machine Tools (IFW) in Hannover, Germany

Berend Denkena: We are motivated by the opportunity to identify potential areas for future research and networking possibilities between science and industry. Talking to company representatives and presenting our current research projects, innovations and cooperation opportunities to them provides us with a good opportunity for this.

How important is grinding technology for you?

Berend Denkena: It has long been a core issue at IFW and one which has grown in importance over the years. This is also reflected in the staffing levels. There are now 15 research assistants working on grinding technology, making it the largest working group. The topics range from tool and cut-off grinding through to application behavior and the manufacture of grinding tools. End-to-end digitalisation of the grinding process and grinding tool manufacture play key roles in our research.

Sebastian Barth: We accord grinding a

great deal of importance, since in many process chains it is one of, if not the primary factor, which decides the final functional properties of the components. The WZL has many years of expertise in surface and profile grinding, tool grinding, external cylindrical grinding (between centres and centreless), centrifugal and flow grinding, and robot-guided vibratory grinding. The primary focus is on four aspects: economical machining of innovative materials, targeted and integrated process design and optimisation, and the digitalisation of grinding processes using sensor technology and sophisticated algorithms.

What does the IFW see as the current trends?

Berend Denkena: There is strong demand for energy and resource-efficient processes, in grinding tool production, for example. Our approach here is to design energy-optimised sintering processes. The secret is to adjust the energy-intensive sintering parameters such as dwell time and heating rate without changing the abrasive coating properties. We also use additive manufacturing processes. The IFW uses simulation to design tools deterministically. This means that the eventual 3D-printed result corresponds exactly to the design specifications. We demonstrate how it works in practice based on an application example. For those interested, it involves setting pattern grinding beads for wire grinding.

Simulation is a crucial factor in the digitalisation of the entire manufacturing process. In Stuttgart we will be using grinding tools to show how manufacturing can be made more flexible and optimised by simulating the complete process chain, but we also use digitalisation for specific solutions.

A typical problem in tool grinding is so-called displacement. Process forces push away the tool being manufactured, thereby reducing the potential accuracy levels. Visitors will find out how displacement during tool grinding can be compensated by intelligent process planning and the use of grinding spindles equipped with sensors. In cooperation with the machine tool industry,

the IFW has succeeded in significantly increasing the accuracy.

How does the WZL view the role of digitalisation?

Sebastian Barth: Digitalisation now plays a major role in many areas of grinding technology. The data-based manual optimisation of grinding as an isolated process is currently in great demand. I notice that industrial users are increasingly planning to use Artificial Intelligence (AI) methods to predict the outcome of a process in order to reduce quality variations. AI tools can also be used for predictive maintenance of grinding machines. Digital twins are also nothing new for the industry: they can potentially make products and grinding processes even more assessable and certifiable by combining process data and scientific models. Closer cooperation between industry and research institutions in the future will help to leverage this potential for grinding technology in Germany as quickly as possible.

What other trends are you monitoring?

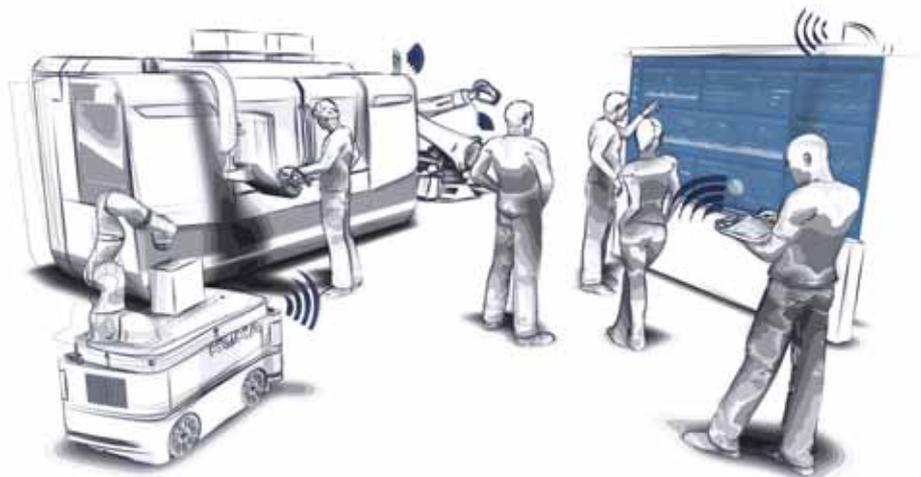
Sebastian Barth: These range from the production of application- and function-optimised surfaces to the machining of innovative and difficult-to-machine materials such as fibre-reinforced high-performance Ceramic Matrix Composites (CMCs) and nano-polycrystalline cutting materials. Another very important trend concerns process chains as an integrated whole, in which grinding technology often plays a decisive role. This is because process chains can only be comprehensively optimised if the effects of grinding technology on other (usually upstream) manufacturing processes are also taken into account. The WZL will be highlighting the latest production solutions at the GrindingHub.

How can grinding technology increase sustainability?

Sebastian Barth: The answer is: by combining different options, such as the use of bio-based cooling lubricants, data-supported and optimised integrated process, process chain and tool design, and employee training. We have expertise in all these areas at the WZL.

What are you interested in seeing at GrindingHub?

Sebastian Barth: I'm looking forward to seeing machine innovations, new tool



No process is an island. For the WZL, digitally networking grinding technology with other processes to form a closed process chain will play an important role in the GrindingSolutionPark

trends, cooling lubricant solutions and key research developments in the GrindingSolutionPark. Of course, I'm especially looking forward to the get-together with the 'Schleiftagung' (grinding conference) community, which will now be taking place at GrindingHub. The cooperation between the GrindingHub and the Schleiftagung, which we took over this year, provides an ideal basis for the future. The partnership combines the strengths of Germany's high-tech industry and the latest research in the field of grinding technology in producing a joint response to current and upcoming challenges.

Berend Denkena: I have a similar focus to Sebastian. In addition to tool-related innovations, I'm interested in innovations in machine tools, such as solutions for complete machining and automation. But I'll also be checking out the latest developments in lasering for tooling, such as the machining of ultra-hard cutting edges.

Background on GrindingHub 2022

The first ever GrindingHub will be held in Stuttgart from 17 to 20 May 2022. It is the new leading trade fair and the new centre for grinding technology and is scheduled to be run every two years by the VDW (German Machine Tool Builders' Association), Frankfurt am Main, in cooperation with Messe Stuttgart and with Swissmem (Swiss association of mechanical and electrical engineering industries) as its institutional patron. Grinding is one of the top four manufacturing processes within the machine tool industry in Germany. In 2020, the sector produced machines to the value of 870



It's all go: The IFW is looking to engage with industry with its current projects (shown: deep groove grinding of a solid carbide milling cutter with graded diamond grinding wheel)

million euros. Almost 80 percent were exported, with about half going to Europe. The largest sales markets are China, the USA and France. Germany, Japan and Switzerland head the list of top global producers. The grinding technology sector produced 4.9 billion Euros worth of machines in 2019.

You can also visit the GrindingHub on the following social media channels: LinkedIn; Twitter; Facebook; YouTube; IndustryArena.

VDW (German Machine Tool Builders' Association)

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www.vdw.de

Laboratory for Machine Tools and Production Engineering WZL

Tel: 0049 241 802 8183
www.wzl.rwth-aachen.de

Institute of Production Engineering and Machine Tools

Tel: 0049 511 762 2553
www.ifw.uni-hannover.de

The expert for highly complex tools

Over the past few years, Haas Schleifmaschinen has installed a wide variety of turnkey solutions that produce cutting tools for a wide range of manufacturing processes. Around the globe, the high-tech grinding manufacturer from Trossingen has earned an excellent reputation among precision tool manufacturers. This reputation is based on the precision and cost-effectiveness that result from the perfect interaction of hardware and software.

Machine control made easy

As everything in grinding revolves around the NC code, operation or programming in CNC grinding has always been inextricably linked to the machine itself. The high-tech grinding machine as a pure execution system was previously inconceivable. However, if calculation and machine are separated, completely new possibilities arise. The decoupling shifts the necessary computing load from the machine to the network. This not only makes the generation of NC code more flexible overall, but also significantly faster, because scaling is possible in the network, but not on the machine.

It also means that the operating concept offers a large degree of freedom even after many years of use. This is because the obsolescence of the machine's PC control system is prevented. Considerations about retrofitting and upgrading slowly aging control systems are therefore obsolete. In this way, the user can benefit directly from the permanent further developments in the software. This is because the NC code is calculated in the company network and not on the machine. The calculation is located in the company's own network and is thus available for execution via tablet, laptop and cell phone. This makes the work in front of the machine more flexible. In the future, the

tool grinder will work on the move and will always be up to date wherever he is. By being located in the company network, operation is no longer limited to just one machine. This can be implemented for several machines via a freely selectable platform (tablet, PC, laptop). The issue of IT security is also taken into account by the separation.

Hardware and software from a single source

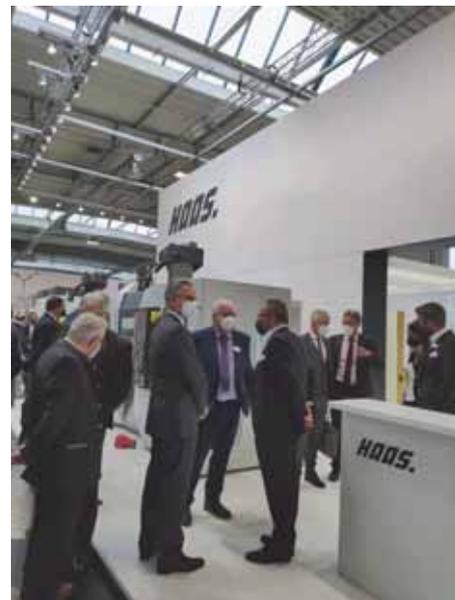
Unlike other solutions already established on the market, the Multigrind® Horizon grinding software calculates back from the perfect geometry of the cylindrical gearing to the geometry of the skiving tool. In this process, the motion sequences in production and the relative speed of the flanks define the future geometry of the respective skiving tool. Multigrind Horizon thus calculates the exact path resulting from the movement of the gear.

Cutting tools: one solution for an infinite number of possibilities

With the Multigrind CU and Multigrind CA universal grinding machines and the Multigrind Horizon software, Haas Schleifmaschinen customers are able to easily define, simulate and apply a wide variety of contour and clearance angle constellations, for example on grooving plates. The constantly changing geometry of the diamond grinding wheels in such manufacturing solutions is no longer an obstacle, because the 5-axis Multigrind universal grinding machine can be moved so precisely with the help of the control software that continuous peak values in dimensional accuracy are realised. Any inaccuracy due to grinding wheel wear is fully compensated for by the software. In this way, valuable time can be saved through significantly less dressing.

Extruder shafts: demanding in terms of geometry and material design

On the Multigrind CB on display at GrindTec, Haas Schleifmaschinen used the example of an extruder shaft to show that modern grinding processes often pay off several times over. Not only in terms of machining times, but also in terms of tool costs. These are comparatively low for grinding operations. However, the fact that



complex workpieces can be produced entirely on one machine predestines the Multigrind machine as a real alternative. This is because such workpieces are often produced on several different machines, which is associated with a higher time expenditure in terms of setup and the actual machining. The reason for such complex production layouts can be seen in the demanding material designs, the different materials and the alloys. The fact that Haas Schleifmaschinen is the specialist for such turnkey solutions is demonstrated by its many years of expertise in the machining of Inconel, sapphire glass as well as carbide and special alloys.

Stop Press

Haas Schleifmaschinen was awarded the Innovation Award at GrindTec for its Multigrind Radical tool grinding machine.



Further details in our June issue.

Haas Schleifmaschinen GmbH
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www.multigrind.com

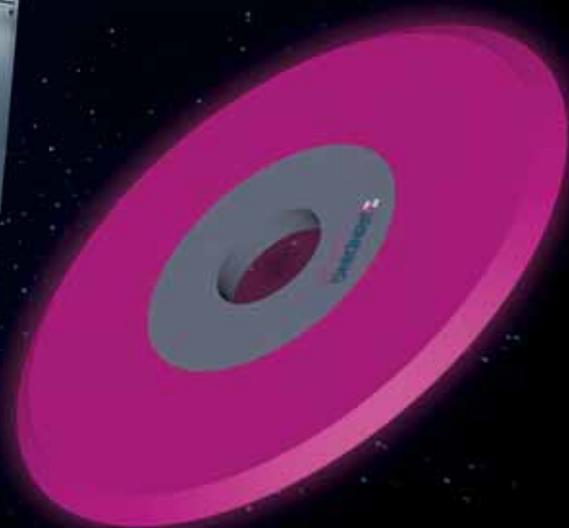
Hall 10 - Stand 10C50



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17.-20.05.2022

Stuttgart

***Unknown Grinding Objects** landing in Stuttgart open up new horizons for the full spectrum of highly innovative grinding technology and superfinishing. As the new trade fair at the heart of the market, GrindingHub presents the complete range: machines, tools and the entire production environment. **GrindingHub – the new hub of grinding technology.**



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Innovative solutions for high-precision grinding applications

Okuma Europe reveals its “best-kept secret” at GrindingHub 2022

Okuma is on its way to Stuttgart, Germany, where the world-renowned manufacturer of CNC machine tools is set to reveal its best-kept CNC grinding machine secret at GrindingHub 2022. The company will present the GI-20NII and the GP25W to an audience of trade professionals at its 91 m² stand located at **Hall 10, Stand A18**, of the Messe Stuttgart exhibition centre.

Okuma enjoys an international reputation for innovative turning and milling machines featuring proprietary CNC control systems. However the fact that this same machine tool manufacturer has also been very active in promoting the development and production of innovative grinding machines for over 100 years has often taken a back seat. Okuma is now set to show that it is just as capable of creating equally high-quality, high-performance solutions in this field by presenting two innovative products that deliver incredibly precise grinding with maximum dimensional accuracy.

Detailed profiles with the GI-20NII

The GI-20NII internal grinding machine is perfect for profile grinding and automated series production. It is enormously precise, highly efficient and especially reliable, thanks in part to the five-sided hydrostatic axis guide that has proved so successful at Okuma. The company's own Thermo-Friendly Concept achieves thermal stability and, therefore, better machine performance. With the aid of the numerically controlled axis, the machine is able to reach a higher removal rate at faster cycle times, whether in the two-spindle version or the four-spindle version. The direct-driven high-frequency spindles with various power and speed ranges offer maximum flexibility. Finally, the machine can be equipped with a top speed range of 15,000 rpm to 150,000 rpm, depending on requirements.



The GI-20NII internal grinding machine is perfect for profile grinding and automated series production

Optimum external grinding with the GP25W

The GP25W is ideal for the high-performance machining and high-precision mass production of small parts to be used in either the automotive industry, household appliances or hydraulic systems. Its compact dimensions make it easy to accommodate and it can be relied on to run accurately. Users benefit from shorter machining times thanks to fast axis feed rates. What's more, the grinding disc speed is adjusted automatically and unwanted resonant frequencies caused by the machining process are monitored to keep component accuracy consistently high.



The GP25W is ideal for the high-performance machining and high-precision mass production of small parts to be used in either the automotive industry, household appliances or hydraulic systems

CNC control system for incredible ease-of-use

Both these grinding machines are supplied with Okuma's OSP-P300GA CNC control system, which makes them so easy to use and also ensures faster setup times.

For more information about Okuma at GrindingHub 2022 and to make an appointment, visit <https://grindinghub-2022.okuma.eu>

Okuma Europe GmbH is the European-based sales and service affiliation of Okuma Corporation, a leader in CNC machine tools, founded in 1898 in Nagoya, Japan. Okuma is the industry's only single-source provider, manufacturing the CNC machine, drive, motor, encoder, spindle and CNC control. Okuma's innovative and reliable technology, paired with comprehensive, localised service protection, allows users to run continuously with confidence and maximise profitability.

Okuma Europe GmbH Tel: 0049 2151 3740 www.okuma.eu

Hall 10 - Stand A18

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Simple operation, small footprint

With the roboLoad, STUDER presents a new type of loading system for CNC radius internal cylindrical grinding machines

Loading systems for CNC radius internal cylindrical grinding machines were not so easy until now. The special characteristics of these machines, such as the height of the workhead and the associated geometric restrictions, made the development of a handling solution a major challenge. STUDER has now developed a system that not only meets the geometrical requirements but also has a comparatively small footprint and an unbeatable price-performance ratio. The STUDER roboLoad can be operated without any programming knowledge, enables great flexibility in production and a high degree of operating comfort.

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Large storage capacity

The STUDER roboLoad is an external loader that, with a width of 1.5 metres (59.06"), is only half as wide as the machine itself. "This is not insignificant," emphasises Daniel Schafroth, "because the floor space in modern production halls has to be used efficiently." In this comparatively small space, the roboLoad offers plenty of room for workpieces on six trays, each measuring 1,080 x 320 mm (42.52 x 12.6").

The trays are loaded manually. "We are not talking about large-scale production here but about unmanned production during the night shift, for example, or making good use of breaks in other production processes," explains Daniel Schafroth. Any grinding program can be called up for the workpieces. The STUDER roboLoad processes these and places each workpiece back in the same place after machining.

The unique selling point: simple operation

The decisive factor in the development of the STUDER roboLoad was the simplicity of operation. The setup wizard developed by the automation specialist WENGER from Winterthur does not require



Loading and unloading with the STUDER roboLoad



Workpiece trays of the STUDER roboLoad

any programming knowledge from the setter or machine operator. "The steps are graphically supported on the 19" large, intuitive display," explains managing director Michael Wenger.

"We have had a successful development partnership with WENGER for 25 years now," explains Daniel Schafroth. "The requirement for the partner this time was that an operator should be able to set up a new workpiece, including the changeover of the gripper jaws, within 15 minutes and they succeeded."

STUDER will also exhibit the roboLoad at GrindingHub in Stuttgart. On the UNITED GRINDING Group stand, STUDER will also present a completely new STUDER cylindrical grinding machine.

Sandro Bottazzo, CSO of STUDER says: "We are very much looking forward to the upcoming GrindingHub. We are convinced that this will become the new industry meeting point for grinding machine manufacturers. To underline this, we as a group will present our novelties on more than 1,200 m²."

UNITED GRINDING will unveil innovations at GrindingHub on May 17th, the first day of the show at 10 am, including the new STUDER machine and another new loading system as well.

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Hall 9 - Stand 9A50



A STUDER S131 Radius internal cylindrical grinding machine with roboLoad loading system

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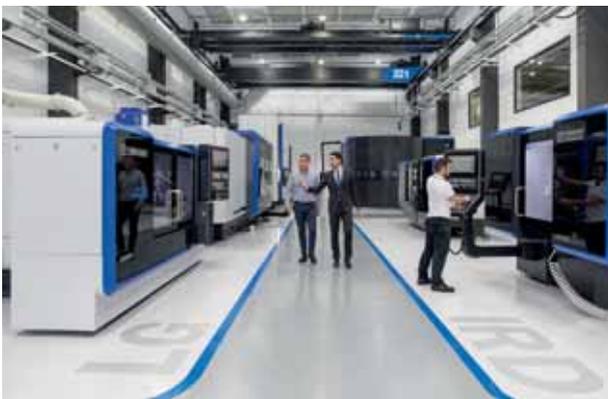
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Meister Abrasives and Alfons Schmeier exhibit at the very first GrindingHub

Swiss superabrasives leader Meister Abrasives AG and German precision grinding specialist Schleifscheibenfabrik Alfons Schmeier GmbH & Co.KG have announced their participation in the very first edition of the international grinding trade fair GrindingHub in May.

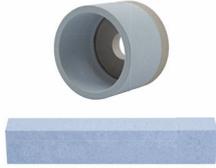
Swiss company Meister Abrasives and its German sister company Alfons Schmeier will take part in the GrindingHub exhibition, the new hub for grinding technology and the platform where industry experts discuss the areas of technology, processes, productivity, automation and digitalisation. As official exhibitors, Meister Abrasives and Alfons Schmeier will present their latest technological innovations in the area of superabrasive grinding solutions.

With its unparalleled expertise, Meister Abrasives turns its innovations in ceramic and hybrid bonds with CBN and diamond grits into industry-wide benchmarks. Adept in precision grinding, Alfons Schmeier continuously improves its offering and has recently developed the industry-first sulfur-free solution for honing cups and stones that does not compromise tool life. The innovative technologies and superior materials employed in all Meister Abrasives' and Alfons Schmeier's solutions, make the latter revolutionary for the industries in which they are used, i.e. automotive, e-mobility, semiconductors, medical, bearing, ceramics and coating. From grinding coated brakes, through mastering the properties of Silicon Carbide (SiC), to eliminating malicious sulfur Meister Abrasives and Alfons Schmeier apply their extensive expertise to design solutions that define the world of tomorrow.

Visit the Meister Abrasives' and Alfons Schmeier's pavillion, **Hall 9, Stand 9D70**, to discover the latest innovations and personally meet the brands' experts. Join the technical presentations and lively discussions and immerse into Meister Abrasives' and Alfons Schmeier's world to learn more about their cutting-edge technological solutions that grind the future.

Meister Abrasives is a leading and highly innovative company with extensive experience in developing and manufacturing customised cutting-edge industrial superabrasive tools for high-precision grinding applications. Founded in 1951 in Switzerland, Meister Abrasives is synonymous to exceptional quality, precision, and individualised customer solutions, values inherent not only to the brand but also to the land in which it originated. Being at the forefront of technological innovation, Meister Abrasives is dedicated to its quest of creating innovation with a higher meaning through processes optimisation, sustainable use of resources, control of own manufacturing processes and uncompromising attitude to quality in customer care, facilitated by the brand's international structure with family values.

Alfons Schmeier was founded in 1946 in Helmbrechts, Germany and is an innovative company and leader in application technology and production with ample experience in manufacturing internal grinding and finishing industrial tools. The Alfons Schmeier name evokes the brand's values of highest precision, exceptional quality, and individualised customer solutions.

	We Grind The Future.
 Meister Abrasives	
	
	

GrindingHub

Premiering in May, GrindingHub is the new hub of international grinding technology. With its clear focus, international approach and modern, hybrid trade fair concept, GrindingHub is set to become the new industry meeting place for grinding technology, from the industry for the industry.

Under the motto "Brings solutions to the surface", GrindingHub showcases solutions along the entire value chain. Industry sectors, among which grinding, polishing and honing agents, grinding machines for cutting and machining tools, disposal and treatment of cooling lubricants, and surface grinding machines, will be spotlighted. During the trade fair, topics such as Technology, Processes, Productivity, Automation and Digitalisation in Grinding Technology will be discussed in order to demonstrate how science and industry can work hand-in-hand together.

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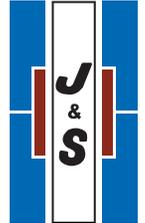
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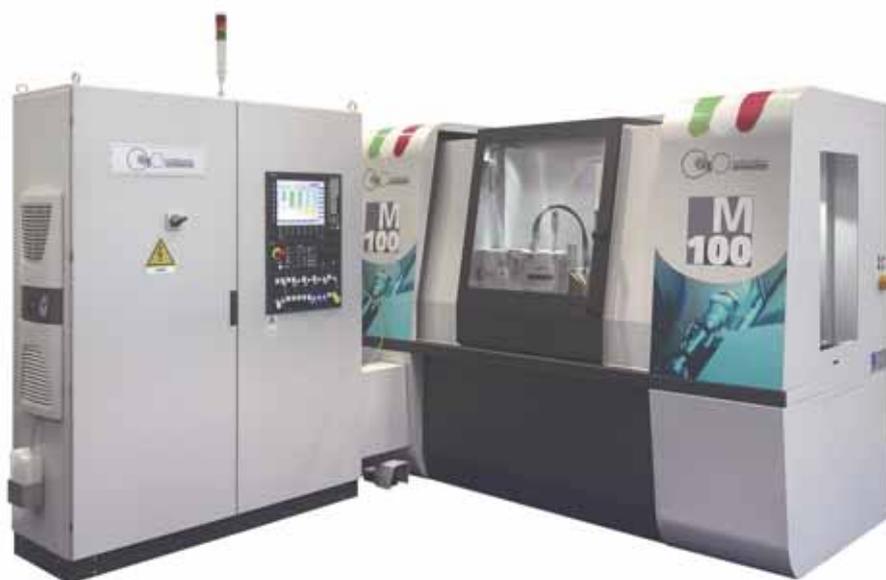
In the product range manufactured by the Italian company Rettificatrici Ghiringhelli S.p.A. headquartered in Luino (VA), the renewed M100 CNC6A machine, exhibited at the GrindingHub in Stuttgart, **Hall 10, Stand 10A30**, stands out when it comes to combine high technology in very compact machine dimensions, and it is particularly suitable for the grinding of medium-high parts of various areas.

"In recent years, says Mrs. Patrizia Ghiringhelli, Joint Managing Director of Rettificatrici Ghiringhelli, the M100 project generated a lot of success with hundreds of applications all over the world, particularly among the users of the "fine" tolerance who work in the most technologically advanced sectors: aerospace, cycle/motorcycle, automotive, medical, electrical motors, power tools/tooling and the fine tolerance. The M100 is already conceived to meet the requirements of Industry 4.0, is constantly innovated with the latest technologies and is characterized by extremely compact dimensions, flexibility of use, ergonomics and high reliability."

With a floor space of only 2.000 x 1.100 mm, the new M100 CNC6A is a centerless grinding machine that represents a mix of technological solutions for the very high precision through-feed or plunge grinding of parts with diameters between 0,50 and 20 mm and lengths up to 130 mm



The new M100 CNC6A model is particularly suitable for the grinding of a wide range of parts for medium-high batches



The new M100 is a very compact centerless grinding machine and is a mix of technological solutions for the very high-precision grinding

for medium-high batches. The new design combines aesthetics, functionality, accessibility, ergonomics, and integrated systems. The whole machine structure rests on a solid mineral casting frame designed in 3D CAD and engineered with FEM, thermometric and sound analysis. The use of this material gives high vibrational absorption, high heat inertia, good mass/rigidity ratio and above all an overall perfect ecological balance being completely recyclable. The machine has 6 CNC controlled axes. The two main working slides, V and Z axes, are overlapped with optical scales with resolution up to 1/100 micron and slide on pre-loaded linear guides with extra-precise roller pads. The control wheel head on the upper slide can be tilted +/-5°, thus allowing the optimal regulations of the mechanical stop on the blade with plunge cycles, or the optimizations of the pass speed of the parts between the wheels in through-feed cycles. The control wheel head is moreover equipped with a spindle with extra-precise bearings with a 3rd outboard bearing and a control wheel of Ø 205 x L 130 mm with motor torque up to 3 Nm. The grinding wheel head instead is equipped with a hydrodynamic spindle and allows the mounting of wheels of Ø 450 mm x



Basically the 6 axes and the two wheel spindles are managed by the CNC Siemens 840D SL.

L 130 mm, motor power of 11 kW, constant peripheral speed up to 50 m/s (63 m/s optional) and automatic wheel balancing. The grinding wheel dressing is controlled by CNC through a dressing unit (X/Y axes), as well as for the control wheel (X1/Y1 axes). The CNC is Siemens 840D SL and, as an option, the brand new digital native Sinumerik-ONE which allows the creation of a Siemens digital Twin with great advantages for the final user.

"We wanted to implement the new Sinumerik-ONE on the M100 as well as on the APG series, concludes Mrs. Patrizia Ghiringhelli, because through a digital twin grinding system you allow the planning of

solutions like those that must be physically accomplished, the simulation of their functioning, their technological cycles, their automation, etc., not only before but also after its physical implementation and with an unprecedented speed. The users of the centerless grinding machine can benefit from the changeover time or of faster setups, optimize and improve the performances during production, maintenance, parts programming, automation and all the technological cycles, by becoming more flexible and reducing time-to-market”.

All software functions, automation is included, with loading/unloading systems, diagnostics, wheels and profiles libraries, cycles and instructions programming, statistical calculations, remote control, telediagnosis and predictive maintenance are incorporated into the machine through the exclusive Ghiringhelli HMI interface. In addition, a wide choice of accessories and optional devices for the highest system customization and several solutions for the



Remote control, diagnostics, ordinary and predictive maintenance are available through the Ghiringhelli NC interface



The M100 line can be customized with the integration of pre-and-post process robotic automations and control system

diagnostics, the remote service also through the use of the most recent technologies of Artificial Intelligence through the Augmented Reality. Beside the new M100, the wide range of the Ghiringhelli centerless grinding machines with the models A80, EP250, CF400, CF600, APG-M, APG-S and APG-S HS, all customizable, is the result of the high skill of our engineers who can satisfy the specific customer requirements thus accomplishing new performing solutions. Thanks to more than 100 years' know how in terms of continuous activity as a manufacturer, the Rettificatrici Ghiringhelli "added value" is the ability to accomplish "ready to use" integrated grinding solutions and efficient automations thanks to modularity, flexibility and easy reconfiguration of the machines. The product range with low energy impact offers pioneering solutions which combine precision "to the micron", productivity and flexibility of use. An international company success based on high qualitative and performance levels on the products which is the result of steady investments in research, study and development of innovative technologies.

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Hall 10 - Stand 10A30

Walter launches compact Helitronic G 200 for cost-effective tool grinding

Offering an unrivalled level of cost-effective grinding of tools of up to 125 mm diameter, 235 mm long and weighing up to 12 kgs, the new Helitronic G 200 is the latest addition to Walter's extensive range of tool grinding and erosion machines.

Making its public debut at the GrindingHub 2022 exhibition and available in the UK from Walter Ewag UK, the compact machine occupies a footprint of less than 2.3 m² and features Walter's characteristic ergonomic design as well as quality build principles.

With a maximum grinding wheel diameter of 150 mm, the Helitronic G 200 features a low-vibration solid mineral cast bed and is of C-frame construction that offers high damping capabilities and temperature stability, resulting in maximum precision in grinding. The X, Y and Z linear axes mirror Walter's renowned quality standards, and the rotating A and C axes have torque motors for maximised usage with minimal service.

The machine's flexibility is enhanced by the use of Walter's Top Loader loading system which obviates extra space requirements and provides easy access by being integrated into the working envelope. Suitable for tools of 3 mm to 16 mm diameter, Top Loader can accommodate 500 tools of 3 mm diameter, for example, on its Walter-standard robot pallets.

Available with a swivelling, multi-function touch panel having a 21.5 inch monitor, the Helitronic G 200 also utilises Walter's globally-proven Helitronic Tool Studio grinding software for ease of programming.

New 3D sensor option for the HELICHECK PLUS and HELICHECK PRO measuring machines

Walter will also show this new option at the CONTROL 2022 exhibition from 3rd to 6th May in Hall 7 Stand 7302 and at the GrindingHub 2022 in Stuttgart from 17-20 May in **Hall 9 Stand A50**.

For the measuring machines HELICHECK PRO, HELICHECK PLUS and their LONG versions Walter now offers as an option a 3D sensor for fully automatic measurement and digitisation of tools and workpieces.

When the cutting edge geometry, pitch



and spiral pitch of cutting tools vary from cutting edge to cutting edge, we are talking about high-performance tools. These not only place high demands on production, but also on measurement. In view of the many varying parameters, the much faster 3D laser measurement is recommended, for example with a WALTER HELICHECK 3D. For the complete measurement, however, a more precise, conventional measuring machine was then additionally required for some measurement criteria. So far, two measuring machines were necessary for "demanding" tools, such as those commonly used in the automotive, aerospace or medical sectors. With the new optional 3D laser measurement, this is no longer the case.

"This gives customers two measuring machines on the floor space of one," explains Siegfried Hegele, product manager Applications. The 3D sensor visualises the workpiece as a point cloud. Various measurements can then be performed on this three-dimensional image. If the operator places this image on the 3D design drawings, or on those of a master part, the deviations can be seen on the tool. "Customers with several locations can compare the scans of different machines and then see at which operations differences in production occur," he explains.

The optional laser sensor is a generation change in scanning technology. It has four times the resolution and the measuring

The new Walter Helitronic G 200 (below) can utilise the Top Loader (above)



machine with high-end PC can process four times as much data in the same time. In addition, the swivel angle of the scan head has been extended, which now ranges from -55° to 90° and thus also enables the complete scan of indexable inserts.

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Hall 9 - Stand A50



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.



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Rettificatrici Ghiringhelli S.p.A.

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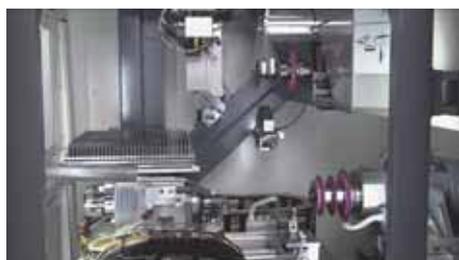
**GRINDING
HUB**

Hall 10 Booth 10A30

Advanced Grinding Solutions at GrindingHub

No less than eight of Advanced Grinding Solutions machine tool principals are exhibiting at the forthcoming GrindingHub exhibition, including Rollomatic in **Hall 7 Stand C70**, Tschudin and HandlingTech in **Hall 9 Stand D5**, Bahmuller in **Hall 10 Stand D70**, Krebs & Riedel in **Hall 10 Stand E30**, Comat in **Hall 10 Stand B44**, Platit in **Hall 10 Stand B30** and FLP in **Hall 10 Stand D07**.

Rollomatic will be using the GrindingHub to showcase its latest range of CNC tool grinding machines, blank prep cylindrical grinding machines and laser machines for PCD tooling. One machine which will be the centre of attention will be Rollomatic's new GrindSmart®660XW grinding machine, which combines, for the first time, the power and performance of a blank prep cylindrical grinder with the flexibility of a multi axis tool grinder, to allow for all machining operations to be carried in in one single automatic operation on the same machine and in one clamping. Therefore for the very first time cutting tools may be machined complete in a highly efficient single grinding process. Typical production efficiency from the traditional multi machine production method for standard end mills is in the region of 11 percent increasing to some 82 percent on the Rollomatic machine.



The new LaserSmart Femto 510 machine offers cutting speeds of up to 500 percent faster than conventional laser machining. The laser machining process is superior to any traditional method of machining super-hard materials such as PCD and CVD diamond and creates razor-sharp cutting edges with a radius of under 1 µm. Rollomatic's ShapeSmart® machines are designed for grinding tool blanks and are based on the method of peel grinding; a technology invented by Rollomatic. This new generation of cylindrical grinding machine has been improved to offer more advantages for fast setups and superior

grinding quality including both rough and finish grinding in a single automatic operation for tools up to 25 mm in dia.

The 4-axis NP30 machine is a precision pinch and peel grinding machine for producing cutting tool blanks such as end mills, drills and stepped tools and can also grind steps, tapers and radii. For special tools and punches, Rollomatic's 5-axis ShapeSmart®NP50 machine uses a patented method of peel grinding. This innovative technique allows the grinding of non-round shapes such as ellipses, squares, triangles or hexagons. The machines benefit from Rollomatic's industry leading three year unlimited hours, parts and labour warranty and free-of-charge software updates for life.

"For the first time, Tschudin is exhibiting all three machine types at the same time, thus underlining the wide range of applications. Workpieces of the most diverse sizes can be ground, from the smallest wires for medical technology, whose shape can only be seen under a magnifying glass, to truck axles weighing 150 kg," reports Iwan von Rotz, CEO of Tschudin AG. The product portfolio of the technology leader founded in 1947 consists of three different machine types.

The compact, centreless CUBE 350 is the latest innovation. "We developed this patented 3-axis CNC grinding machine specifically for machining small workpieces up to 20 mm in diameter. The CUBE 350 has



a small footprint and offers maximum efficiency a real all-rounder," emphasises Iwan von Rotz. The other two machine types are the 400 ecoLine/proLine, which is ideal for machining medium-sized workpieces with a diameter of up to 150 mm, and the centreless grinding machines of the 600 ecoLine/proLine, which can also machine larger workpieces with a diameter of up to 250 mm and a length of up to 500 mm. The

centreless cylindrical grinding machines from TSCHUDIN are used in all industries where mechanical components are required with high precision and at economical unit costs - from injection technology, hydraulics, automotive engineering, drive technology, the bearing industry, medical technology and toolmaking to aerospace.

Bahmuller produces internal, external and combined universal grinding machines of the very highest precision. The industry leading machine tool manufacturer provides turn-key production solutions for the high-precision grinding of diesel injection units, hydraulic, turbo charger, valve train and other highly precise mass produced components. For pinion gears, Bahmuller has developed a solution with its Qube machine to grind both faces, and to also grind and hone the bore in the same production cell. For bore grinding, Bahmuller offers a variety of solutions with grinding spindle speeds of up to 250,000 rpm for grinding bores as small as 0.8 mm in diameter. Bores are ground to the highest precision with roundness and straightness of 0.1 µm and surface finishes of 0.3 µm Rz.

Krebs & Riedel is one of the leading German grinding wheel manufacturers with over 250 employees with distributors in 32 countries. The product range includes conventional internal and external grinding



wheels up to 900 mm in diameter, manufactured using aluminium oxide and silicon carbide with ceramic and synthetic resin bonds for most industrial grinding applications. Krebs & Riedel vitrified diamond and CBN grinding wheels with ceramic bonds have a working speed of up to 200 m/s for internal, external and special grinding processes and new types of wheels with improved grain structures and novel bonding systems that optimise performance are being created. In all, Krebs & Riedel has one of the largest ranges of grinding wheels available for a huge variety of applications.

Comat manufactures super-filtration systems that deliver $\leq 2\text{-}3\ \mu\text{m}$ filtration quality, making oil cleaner than unused oil as supplied new, importantly do so throughout the entire working cycle while minimising



lifetime running costs and maintaining maximum coolant consistency. Importantly for end users, the Comat filter systems use Intelligent Performance Technology that allows them to be remotely monitored in real-time during the manufacturing processes with customers filter systems fine-tuned by Comat to ensure that the optimum filtration quality is obtained at all times. Furthermore, depending upon the model, the Comat filter units can be monitored, controlled and optimised by integrated controls or externally by PCs, tablets or smart phones.

Today, more than 20,000 machine tools use Comat filtration systems, with more than 120,000,000 litres of metal working oil being super-filtered every single day. Comat operates globally and has a 30-year history in developing the most advanced filtration systems available today. Comat's



Superfiltration Technology uses continuously regenerating filtering media (diatomaceous earth, cellulose or other vegetable media), to ensure that particles larger than $\leq 2\text{-}3\ \mu\text{m}$ are removed from cutting fluids and the fluid is maintained at a stable desired fixed temperature of ± 0.2 degrees. Oil cleanliness is measured according to internationally set and agreed standards such as the National Aerospace Standard 1638. Brand new, neat cutting oil is typically classified in category 9. However with Comat Superfiltration systems, brand new clean oil is brought down and then held to a finer filtration category of just 7 or 8.

Platit is a leading manufacturer of coating machines using plasma generating PVD technology. The company operates on a global basis and has supplied around 600 coating installations worldwide into no less than 38 different countries. One of the main applications for the easy-to-use plug and play Platit coating machines is the coating of cutting tools (usually TiN, TiCN, CrTiN, etc). Sputtered Monoblock Coatings, TiXCo Nanocomposite coatings, BorAC-ARC Boron doped AlCrN coatings and SCiL-Coatings (Sputtered Coating induced by LGD) and CCS (Custom Coating Solutions) are all available.

Profound competencies in cathodic ARC, SPUTTER, HiPIMS and DLC technology allows Platit to integrate these technologies into hybrid processes, creating solutions for different applications. The company's open-source philosophy allows customers to adapt coatings to their specific requirements and individual needs. Platit offers turnkey solutions including de-coating, edge pre-treatment, cleaning, post-treatment and quality control; making its systems ideally suited for seamless

integration into the tool manufacturing and regrinding process allowing cutting tool manufacturers to easily and cost efficiently coat their own tools instead of relying upon expensive and time consuming subcontract solutions.

FLP Microfinishing is the only company in Germany to offer the entire range of industrial fine grinding, lapping and polishing machines for flat surface finishing from a single source. The four FLP product lines are new single and double sided machines, both standard and full CNC, fully rebuilt and refurbished machines, the supply of lapping consumables and tooling and finally a large subcontract lapping facility. The broad range of FLP fine grinding and lapping machines includes for both twin wheel double sided CNC lapping machines as well as single wheel machines. Around 25 percent of FLP's sales are for fine grinding machines that offer 2-3 times the stock removal of more traditional lapping machines with 75 percent of sales being for lapping machines that are used where there is a low stock removal requirement with a mirror finish and perfect flatness.

The fine grinding process, that uses diamond or CBN wheels, is much cleaner than lapping and virtually eliminates work piece cleanliness issues. Furthermore, this process is many times faster than lapping and bridges the gap between traditional lapping and standard grinding technologies.

AGS will have staff present throughout the exhibition to welcome engineers.

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New HMI for Peter Wolters AC series launched

In the field of double-sided systems, Lapmaster Wolters has been recognised worldwide for decades as a competent supplier and reliable partner. Since the 1930s, it has been continuously working on the further development and optimisation of its machine solutions, always focusing on the changing requirements of the market. In addition to relevant machine functions and handling solutions, the focus is the application itself. For this purpose, it has access to a large number of machines in our technology centre at any time. These machines also serve us for demonstration purposes to show our customers individual possibilities as well as the high precision of the machines. Lapmaster Wolters' flexible machine solutions are suitable for fine grinding, honing, lapping as well as mechanical and chemical polishing. Human Machine Interface (HMI) essential for machine performance.

An important aspect in terms of machine functionality is operation via the HMI. This means that the HMI not only has a fundamental influence on the performance of the machine but also has a direct impact on customer satisfaction.

Lapmaster Wolters has equipped almost the entire AC machine series with a 19-inch touch panel. Furthermore, a team of experienced colleagues from different departments and a recognised external partner analysed and revised the entire grown program structure as well as the visualisation.

The focus was on creating an innovative, user-friendly, and clear program structure without sacrificing functionality. The new,

intuitive visualisation is to a large extent self-explanatory and in parallel equipped with pop-up windows for quick assistance. The goal was to generate optimal menu navigation with minimal interaction, while always being able to view and retrieve all process- and system-relevant data.

System data enables precise cost calculations and analyses

When talking about system data, the focus is not exclusively on process-relevant data. Rather, it refers to general information relating to the entire manufacturing cell. Depending on the application, auxiliary units such as exhaust units, filters, heating, and cooling units are part of the machine. For example, the new HMI optionally offers the possibility to measure and visualise the current power consumption. This also applies to other media such as air. However, this is not just a snapshot, as data can be recorded and stored over the long term. This allows very precise cost calculations and analyses to be carried out. Especially concerning developments such as Industry 4.0 and Green Manufacturing, these aspects are becoming increasingly important.

Lapmaster Wolters is aware of its task and works permanently on future-oriented systems and solutions.

An industry leader in precision surfacing solutions

In today's technologically advanced world, there are a growing number of applications where conventional machining techniques just aren't accurate enough to meet precision surfacing requirements. Precision surfacing with abrasive media, a technology developed and refined by Lapmaster Wolters over the past decades, can often be the answer. However, it takes more than the technology alone to produce precision surfacing specifications; it takes a company with extensive knowledge and experience with a broad range of materials and applications; it takes a company capable of creating customised, turnkey precision surfacing solutions utilising the latest conventional and superabrasive techniques. It takes Lapmaster Wolters, your partner in precision surfacing technology.

Over the last decades, industry has



relied on Lapmaster Wolters to solve the most challenging precision surfacing problems. With its intense experience, the company has a proven history of successfully developing cost-effective processing solutions for virtually any application. Whether its precision sizing, flatness, parallelism, or surface finish that's required, Lapmaster Wolters has the solution.

It serves the fine grinding and creep-feed grinding, advanced materials, precision optics, bore honing and finishing, lapping/polishing, deburring and metallographic markets through an expanding network of sales and services offices located throughout the world. Sales and technical service is available either through your local Lapmaster Wolters sales representative or through the main Sales and Technical Services centres located in Mount Prospect, IL, Rendsburg, Germany, Plymouth, UK, Chennai, India, Tokyo, Japan and Shenyang, China. Customer service staff are standing by to assist you. Training at one of these facilities or on-site training is also available.

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Hall 7 - Stand 7C71



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World premiere at GrindingHub

Kellenberger presents new innovative CNC control philosophy

At the Grinding Hub in Stuttgart, **Hall 10 Stand A70**, Swiss grinding specialist Kellenberger will be presenting an updated software suite for the first time across all its complete product portfolio as well as the Voumard universal internal cylindrical grinding range: The KELLENBERGER® 100 and KELLENBERGER® 1000 and the VOUMARD® 1000 will also be shown.

An innovative touch HMI software solution is being presented to the public for the first time, which can be adapted equally across all series and is easy and logically intuitive for the operator to use. Regardless of whether the focus of machining is internal grinding or external grinding.

The KELLENBERGER 100 is perfectly automated with a Wenger loader for chuck and shaft parts. This automation solution is also available for the KELLENBERGER 1000.

The machine will be shown with a flexible automation solution specially developed for this machine allowing quick changeovers and even viable for small batches. The machine offers a wide range of configuration options for the most diverse grinding operations.



The KELLENBERGER 100 is perfectly automated with a Wenger loader for chuck and shaft parts. This automation solution is also available for the KELLENBERGER 1000

The KELLENBERGER 1000 has hydrostatic guides in all main axes for the highest form accuracies in grinding tasks with interpolating axes. The hydrostatic universal cylindrical grinding machine is oriented towards the high demands of precision production of prototypes, as well as small and medium series, for example in tool and mould making, the automotive and electrical industries and the aircraft industry. The solid machine table with the reinforced machine bed provides very high rigidity and stability, prerequisites for high precision. Workpieces weighing up to 300 kg can be



The KELLENBERGER 1000 has hydrostatic guides in all main axes for the highest form accuracies in grinding tasks with interpolating axes

machined. Full flexibility is provided with over 30 different grinding head variants with external and internal grinding spindles as well as optional centre heights of 250 and 300 mm and 1,000/1,600 mm between centres.

The VOUMARD 1000 internal and external cylindrical grinding machine can also be easily automated if required. The internal and external cylindrical grinding machine VOUMARD 1000 was designed for precision workpieces with a length of 300 mm and a swing circle diameter of 300 mm. The hydrostatic linear axes with newly developed HYDROLIN® guides are backlash-free for positioning accuracies in the nano range. The two high-precision hydrostatic B axes additionally carry out all necessary movements of the dressing and measuring devices.

This flexibility makes grinding a wide range of different component types possible and shortens setup times. The spindle turret on the B1 axis is equipped with a uniquely compact grinding spindle head with flexible internal grinding spindle arrangement for max. four grinding spindles.



The VOUMARD 1000 internal and external cylindrical grinding machine can be easily automated if required

New generation Okamoto ACC-64CAiQ FANUC controlled surface grinder (OKAMOTO Hall 7 Stand D46)

Okamoto will present the new improved ACC-64CAiQ from the ACC-CAiQ range of heavy-duty precision surface grinders. The ACC-CAiQ range consists of 5 models ranging in table size from 600 x 400 up to 1,000 x 600 mm. With a capacity of 600 x 400 mm, the ACC-64CAiQ is one of the most popular sizes in this range.

The touch screen user interface has proven to be popular, not only in production, but also in the tool room. The graphical touch screen interface featured on the iQ range of surface grinders has proven to make machine setup quicker and easier, an example of the iQ function can be seen when the optimal grinding conditions are automatically set, simply by entering the wheel grit size.

The new FANUC control now offers an even faster response, and the touch screen has been further improved with crisper graphics. Until now complex tasks in precision grinding depended very much on the experience of a skilled operator. The development of the new Okamoto iQ touch screen control and its easy-to-use software, coupled with the inherent mechanical accuracy of the column moving design, allows even unskilled operators to use the machine with maximum efficiency.

Also on show is the time saving Aerolap polishing machine. This product can create mirror finishes in a fraction of the time to polish and is perfect for precise components with forms and profiles as it does not alter the geometry. This is possible using a special process and flexible media that deforms when applied at high pressure to the component in question.

In addition to huge time saving this special process also can increase the life of tooling such as punches.

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Hall 10 - Stand 10A70
Hall 7 - Stand 7D46

INVITATION

Visit us at **GRINDINGHUB 2022** in Stuttgart, Germany

We kindly invite you to visit the Precision Surfacing Solutions Group with their family of brands in **hall 7, booth C71** at the forthcoming GRINDINGHUB Exhibition in Stuttgart, Germany from **May 17 - 20, 2022**.

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Danobat presents its new generation CG external grinding machine

Maximum productivity and best cost-per-part ratio

The new generation of CG external and internal grinding machines is the answer to the most complex and demanding grinding challenges for workpieces up to 1,800 mm in length.

This range of cylindrical grinding machines has been designed with state-of-the-art technology improving the performance of the machine to ensure maximum productivity, without compromising precision or quality. CG machines guarantee long-life grinding solutions under the most demanding 24/7 manufacturing conditions.

This new CG gives the possibility of grinding at 80 m/s achieving as results higher removal rates and productivity, better surface quality, lower wheel wear and higher tool life. All this is reinforced by the knowledge of the process working at high speed.

To ensure shorter change over times and thus increase productivity, two different types of integrated loading systems can be offered with CG machine. Both were developed in modular form at Danobat and are compact, efficient and low-cost. Among its automation solutions, there can be found gantry loaders as well as integrated robots. Together with this, Danobat integrates third party automation systems, providing automation solutions with workpiece infeed or stack cell systems tailored to the customer's specific requirements.

The most demanding industries can



benefit from customised machine configurations for CV Joints, gearbox shaft, steering pinion, differential case, rear axle, tools and toolholders, screw compressors, hydraulic components, wind power industry, electric motor spindle/shafts, components for textile machinery and small and medium gears among other examples. Industries that require innovative solutions that ensure maximum profitability.

80 m/s with conventional abrasive

State-of-the-art technology guarantees excellent precision, consistence and process flexibility.

After several years of research and development in the area of advanced high added value solutions, sharing knowledge

and experience with customers and providers, Danobat has achieved a substantial improvement in grinding processes. Thanks to those mentioned, this solution offers the possibility of grinding at 80 m/s with conventional abrasives, reaching 19 percent reduction in cycle time and increasing wheel life by twice.

Danobat solutions includes a new built-in house way of dressing, Optidress. This enables a considerably reduction of non-productive time and collision risk, thanks to offset calculation algorithms. It also decreases the non-productive time and wheel wear due to automatic calculation of dressing passes required. Dressing time is also significantly decreased through optimised calculations of feeds and speeds adapted to wheel shape. The result of this revolutionary development is up to 68 percent saving in non-productive time.

The grinding machine has a natural granite bed that stands out owing to its ultimate thermal stability due to highly favourable thermal expansion coefficient of natural granite. Besides, consistency of dimensional part accuracy is enhanced by permanent coolant bed flushing system.

The machine includes linear motors guaranteeing optimal results in terms of precision in the short term and also in the long term unlike ball screws technology. This change has meant a considerable reduction in the number of components



used, thus reducing maintenance. The optimal positioning of the optical rules has been another challenge that have been solved, achieving quality results in repeatability. In the same way, this development makes the acceleration of the machine three times faster than the previous one.

Amongst its outstanding core technology, it has an infinite programmable CNC swivelling B-axis with large swivelling range for angular positioning of the tools. It also offers direct torque motor drive, with no backlash. Thanks to Danobat's B-axis design with integrated, high resolution rotary encoder, repeatability of ± 0.005 arc sec ($\pm 1 \mu\text{m}$) can be achieved by measuring at a radius of 650 mm from the centre of the B-axis. In addition to this, positioning accuracy of ± 1.5 arc sec is achieved. The result is excellent rigidity, positioning accuracy, consistency and process flexibility.

To ensure the highest precision levels, Danobat uses its own in-house developments to design the critical elements of the machines such as high frequency spindle for external, internal and face grinding, work head and tailstock, as well as B-axis. They are designed, developed, manufactured and installed by highly qualified specialist personnel in state-of-the-art facilities. Well documented processes and sign-off protocols allow for exact traceability and assure component interchangeability if ever needed. Due to this, Danobat maintains a large stock of OEM parts. These are delivered quickly and directly without the intervention of secondary parties. All this contributes to the high annual machine availability.



Compact and eco-friendly design, less operator intervention, more machine availability

Thanks to this new development, it has been possible to reduce the number of machine components by 20 percent, thus ensuring greater reliability without compromising the quality. In this way, great results are achieved in delivery times of the machine and less time is needed for machine maintenance.

The new CG has a compact design, both the electrical cabinet and the wheel change cantilever are attached to the machine, this facilitates the shipping and handling of the machine itself, being possible to manipulate by forklift. This development allows to be handled in a single package, thus achieving rapid assembly and installation of the machine. It is worth noting the importance

of the cantilever for quick and ergonomic grinding wheel changes.

Among the improvements, it incorporates electrical and pneumatic systems, thus eliminating the hydraulic system used to date. Therefore, the result is a machine much more eco-friendly and a considerable cost saving due to the low maintenance required.

A better user experience for you and higher productivity for your machine

This development comes with Danobat DoGrind+ software. A software where the user is more efficient, with the execution time of tasks reduced by 40 percent, it also enables faster programming since it displays only the necessary parameters and it also has a quick problem-solving thanks to the integration of a troubleshooting application.

Danobat has integrated all the advances of communication technology into its Digital Focus, an environment of digital solutions designed to improve user experience and make it easier to access, control and understand the complex processes of your machines. This development allows the operator to view error solutions 30 percent faster and also using same interface for different applications, increase ease of learning by 50 percent among other improvements/benefits.

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Hall 9 - Stand 9A70



ANCA to showcase technology range at GrindingHub

Cutting tool manufacturers need to remain agile, improve quality and grow capacity

Transforming through innovation with ANCA's AIMS: The future factory is efficient, automated and runs round the clock. It uses modular programs scripts, remote access and cutting-edge machines to operate at maximum efficiency.

The world of CNC machining thrives on innovation. Grinding machines, cutting tools and software are constantly evolving to be more efficient, flexible, accurate and automated. ANCA chases customer requirements to identify the next challenge to solve, constantly iterating and refining its technology. Over its 40 plus years of operations, developments that were considered cutting-edge are now business as usual, even at ANCA.

Pat Boland, ANCA co-founder and joint managing director, says: "We can recall a time when it was almost impossible to resharpen cutting tools on a CNC machine. That was until 1986, when ANCA launched our TG4, the first machine in the world to automate the measurement of tool geometry and regrinding through probing.

"Or when we introduced the System 32 which, for the first time, applied advanced robotic software to tool grinding which enabled significant opportunities, for example, the soft axis or soft machine kinematics which simplified the grinding of cutting tools. We've come a long way, from probing for cutting tools, leading the competition in 5-axis grinding or from simulating grinding processes before grinding with the CIM3D.

"Designing the best technology requires

a multi-pronged approach. We immerse ourselves in the market; are continually inventing; keep a keen eye on new developments and bring them into our applications. We seek out intelligent, talented people, and interact with customers daily to understand their specific needs. This is how we design and manufacture our market-leading solutions."

"ANCA will showcase its latest innovations at GrindingHub Hall 10, C51. "Automation and digitisation are at the centre of this exceptional display. We are showing industry 4.0 solutions that fit with the context and targets of our customers, be it small, mid-sized or larger companies," says Martin Winterstein, sales manager for Europe.

Launching the CPX in-process OD measurement system

The CPX in-process OD measurement system is a quality control system that monitors and controls the OD of ground blanks within a batch production. Batch grinding on a CPX with high material removal rates and to tight tolerances is a basic function of the machine. The OD measurement system takes it further by utilising the Statistical Process Control (SPC) feature that comes standard with the OD measurement software. SPC is user defined, the tolerances along with the Cp and CpK values are constantly monitored, controlled



Martin Winterstein, sales manager ANCA Europe

and reported to the user. The OD measurement system is permanently mounted inside the machine and only called upon when required, based on the set tolerances and the frequency of measurement, an accurate in-process measurement and compensation is applied to maintain the blank OD to the nominal diameter.

The system is flexible with the ability to handle multiple diameters in one setup, making it perfect for complex blank geometries/shapes and longer batch runs.

AIMS

ANCA's Integrated Manufacturing System (AIMS) is the future of optimised cutting tool production through streamlined manufacturing and connectivity. With ANCA and AIMS, customers can achieve continuous, unattended production that dramatically reduces non-productive machine time, with smart automation that connects sequential tool production processes and offers connectivity across the whole factory.

This is Industry 4.0 factory-wide integration. The technology considers a factory as a single machine, rather than separating it into many different elements of design, blank preparation, grinding, laser marking, washing, packing and shipment. This is a powerful concept that brings together one ecosystem and builds it to be as efficient as possible. AIMS, being a modular solution, could be deployed in stages, allowing for easy, gradual and smooth transition from traditional to automated and integrated manufacturing.

An AIMS manufacturing cell will be



Pat Boland, ANCA co-founder

displayed at GrindingHub, demonstrating a fully automatic process of tool manufacturing starting from the pallet with blanks and finishing with pallets with ground tools.

The GrindingHub demo consists of the following components:

AutoSet preparation station, is a main operator interface. Jobs scheduled for production are downloaded through the AIMS Server to the AutoSet station and are prepared for production here, pallets are being loaded with blanks for further automatic process.

AutoFetch AMR (Autonomous Mobile Robot) is responsible for material transfer between processes replacing operators carrying pallets or individual tools between machines/processes. The AutoFetch robot will transfer full pallets with blanks to the respective grinder, will pick up an individual tool from a grinder for out-of-process measurement and compensation and then will pick up a pallet of finished tools and transfer it to the Finished Goods area.

MX7 Linear grinder equipped with AutoLine Advanced loader (Robomate 2 loader with AIMS kit installed), allows for accepting pallets presented by the AutoFetch.

Zoller Genius with Zoller AutoLine Advanced responsible for out-of-process measurement of individual tools from a batch being manufactured. Measurement values are transferred to the respective grinder and compensation of grinding parameters is taking place based on individual customers tolerance settings.

AutoMarkX: ANCA'S automatic laser marking station

AutoMarkX is an automatic stand-alone laser marking station replacing manual and labour-intensive processes. It is AIMS Ready, which means it can be used as a standalone machine but could be easily integrated to your lights out, unmanned



AutoMarkX or short: AMX - automated laser marking opens up new possibilities in terms of productivity and process control

AIMS manufacturing cell with automatic pallet transfer using AutoFetch robot.

The AutoMarkX eliminates the need for manual laser marking which is a repetitive and labour-intensive job which could be automated and therefore saving you money. By avoiding manual handling, tool quality is protected by eliminating risk of chipping.

AutoMarkX accepts up to two full pallets of tools, which means you can mark a large batch of tools unmanned. Flexible marking means the message could be etched on a single side of the shank or on opposite sides of the shank as well as at the end of tool. The last option is particularly useful for applications where a unique tool identification code (e.g. Datamatrix) needs to be etched on the tool. Codes like Datamatrix are usually etched on the shank where they risk the exposure to excessive surface wear, rendering them unreadable. The end of tool is the best location to etch this type of code to overcome this issue.

Automatic small batch and regrinding solution and insert grinding demonstrations

ANCA understands the requirement to continuously reduce cost within the production processes which is a particular challenge in smaller production batches of complex tools and in regrinding process. To address this challenge ANCA has developed a flexible solution utilising RFID technology, the LaserUltra closed loop measurement and barcode reader interfaced into the iGrind and end-customer's ERP system. This system will be demonstrated on the FX7 Linear platform. The demonstration will highlight how to set up a tool for regrind utilising a barcode reader and QR code, how to easily make adjustments within our ANCA software, what inputs are possible in an ERP system, setting up the RFID to allow mixed diameter automation and the actual grinding process itself. The FX7 Linear machine will also be fitted with the Pop-Up Steady, AutoStick, Auto Wheel Qualification and iView.

The standalone MX7 Linear with RoboMate loader will be demonstrating ANCA's solution for grinding and auto loading of indexable inserts. The machine and loader will be installed with workholding, grippers, pallets and interchange station specifically for the manufacture of special inserts.

Accessories fitted on the machine include the 4-station Auto Stick, Auto Wheel Qualification and LaserUltra.

GCX Linear: gear up for skiving

Driven by the automotive industry's electrification and the general rise of e-mobility, the demand for skiving cutters has seen 30 percent year on year growth. The GCX Linear provides a complete solution for customers to tap into this rapidly developing market, including the ability to produce skiving cutters, shaper cutters and regrinding of hobs. It offers advanced stand-alone software to design and optimise the tool, neatly interfaced with



High demand on skiving tools: ANCA'S GCX is the complete solution including complex in-process measurement

the gear tool package inside ANCA's renowned ToolRoom software. The machine is designed for accuracy with features including all axes with LinX linear motors and an enhanced headstock. GCX Linear also added a series of technologies: AEMS dressing, MTC on grinding spindle and dresser spindle, integrated gear tool measurement and direct compensation, setting the new standard for producing skiving tools that achieve the highest DIN AA quality class.

Due to the skiving tool's innovation, many gear measurement machines still don't have the correct mathematical model for evaluating the quality of the cutter. Leading the world in solving the quality control issue, ANCA developed the world-first integrated gear tool measurement system, which enables the grinding-measuring-compensation all done in the machine, as the only practical closed-loop solution.

At GrindingHub, the GCX Linear will demonstrate the skiving cutter production process assisted with the industry-first integrated gear tool measurement system.

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Hall 10 - STAND 10C51

ACCRETECH SBS provides the 'balance of power' at GrindingHub

ACCRETECH SBS UK Ltd will be exhibiting its technically advanced dynamic balancing systems, acoustic emission sensors and gauging systems at the GrindingHub exhibition in **Hall 5 Stand 5076**.

ACCRETECH SBS designs, manufactures, and markets SBS systems, simple and reliable solutions for the in-process dynamic balancing of precision grinding machines. As precision grinding is a necessary step for nearly every manufacturing process, the company's renowned products are used throughout the world and have earned an excellent reputation for their precision. ACCRETECH SBS dynamic balancing systems are able to detect and dynamically correct vibration as low as 0.02 µm to ensure premium product quality.

At GrindingHub, the staff of ACCRETECH SBS UK Ltd will be explaining how the purchase of the company's cost-effective automatic balancing systems and their use on grinding machines, delivers rapid returns on investment as they provide a wide range of benefits, including:

- Reduced spindle vibration, ensuring extended spindle and bearing life
- Reduction in chatter, grinder burn, 'ovality' etc.
- Improved surface finish
- Improved roundness
- Increased component repeatability
- Extended wheel and dresser life
- Wheels balanced in seconds, increasing productivity
- Elimination of time consuming 'off-line' manual balancing technique
- Reduction in scrap and rework rates

In addition, ACCRETECH SBS UK staff will be illustrating how SBS acoustic



emission sensors help grinding machine operators to maximise the efficiency of their grinding processes, thereby increasing part throughput and lowering operating costs.

Benefits of using ACCRETECH SBS acoustic emission sensors include:

- Touch detection on parts within milliseconds/sub-microns, eliminate grinder burn during first touch
- Control grinding force on part, reduce scrap
- Gap elimination, reduced air-grinding time at grinding feed rate; typical 10–15 percent cycle time reductions achieved
- Crash prevention monitor for excessive acoustic noise produced by a crash event onto parts, tooling or dresser; wrong part, incorrectly loaded part, wrong program, wrong offsets etc. Detect within less than 1 ms and stop infeed/retract wheel-head to prevent damage. Prevent machine, wheel and tooling damage, save money
- Detect unexpected events during the grinding cycle. Part stops/part slipping on chuck, reduce excessive force during grinding. Reduce scrap
- Grinding process monitoring. Monitor part roundness/black part clean-up. Monitor for excessive grinding force during rough grinding. Reduce grinder burn. Maximise dressing intervals. Increase productivity
- Dressing process monitoring. Monitor for full wheel clean-up. Monitor and correct dressing profile, look for defects during



dressing. Minimise dress passes. Increase abrasive and diamond life, reducing costs

ACCRETECH SBS UK Ltd regional director North Europe, Tim Wood adds: "We recommend all visitors to GrindingHub to visit Hall 5, Stand 5076 to discuss their precision grinding problems. Visitors to our stand will be able to witness how fully automatic balancing enables operators to ensure high-precision balancing with just the push of a button. The advanced ACCRETECH SBS auto balancing solution is elegantly simple, it consists of a computer control panel, a vibration sensor, spindle mounted adapter and a balance head.

"Our GrindingHub technical staff will also be explaining how cost-effective ACCRETECH SBS acoustic emission sensors can be set up quickly and easily, enabling users to immediately benefit from improved control over their grinding processes. Standard process monitoring with acoustic emission involves the detection and analysis of high frequency noise Acoustic Emission (AE) generated by the grinding process. The use of our advanced systems reduces air-grind time and provides automatic crash protection by using proprietary acoustic detection technology. ACCRETECH SBS products are able to help all users as they can be specified as OEM equipment on new grinding machines or retrofitted to existing machines."

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Hall 5 - Stand 5076



UNITED GRINDING presents C.O.R.E. and other world firsts at GrindingHub 2022

The UNITED GRINDING Group, one of the leading manufacturers of precision machines for grinding, eroding, lasering, measuring and combination machining, is presenting its revolutionary innovation C.O.R.E. (Customer-Oriented REvolution) at GrindingHub 2022 in Stuttgart. Visitors can look forward to this and other innovations from the group, to be presented to all guests at the Group's booth at an unveiling presentation on the first day of the trade show, May 17 at 10 am local time.

With the initial presentation of C.O.R.E. at EMO 2021 in Milan, UNITED GRINDING Group launched a revolution in machine tool development. The modern hardware and software architecture at the heart of C.O.R.E. offers a visionary new machine interaction concept and was recently honoured with the "Special Mention" award for outstanding user and customer experience at the UX Design Awards 2022. However, C.O.R.E. represents much more than just revolutionary operation. It also opens up new possibilities for networking, controlling and monitoring the production process, and therefore for process



optimisation, as well as laying the foundations for the operation of modern IoT applications and the digital future.

C.O.R.E. is only one of several remarkable technologies that can be experienced up close at GrindingHub 2022. The Group will also be presenting new products from its various brands, including MÄGERLE, BLOHM, JUNG, STUDER, SCHAUDT, MIKROSA, WALTER, EWAG, and IRPD. Among them is the WALTER HELITRONIC G 200, the latest addition to the tool grinding machine range, featuring innovative machine concepts on a mounting area of less than 2.3 m². Other brands, including STUDER from the cylindrical grinding machines technology group, will also be presenting world firsts. To keep things

exciting, the company will not divulge any details about these new products in advance before the unveiling presentation on the first day of the trade show.

UNITED GRINDING Group has selected the inaugural GrindingHub as the ideal stage for unveiling several of its innovations. The new trade show will also be the only German trade show at which the Group will be exhibiting this year.

Stephan Nell, CEO of the UNITED GRINDING Group, has high expectations for GrindingHub: "We welcome the merger of three strong and experienced partners in the world of trade shows: the VDW (Verein Deutscher Werkzeugmaschinenfabriken), Messe Stuttgart, and Swissmem (Verband der Schweizer Maschinen-, Elektro- und Metallindustrie). Given the strong international orientation of the trade show, we are convinced that it has the potential to become the new leading trade show for grinding technology."

UNITED GRINDING

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Hall 9 - Stand 9A50

HIGH PRODUCTIVITY. COMPACT DESIGN.

MFP 30

GrindingHub

17. - 20.05.2022
Stuttgart DE
Booth 9, Stand A50

The MFP 30 5-axis grinding centre. First class performance in an extremely compact design. Now equipped with C.O.R.E.: a new operating system that boosts the machine to the next level.

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A member of the United Grinding Group

Curtis Machine Tools: where customisation is standard

Curtis Machine Tools (CMT) is a well-established British manufacturer of high precision grinding machines for small precision components. It supplies bespoke engineered grinding solutions to manufacturers worldwide and has almost 50 years' experience within a variety of industries, such as automotive, bearing, cutting tool, defence and hydraulic.

The company's patented Grind in a Box technology has proved to be a global success and, based on this innovative concept, CMT has designed and manufactured the VECTOR family of grinding machines. The engineering team at CMT are constantly developing new grinding methods and applications that are precisely tailored to the needs of customers and market conditions in order to maximise the production efficiency. In addition to this, the integration of ancillary processes can be offered to provide a complete turnkey system. Processes such as deburring, washing, inspection, marking, packing etc, can be carried out in parallel with the grinding process.

CMT offers limitless possibilities to engineer and implement the user-specific requirements and already has hundreds of machines in the field ranging from a standalone solution to fully automated production lines, CMT is one of the market leaders in this field and the ideal partner when it comes to process orientated solutions. The machines are fitted with the

latest technology, including Siemens control systems. In addition to this, CMT engineers specialise in using FANUC and Staubli robotics for complex multi process solutions.

The Vector Range

Vector: the VECTOR is the basis for all machines with a long radial stroke and a short axial stroke, for single, multi-plunge or peel grinding operations on parts between centres or held in a chuck. With optional C-axis control for thread or polygon grinding, integrated loading system and exceedingly small footprint, all providing an excellent return on investment.

Twin: the VECTOR Twin incorporates an indexing twin-spindle work head, allowing loading and secondary operations to be performed. This additional spindle allows loading and unloading to take place whilst grinding is in process on the other spindle, giving a spark-to-spark time approaching zero, making it ideal for cycle time optimised production.

Quad: the VECTOR Quad is based on the proven VECTOR Twin, revolutionising production grinding. The Quad uses an innovative four-spindle work head, enabling the outer diameters or contours to be ground simultaneously on two workpieces, using the same grinding wheel, doubling the output.

GFS: the VECTOR Grind from Solid is based on the proven VECTOR but with the inclusion of a bar feed system enabling small intricate parts to be ground from either standard or hardened bar. The workpiece is then cut off in turn using a separate spindle, eliminating the need for turning/hardening operations.

Rotary: the VECTOR Rotary is based on the proven VECTOR but with the workhead mounted on a programmable B-axis thus giving a machine that can be used for either straight or angle approach grinding with the additional ability to produce more complex spherical blended profiles all in one clamping.

Nano: the VECTOR nano has been specifically designed for ultra-precision grinding and is equipped with a hydrostatic wheel spindle capable of 120 m/sec and workhead which has a guaranteed axial and radial position variation of less than 0.0001 mm. Glass scale absolute linear encoders are fitted to both the X-axis and Z-axis with 1 nm measurement increment. Integral temperature monitoring and compensation system. The machine has high mechanical rigidity, extremely high spindle speeds, excellent damping, high overall loop stiffness and thermal stability.

Centreless/Concentric: the VECTOR Centreless/Concentric is based on the proven VECTOR but incorporates a control wheel and work rest blade setup, allowing for plunge/angle approach centreless/concentric grinding of complex and slender parts.

Pendulum: the Vector Pendulum has been specifically designed with two workpiece spindles on either side of the main grinding spindle to combine two grinding processes in one machine. With loading and unloading taking place whilst the part in the opposite workhead is being ground.

CMT will be exhibiting the Vector Twin + Flat at GrindingHub 2022. This machine is based on a standard Vector Twin but has an additional surface grinding station added to enable a secondary grinding operation to operate in parallel on the one machine, giving a 13 second Takt time for two processes.

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Hall 9 - Stand 9A40

CMT
CURTIS MACHINE TOOLS



From batch to mass production: your partners in precision

TECNO.team UK has been established to be a frontrunner in supplying the most advanced grinding technology to the UK's engineering and manufacturing industries. Together with a strong relationship with Curtis Machine Tools, it is able to provide a range of high precision grinding machines from Japan and Europe's elite. TECNO.team UK can offer customers engineered solutions along a broad spectrum of high precision grinding applications, from a single machine to a complete production line. Its focus centres on productivity gains through process and accuracy optimisation. The engineering team, with support from its Japanese and European principals, provides the highest level of technical support.

From the showroom and application centre based in Colchester, Essex, the UK engineering team can provide the design and development of solutions that are precisely tailored to maximise your production output. It has installations within the aerospace, automotive, bearing, cutting tool, defence, hydraulic, tool and die industries, meaning that it is equipped with in-depth knowledge and experience.

In addition, it can also offer its Q-Grind cylindrical and surface grinding machines, which are similar to the Supreme and Techmaster, previously offered by Jones & Shipman.

TECNO.team is the exclusive sole UK agent providing sales and service for the following selection of world-leading grinding machine manufacturers:



TECNO.team UK is also ideally structured to offer the following services for Jones & Shipman and other European grinding machine manufacturers:

- Service and preventative maintenance contracts
- Breakdown assistance for mechanical, electrical and software faults
- Spare parts
- Operator training
- Customised software reduces setup time, operator error and extended functionality

- Machine upgrades and refurbishment
- CNC retrofits and control upgrades to extend product lifecycle

These services are offered by ex-Jones & Shipman engineers, supported by the partnership with Curtis Machine Tools, one of the few remaining grinding machine manufacturers in the UK, offering nearly 50 years' experience in high precision grinding.

Q Grind U1000

The Q Grind Universal performs complex and varied grinding tasks precisely and reliably. The machine has been designed to produce both small and medium size workpieces and is available with a distance between centres of 600 or 1,000 mm and a maximum swing diameter of 450 mm in individual, small batch or high-volume production.

The machine is based on the standard 'T' configuration, with a base being formed by a high quality Meehanite casting, designed in such a way to ensure high stiffness and damping properties are inherent in the machine.

The Q Grind offers you a precise and inexpensive CNC universal grinding machine with an excellent price/performance ratio. This machine includes user-friendly conversational software, using the latest FANUC control and touchscreen.



TECNO.team UK will be exhibiting the Q Grind U1000 at GrindHub Stuttgart

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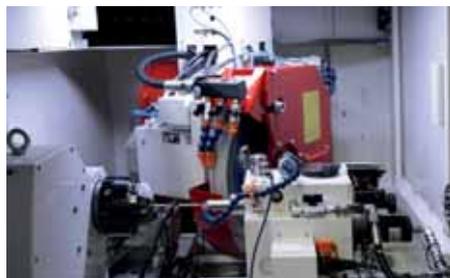
Hall 9 - Stand 9A40



Unmanned cylindrical grinding processes for small series

The internationally operating MPS Micro Precision Systems AG (MPS) consistently uses grinding processes for demanding high-precision components in IT02 tolerance ranges. With a total of seven STUDER grinding machines, the company has a cylindrical grinding expertise which is second-to-none. Thanks to automation and process optimization, medium-sized series are also flexibly produced in unmanned processes 24/7. Future projects and prototypes can be brought to market more quickly thanks to a flexible production cell.

MPS, employing a staff of more than 400 employees, is a "Hidden Champion" of a special kind. Back in 1969 RMB (Roulements Miniatures Bienne SA), from which MPS originated, developed components for the Apollo Mission. With 250 employees Biel is the MPS Group's largest site and has more than 140 turning, milling, grinding, polishing and eroding machines. Plant manager Manuel Nercide says: "We have a very varied range of technology, if you want to reduce it to a common denominator, then it's the manufacture and assembly of complex electromechanical assemblies within the tightest tolerances for high-precision applications in high-end segments."



View of the S33 with wheelhead, which has two external cylindrical grinding wheels here. An internal grinding spindle could also be integrated as a modular unit

Consistent investments in grinding machines

Production manager Michael Bazzan adds: "With seven STUDER grinding machines, we currently have a high grinding capacity for producing high-precision components. The grinding machines are matched to our varying lot size spectrum, which ranges from individual component production up to 25,000 pieces per year for some references."

In accordance with the lot size spectrum, three of the seven STUDER machines are currently equipped with an automatic loading system. The focus in the following is on the STUDER S33 for the production of recirculating ball screws and a STUDER S21 in the area of a flexible production cell (Flex Cell).

Flexible production cell for prototype manufacture

Flex Cell manager Didier Noirjean comments: "The Flex Cell was recently integrated into cylindrical grinding production as a self-sufficient production unit, in order to set up grinding processes for prototypes and new developments without having to intervene in production. Thanks to this flexible production cell our process from development through to the finished component is much quicker. The decisive factor with the STUDER S21 was that it can be changed over very quickly and it can be flexibly configured for different components. Eccentric grinding processes are also possible with the S21. In this regard the STUDER S21 is perfectly suited to our requirements."

While the Flex Cell primarily involves prototypes, series parts are machined on the other six STUDER machines. These include recirculating ball screws with a high-precision design.

Core competency recirculating ball screws

The smallest recirculating ball screws have a ball diameter of 0.8 mm. All components are developed and manufactured in-house by MPS, including the balls. The larger series of screw spindles with gothic-arch thread are produced on a fully automated STUDER S33.

Ball-type linear drives for high-precision applications

Manuel Nercide continues: "We are involved in research and development with these precision screw spindles. The expertise developed by MPS Microsystems in the extremely gentle and precise positioning of lens groups enables the company to offer powerful alignment systems for optical components such as zoom and laser beam focusing systems."

Systems designed to customer requirements

MPS Microsystems miniature recirculating ball screws, or ball-type spindles, are made exclusively of stainless steel and are positioned with double nuts, which enable fine adjustment of the axial play. These often customised spindles guarantee virtually smooth movement thanks to the high precision of their ground thread. With regard to customised production: There is a wide range of customised options available for recirculating ball screws.



Today MPS high-precision recirculating ball screws are in demand worldwide and are used in high-performance microscopes and telescope systems for example, for precise positioning of lenses



A complete view of the S33, on which the recirculating ball screws are produced with minimal personnel. The Humard automation solution can be seen in the foreground. The grinding processes are programmed directly on the machine

Screw grinding manager Julien Grosjean says: "Such applications require the highest precision and positioning accuracy, 100 percent backlash-free and it is precisely here that the spindle systems show their strengths. We grind a so-called gothic-arch thread profile within the tightest tolerance ranges, so that it can reduce the radial clearance and backlash to zero."

Gothic-arch thread: grinding from solid

The gothic-arch thread form is ground directly from the solid hardened blanks. A macro was developed for these gothic-arch thread forms together with STUDER The grinding parameters can be adapted very quickly to the respective screw spindles with this macro.

Regional sales manager for Fritz Studer, U. Weyermann says: "The Studer S33 used here is an external cylindrical grinding machine with a turret wheelhead. Specifically, the wheelhead used here has two external grinding wheels. One of the two wheels is used for the thread profiling, while the second wheel is generally used for external cylindrical grinding."

Handling system for unmanned production

In order to produce the medium-sized series cost-effectively, the Humard company developed a flexible handling system for automatic loading and unloading of workpieces in collaboration with MPS and Studer. A crucial factor in the design of the handling system is that it can be quickly adapted to different workpiece geometries, because lot sizes are variable."

Typical thread grinding process

The Studer S33 requires less than quarter of an hour for the complete machining of a screw spindle 8 mm in diameter and 120 mm in length. The thread is roughed and finished with the same grinding wheel. The grinding wheel is dressed repeatedly in the micron range throughout the grinding process. More than 1,000 screw spindles of this size can thus be ground with one grinding wheel."

The dressing process with a number of tasks

The grinding wheel dressing process performs an important function during grinding. On the one hand the dimension and form of the grinding wheel are calibrated, and on the other hand the cutting ability of the grinding wheel is defined.



The MPS team in front of the Studer grinding machines, from left to right: Didier Noirjean Flex Cell manager, Michael Bazzan, production manager, Julien Grosjean, screw grinding manager, Manuel Nercide, plant manager, all MPS and Ulrich Weyermann, regional sales manager Fritz Studer AG

Julien Grosjean comments: "In the case of screw spindles we typically need to dress repeatedly during each production process. Both a diamond and a dressing roll are used for dressing. You can define the roughness of the grinding wheel relatively specifically with the dressing roll, and thus control the grinding process and the surface quality. We have carried out many tests in this regard, until finding the ideal dressing method for the roughing and finishing processes."

U. Weyermann adds: "If you consider the complexity of a grinding process and the dimensions of the machines, keyword thermal growth, then producing within IT02 tolerances in unmanned operation is hardly a matter of course. All seven Studer machines deliver exactly the precision and process reliability demanded by MPS on a daily basis. 24/7 production with the IT-02 tolerance ranges that we require is ultimately only possible thanks to the extremely high repeatability precision of our Studer grinding machines."

Investments reduce production costs

Finally, Manuel Nercide takes a comparative look at the past: "Seven years ago, we made between 2,000 and a maximum of 5,000 spindles, today we produce 50,000 spindles a year. We have continually reduced our production costs, not least thanks to investing in modern grinding machines. Seven years ago our production was four times as expensive. From this perspective, investments in modern production

equipment are crucial for ensuring long-term viability. Ultimately, our production must satisfy the qualitative and quantitative requirements of our product range. We are perfectly positioned in the cylindrical grinding segment in this regard, not least because of our continued investments.

MPS Micro Precision AG:

With 400 employees based in three locations and with four units, MPS Micro Precision Systems AG (MPS) is a Swiss company founded in 1936 under the name RMB (Roulements Miniatures Bienne SA) and was renamed as MPS in 2003. The company group has expertise in the areas of linear ball bearings and miniature recirculating ball screws, as well as competencies in development, machining and assembly of electromechanical systems. The electromechanical components and solutions are characterised by reliability, a high level of precision and small dimensions. The demanding markets served by MPS are primarily medical technology, including orthopedics in particular, as well as the watch industry, automation, aerospace, science and optics.

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Intelligent grinding of e-transmission gears

Transmissions for electric cars are much simpler in design than conventional combustion engines. However, they place far higher demands on the manufacturing precision of the gears used. Thanks to completely new procedures for quality assurance directly in the final gear grinding process, these specifications can be met in series production with technology from Kapp Niles, available in the UK from the Engineering Technology Group (ETG).

All-electric vehicle drive units usually use a two-stage non-shiftable transmission. You would have thought that this would simplify production, but in reality, it's not that simple. First of all, engine speeds are much higher for the e-drive than combustion engines, at up to 16,000 rpm. This means that electric motors deliver an almost constant torque over a wide speed range. Unlike combustion engines, it is applied to the transmission right from zero speed.

Furthermore, there is an additional constraint that makes production much more demanding than with the conventional drive train, as Friedrich Wölfel, head of machine sales at Kapp Niles, describes: "The noise from a combustion engine masks the transmission noise, meaning it is not noticed in the first place. On the other hand, an electric motor is almost silent. Above 80 km per hour, rolling noise and wind noise are the predominant sounds, irrespective of the drivetrain. Below that speed, transmission noise can be irritating in electric vehicles. We also have to take that into account when manufacturing gears."

The almost constant torque level and high speeds require a different gearing design, which in turn can affect the noise dynamics. Here, in particular, demands are higher than with combustion engines. However, when it comes to the pressure to generate maximum efficiency, there is no difference at all between gears for e-vehicles and conventional drives. The challenge for Kapp Niles, as a specialist in the hard fine machining of gears, is to implement a generating grinding process that is both productive and optimised in terms of noise dynamics.

Hot on the heels of transmission noises

Achim Stegner, head of predevelopment at Kapp Niles, describes the basics: "Depending on the modifications of the

gearing defined at the design stage, such as line corrections, width convexity, head retraction, as well as the profile and line interlocks typical of the process, characteristic noises occur in the transmission during meshing, which can be assigned to specific tooth meshing frequencies. The entire transmission, in turn, also exhibits characteristic properties concerning structure-borne noise and radiation, depending on the constructive design. This is stimulated in the tooth meshing frequency and its multiples. Manufacturers try to minimise this effect as much as possible by adapting the design of transmission and gears."

For the time being, these considerations only apply to 'perfect' gearing but, of course, like any other mechanical component, gears also generate variances from the ideal target geometry in series production. These have different causes and effects, as Achim Stegner explains: "In addition to the stimulation caused by the tooth mesh, there are other disturbance variables that can result in noises in the tooth mesh. These make themselves feel like 'ghost frequencies'. These are frequencies that do not coincide with the tooth meshing frequencies and their multiples, and can just be introduced into the component during grinding." Ghost frequencies are caused by minimal irregularities that are almost impossible to completely avoid in series production. It becomes particularly critical when these variances map almost exactly onto the circumference of gear, as this results in harmonic stimulation.

The cause of such malfunctions can be found in the axis drives of the machine tool used. Electric motors have certain pendulum moments. Measuring systems work with discrete line counts and finite eccentricity errors from the assembly. Last but not least, balance conditions and spindle bearings can contribute to possible irregularities. Waviness as small as 0.1 mm can cause noise in gears.

Achim Stegner explains some more causes: "Every machine has natural vibrations. For example, the typical natural frequency of a workpiece spindle is about 250 Hz. This can also be reproduced exactly on the workpiece if the speed constellation in the generating grinding process is unfavourable. We can eliminate such effects

by the clever choice of a suitable speed window during machining."

Once the optimisation potential on the machine side has been exhausted, there are also several technological options for improving component quality in terms of noise dynamics. This includes the selection of the number of gears of the grinding worm, the speed ratio during dressing and grinding, the finishing speed and the feed rate.

Not all errors are the same

Roughly speaking, there are two typical types of error patterns in serial gear grinding. On the one hand, trends are emerging that show a continuous change in characteristics. On the other hand, there are individually conspicuous components. Trends are usually easier to control. They can be caused by the gradual wear of a grinding worm. If permissible manufacturing tolerances are exceeded here, it is usually sufficient to shorten the cycle between two dressing processes.

Since the actual machining of a gear takes much less time than the control measurement in highly efficient manufacturing processes such as generating grinding, it is also not possible to inspect every single component. In addition, quality demands for gears for e-transmissions are extremely high. "The required tolerances of profile angle, flank line angle, concentricity, two-ball dimension are in some cases smaller than in the conventional drive train by a factor of 3. For the flank line angle error $f_{H\beta}$, a typical requirement is ± 4 mm. With combustion engine transmissions, this was sometimes ± 13 mm," says Friedrich Wölfel, describing the requirements of his customers. Together with the required machine and process capabilities, these quality requirements are testing the limits of what is technically and economically feasible. And the static and dynamic stability of the processing machine and process cannot be increased at will. The only way out is to start with the methods of analysis and control.

Concerning the approach to trend-related deviations from the target geometry, in particular, the 'closed loop' has already established itself as an important tool. This accelerates and improves the feedback between downstream gear measurement

and the processing machine itself. Here, the inspection results are transmitted directly to the processing machine as a standardised file. The grinding machine then uses pre-selectable tolerance corridors to decide independently whether it needs to intervene in the process at all, for example with scalable correction values. If unexpectedly high variances from the target geometry occur, the decision on how to proceed is then up to the operator (Fig. 1).



Figure 1 - Pre selectable tolerance corridors for closed loop processes

The referee at the end of the manufacturing process

At the end of the process is an 'end-of-line test bench'. It is no longer individual gears that are tested, but fully assembled transmissions. They go through various test cycles that simulate operating conditions in an actual vehicle. The operating noise is also recorded. Acousticians can analyse this data to extract intervention ratios, typical frequencies and possible interfering noises.

Today, it is possible to identify components that could cause noise before they are installed in the transmission. A very common procedure for e-drives is waviness analysis on gear surfaces. Here, profile, line and pitch measurements are carried out on all teeth on the gear measuring machine and lined up in such a way that the gear is mapped over its complete circumference. The waviness on the gear wheel can be mathematically measured. However, starting with the complete measurement of the gears, this procedure is very time-consuming and thus unsuitable for testing every single piece in series production. Friedrich Wölfel comments on this: "The grinding time of typical e-transmission components is less than one minute, whereas the measuring time is four to six minutes. In the case of an all-tooth measurement as the basis of a waviness analysis, it can be significantly more, and downstream component testing does not add value either. What is needed here is further development of in-process analysis, which allows conclusions to be drawn about

the component quality produced during machining."

Identify possible noise problems at the machining stage

A promising approach is to detect possible defects as early as the grinding process. Achim Stegner explains: "We already have numerous sensors and measuring systems in the machine that can provide us with many indications, measured values and information. We primarily use it to operate the functions of the machine, but we also want to use it to assess the machining process."

However, this does not mean integrating an additional tactile measuring function into the grinding machine. Nor is it a question of inspecting a ground component directly in the machine, evaluating it and correcting any discrepancies during production. The focus is rather on analysing the machining process in real-time to detect deviations from a previously defined reference process. This can be explained using the 'power consumption of the grinding spindle' signal in Fig. 2. This signal can be used to detect a possible flank line angle error (fHß) at an early stage. Achim Stegner says: "The procedure via envelope detection reaches its limits here, as the error is difficult to identify. As long as the signal remains within the envelope, no alarm gets triggered. So you need a more intelligent form of evaluation. Artificial intelligence that attempts to emulate human decision-making structures. This involves making decisions based on a multitude of different information that is overlaid with personal experiences, upon which they act."



Figure 2 - Error analysis and index calculation in the machining process

Process monitoring: intervene before it's too late

Process monitoring can be defined as component-specific monitoring and evaluation of the grinding process. As described, it is not a trivial matter to generate an action instruction from the sensor signals, but it is possible. Various characteristic values can be formed from time signals. In the simplest case, these can be maximum or RMS (Root Mean Square)

values of the signals. The characteristic values are then combined with the known project data via algorithms and processed into indices, for example, a noise or screw breakout index.

Achim Stegner explains the transmission noises: "An order analysis similar to the order spectrum on an end-of-line test rig can be created for noise-critical components via an FFT (Fast Fourier Transformation). This makes it easier to classify the recorded signals and relate them to results on the transmission test bench. Measurement data that is not processed is of no use." The benefits of process monitoring can therefore be seen in 100 percent testing of all components, identification of anomalies during grinding, detection of component-specific faults, targeted reporting of irregularities, adaptive in-process intervention and part tracing.

Next step: standardisation

Process monitoring is not yet an App that you can simply download and use. It is a customer-specific development that defines and monitors indices concerning the respective component. But even this first step is far more than was considered feasible until only recently.

Achim Stegner comments: "Several pilot customers are already using this functionality. We are already able to detect different errors and intervene in the process. In addition, we are already working on having the grinding machine teach itself characteristic values for new components. However, this requires broad empirical knowledge from error patterns, the geometric quality of the components and corresponding feedback from the transmission test bench."

Friedrich Wölfel adds: "This approach to process-integrated quality assurance is already available for Kapp Niles machines from the Engineering Technology Group (ETG) and are continuously being given further functional scopes and utilisation options through the experience gained from series production."

Engineering Technology Group (ETG)

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ABB steps up with new version of digital service for grinding, including mobile app

New Grinding Connect app allows mine operators to check gearless mill drive performance from anywhere via smartphone or tablet

ABB has released a new version of ABB Ability™ Predictive Maintenance for grinding which is a unique advanced digital service to maintain, assess and analyse gearless mill drive (GMD) systems. The upgrade means that ABB Ability Predictive Maintenance for grinding is now Cloud-based instead of sited on premises and includes a brand-new mobile application that allows real-time notifications on fleet status. The Grinding Connect mobile app, available for iOS and Android, means that mine operators can monitor performance at any time and from any place.

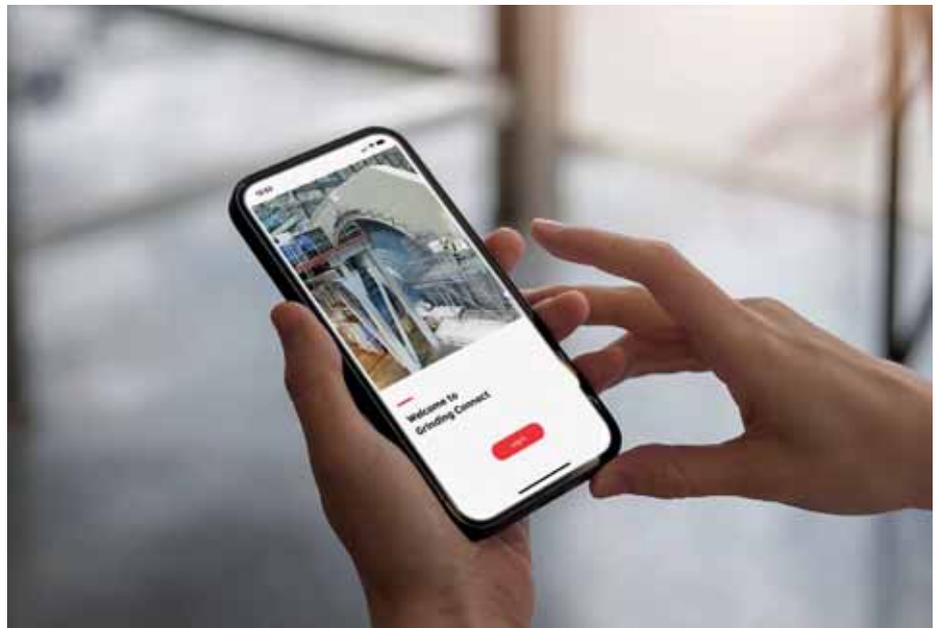
ABB Ability Predictive Maintenance for grinding provides easy access to GMD system parameters and allows visualisation of performance considering past activity and real-time data and assesses future maintenance requirements. It aims to extend the lifetime of grinding assets through better use of resources and to support non-stop operation and to avoid unforeseen downtime.

The new ABB Ability Predictive Maintenance facilitates greater data gathering. The data sample per mine is increased and analytics and trends are more reliably defined. The solution offers a new user experience with fully customisable dashboards, alarms and events all available on the mobile app.

GMDs are the preferred grinding solution at mines characterised by higher-capacity production coupled with low ore grades. By eliminating bolt-on mechanical components such as ring-gears, pinions, couplings and gearboxes, GMDs offer ore producers unrivalled availability, efficiency and durability, while reducing OPEX.

"A gearless mill drive is a major investment and its availability is essential for the process," says Angeles Fernandez, global product manager for Grinding Service in Mining at ABB. "Unscheduled shutdowns and system failures can lead to significant losses in production."

"ABB Ability Predictive Maintenance for grinding is a state-of-the-art service for



analysing system data, assessing the current condition of the equipment and applying predictive methods. The new version is unique in the market and the new Grinding Connect app means you can check that your GMD is performing through your phone or tablet. It is as familiar as the many personal apps we use for monitoring our health, catching up with the news, or checking on the home or children."

ABB draws on 130 years of experience in the mining industry and is a pioneer in the integration of electrification, automation and digitalisation in mining. The world's first gearless mill drive was delivered by ABB in 1969 and is still in operation. Since then, ABB has sold more than 150 units in 23 countries and currently has over 50 percent market share.

A video in English can be viewed at ABB Ability™ Predictive Maintenance for Grinding on YouTube.

ABB is a leading global technology company that energises the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation and motion portfolio, ABB pushes the boundaries of technology

to drive performance to new levels. With a history of excellence stretching back more than 130 years, ABB's success is driven by about 105,000 talented employees in over 100 countries.

ABB's Process Automation business is a leader in automation, electrification and digitalisation for the process and hybrid industries. It serves its customers with a broad portfolio of products, systems, and end-to-end solutions, including the #1 distributed control system, software, and lifecycle services, industry-specific products as well as measurement and analytics, marine and turbocharging offerings. As the global #2 in the market, ABB builds on its deep domain expertise, diverse team and global footprint, and is dedicated to helping customers increase competitiveness, improve their return on investment and run safe, smart, and sustainable operations.

ABB Ltd
Tel: 0808 258 2000
www.abb.com

Automatic balancing devices for grinding machines

The exclusive range of ABSOLUTE BALANCER® heads clearly represents the quality that Balance Systems strive to uphold within the automatic balancing technology. Available in all configurations for one and two plane balancing, the ABSOLUTE BALANCER heads ensure unprecedented performances both in terms of execution speed and final accuracy and are managed via contactless control (NoLink), using the VM25 modular multifunction unit.



Features include:

- An exclusive Balance Systems design with moment-free architecture
- Designed in a wide range of diameters and shapes for built-in spindle mounting, starting from diameter 28 mm
- An embedded rotational speed sensor
- Operating rotation speeds up to 25,000 rpm
- Residual unbalance is achievable in at least 10 times the fewer tries as traditional solutions on 1 and 2 plane
- Deterministic balancing time
- Automatic neutral cycle (weights at 180°)
- Acoustic emission sensor (AE) can be integrated (optional)

Absolute gauges for in-process measuring on cylindrical grinding machines

Top Gauge Absolute (TGA) helps to improve precision and efficiency in manufacturing processes through an accurate measuring of workpiece diameter. Combined with one of the Balance Systems' milestone creations, the TG200 Gauge Head, alongside state-of-the-art mechatronic solutions that provides a quick



measuring process along with a high level of accuracy, the outstanding performance of the Top Gauge Absolute is what you need for your grinding machines.

Features include:

- Two simultaneous measuring processes; available in combination with the measurement of the axial position (active or passive flagging)
- 32 part programs
- Measuring of smooth and serrated surfaces
- In-process roundness and shape analysis
- Six commands to control the infeed
- Thermal compensation
- Remote programming

Improve your grinding machine with quality wheel process monitoring

Based on AE or power sensors, the VMx5 Envelope Function from Balance Systems monitors grinding or dressing processes in order to increase the efficiency of the grinding machine. It compares the current AE or power signal with previously installed master shapes of correctly executed processes to determine and report the successful completion of the process, therefore maximising the efficiency and the shape quality of the dressing process.

Features include:

- Up to 256 timezones (the comparison between current signal and master shape is performed for each zone)
- Four programmable tolerances
- Triggered auto start (programmable)
- Self learned process duration (programmable)
- Gap and crash control included
- Automatic management by CN (Profibus, Profinet, Digital I/O)
- Master shape edit mode
- Available on Panel and HMI
- Available on VM15 and VM25
- Up to two simultaneous processes and 16 part-programs

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Cool, quick, COMBICLICK now available in taster packs

More and more, today's consumers want smaller packaging units and functional sets containing components that are designed to work in harmony with one another. PFERD is now getting on board with this trend by scaling down the packaging unit for its popular COMBICLICK system.

"It's like all the good things about PFERD's COMBICLICK system in an amusebouche form", says Tim Sauermann, key account manager at PFERD Tools. Tongue-in-cheek though his comment might be, he is totally serious about what the company is offering: "Until now, we only provided our solutions for work on surfaces and for cutting in industry-standard packaging units. However, we've recognised that end users like craftspeople and DIY enthusiasts are increasingly looking for something smaller."

As Tim Sauermann explains, PFERD sets have been traditionally designed to include multiple tool options, rather than a certain number of the same tool and reflect a wider range of applications within a single packaging unit: "From the very beginning, the COMBICLICK options have always included the CC-Set, which has tools to cover everything from rough machining to mirror polishing," he says and also confirms that this set will continue to be available. "We've now added three new sets called Universal, Premium and Finish and Polish", he explains.

The Universal set contains aluminium oxide fibre discs with grit sizes of 36, 60, 80 and 120, and is made for universal applications involving a whole range of different materials. With ceramic oxide grain tools from the CO-COOL series in grit sizes 36, 60, 80 and 120, the Premium set provides solutions for working on stainless steel (INOX), hard non-ferrous metals and high-temperature-resistant material with poor heat-conducting properties. Meanwhile, the tools in the Finish and Polish set are designed for finishing work and include COMBICLICK non-woven and felt discs. Every set also comes with a COMBICLICK backing pad plus M14 spindle for use on conventional, speed-adjustable



angle grinders. Sauermann adds that the three sets are currently available with a 125 mm diameter.

"We have grouped the sets into themes based on the most common applications for these tools and have designed them as taster packs. Customers can then make additional purchases of all the components separately, choosing from either the conventional industrial packaging or smaller packaging units that are suited to smaller-scale requirements and levels of consumption. These units contain between two and ten items, depending on the component. This is our response to the increasing demand for smaller packaging units from end users who are looking for solutions online," explains Tim Sauermann.

The COMBICLICK system

The patented quick-mounting and cooling system is suitable for use with fibre, non-woven and felt discs. It consists of a specially developed backing pad and a rugged mounting system at the back of the tool, providing effective protection against scratches and contact corrosion from protruding clamping elements. The backing pad enables COMBICLICK tools to be used on angle grinders.

The unique geometry of the cooling slots ensures high air throughput, which in turn considerably reduces the thermal load on the abrasive material and the workpiece.



Compared with conventional tools, the quick-mounting system, robust holder, secure tool-locking feature and integrated cooling system together achieve a workpiece temperature that is up to 30 percent lower, a 25 percent higher stock removal rate, a 30 percent longer tool life and better utilisation of the abrasive material.

As a whole unit, the tools are easy and convenient to handle and much faster to change, reducing process costs.

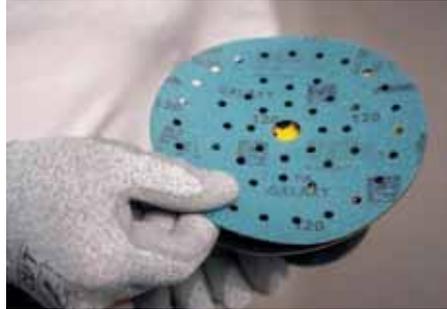
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Mirka reaches for the stars with Galaxy

The expansion of Mirka's innovative abrasive line-up is continuing with the latest addition of Galaxy. This new multi-purpose, film-backed abrasive has been designed to stay sharp from the first cut to the last, whilst also providing the user with dust-free sanding, efficient performance, and a high-quality consistent finish.

Galaxy is the first abrasive to use Mirka's innovative Multifit™ hole configuration. The result of extensive research from the development team in Finland, this technology utilises optimal hole placement to allow the largest amount of dust extraction without sacrificing sanding performance. The alternating hole sections and grip areas are designed to channel the dust away from the sanding process which, combined with Galaxy's special coating, helps eradicate clogging. Multifit also supports full extraction on any type of machine or block with no need to waste time aligning the holes.

Galaxy is the ideal abrasive for sanding both soft and hard materials as well as various substrates that are prevalent across



the automotive, marine production and wood sectors. The specially mixed blue ceramic grains have been engineered to form abrasive edges which break down during the sanding process and present fresh grain; this allows Galaxy to cut quickly and efficiently from edge to edge, which further increases the lifespan of the abrasive and reduces sanding time. The cut is so clean that scratch patterns in finer grits are especially easy to polish out and there are no loose grains left behind in the substrate.

Pete Sartain, national sales manager Industrial, Mirka UK, says: "We are constantly evolving our abrasive line-up and



are very excited to be adding Galaxy to it. We believe this abrasive's new technology will help our customers increase their productivity, while also opening up new revenue streams within their business."

To find out more about Galaxy, contact:

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Cost-saving initiatives for the medical industry

In a world that is constantly changing and developing, like many other industries, the medical sector has had to adapt to the fast pace of emerging innovation trends.

The medical industry grows each year as a consequence of life expectancy increasing and the world population living longer. With that, there can be a lot of significant changes, particularly in terms of costs involved and time constraints.

Throughout the UK and Ireland, Tyrolit is successfully assisting clients within the medical industry to not only achieve their business goals but do so in a manner that effectively reduces costs as well as cycle times, helping businesses to be more profitable in a shorter period of time.

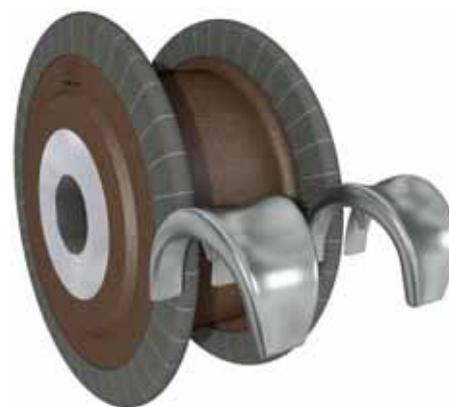
A demanding constraint for the medical industry is that life and performance expectancies have increased dramatically, which has an impact on insuring that we are constantly improving people's wellbeing. Where some are willing to live with their ailments, others are acting on them sooner, meaning issues like joint replacements take place on a regular basis.

For many Tyrolit customers within the medical sector, the supply of the right equipment in order to manufacture parts such as hip ball and knee joints is crucial. Following the recent acquisition of Bibielle, Tyrolit is now able to offer a complete range of non-woven surface conditioning products, which is proving extremely beneficial to many industries, particularly the medical sector. Bibielle is well known for its high-quality three-dimensional abrasive materials for surface conditioning wheels and belts, unitised and convolute wheels, as well as rough cleaning wheels.

Tyrolit is able to demonstrate to customers using past evidence and information, why its products, such as knee grinding wheel can reduce the cost over the product life time, in turn providing a massive cost saving.

Working with an Ireland-based leading medical technology client for over 10 years, proves the strength behind Tyrolit grinding and abrasive products through long standing relationship. Providing a range of successful solutions have helped the client not only achieve their business objectives but also a massive cost saving.

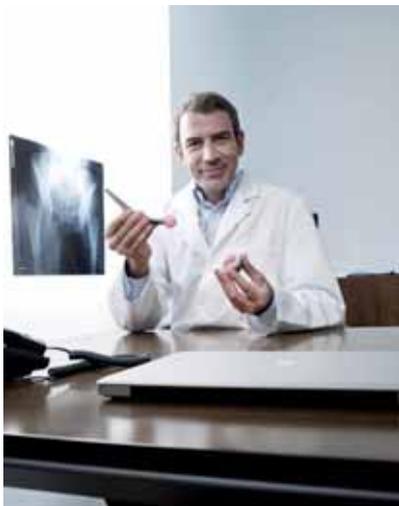
Cathal Finch, Tyrolit area sales manager Ireland, explains: "We recently provided



solutions for knee grinding where we gave a total benefit of wheel changes, improving from every three to four weeks to every three months. This resulted in a massive cost saving for them as well as helping to improve product quality. In addition to knee

grinding on machines with vit, we have also provided CBN wheels, cut-off disks and normal belts in the foundry. Bristle brushes in the 3D printing facility, polishing with SCM wheels and SCM belts. There are cotton mops, wheels and abrasive paste used too."

Continuing its successful cost-saving initiatives for the medical sector, Tyrolit currently supplies a multitude of product solutions into different medical clients across the UK and Ireland. These range from



hip grinding projects, where new honing sleeves are used, to plated single wheels for knee grinding, as well as polishing mops, convolute wheels and cup grinding projects.

Working on a new project for a client based in Leeds, Tyrolit has begun helping to improve their hip grinding process; grinding internal cups through the provision of pinnacle cups and supplying honing sleeves to enable this process.

Through building positive relationships, by supporting both end users and integrators, Tyrolit is able to provide the best cost-saving initiative. With a full range of abrasive, polishing and grinding products, combined with dedicated engineering support, Tyrolit is not only able to support businesses with high quality solutions but also provide the best cost-saving initiatives.

Looking to not only reduce costs but also product cycle time in order to speed up your process? Get in contact with a member of the Tyrolit application engineering team today.

About Tyrolit

Tyrolit is a world leading manufacturer of grinding and dressing tools, as well as being a system provider for the construction industry. Since 1919, its innovative tools have been making an important contribution to technological development in numerous industries. Tyrolit offers tailored grinding solutions for a varied range of applications and a comprehensive assortment of standard tools for customers all over the world.

The family-owned company, based in Schwaz, Austria, combines the dynamic strengths of the Swarovski Group with over a hundred years of commercial and technological experience.

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Kemet shows how to deburr and not demur

During most machining operations, components become burred, and sharp edges or material compression occurs. These effect the quality of the part and can create issues with assembly and failure of parts due to break off of material during working life. Removal of burrs is often critical to many of the lapping and polishing processes Kemet develops for customers, to prevent damage to lapping/polishing support materials, to maintain geometry after lapping and extend their life.

Kemet is always monitoring technical developments around the world and have a range of processes to offer a comprehensive deburring solution.

The comprehensive range of precision power hand tool systems, including Nakanishi, Diprofil, and Flexible Drive Systems, with attachments and abrasive consumables suitable for grinding, smoothing, polishing, and deburring, has been expanded to include the full range of Xebec deburring and polishing products. Deburring solutions available also incorporate vibratory deburring/polishing bowls/troughs/media, super centrifuge machines and dry electrolytic polishing processes.

The Xebec products cater for either hand use or for in process, CNC/Robotic use, with tailored tools for the full range of deburring challenges, including after face-milling, end milling and drilling, threading and drilling, and polishing brushes to remove cutter marks on top surfaces, side, inner diameters, and channels. A simple check whether the Xebec brush range is suitable for removing the burr is to see if it can be bent by your fingernail. If they can be bent, then the brushes will work.

Traditionally abrasive loaded nylon brushes have been used for deburring, but Xebec brushes use abrasive ceramic fibre. One single bristle consists of 500-1,000 ceramic fibres that works as cutting edges, providing excellent cutting ability. This offers a number of features to improve CNC deburring & polishing.



The unique ceramic fibres are the abrasives with a fibre content ratio of more than 80. Cutting edges that are made up from the tip of each fibre bristle create enormous grinding power, 60 times more than nylon brushes, and this power rapidly removes the burrs.

Due to the structure of the ceramic fibre, new cutting edges are constantly being exposed and the brush maintains a consistent cutting performance right up until the fibres have worn down to the end. Unlike nylon brushes the ceramic fibres do not deform with use and the Xebec brush maintains its straight shape and does not spread out like a toothbrush even after repeated use. This makes it perfect for CNC deburring and polishing in mass production lines.



In addition to the ceramic brushes, Kemet also offers the Xebec range of Back Burr Cutters specifically for deburring front and back of drilled or tapped holes. These are supplied with a custom made tool path so that the cutter cuts into a 3D curved edge with the optimal cutting angle ensuring no secondary burrs are generated. The tool life is dramatically extended by continuously shifting the contact point of the cutting edge. In tests, these tools have been proven to cut machining times by up to 90 percent.



Advice on the most suitable brush for customers' component geometry, material and challenge is available from Kemet's team of technical representatives, using Xebec's knowledge base, garnered from deburring solutions they have provided to companies worldwide from a variety of different sectors, from medical to aerospace, from auto to electronics.

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Sunnen meets the challenge of honing heavy parts

New CNC vertical honing system delivers tight bore tolerances and the lowest cost per honed part on heavy-duty equipment parts

Sunnen's SV-2010 AXYS combines the proven performance of its SV2000 series honing column with a heavy duty i5 CNC controlled servo X-Y table for precise bore positioning under the spindle. Easy-to-use, intuitive controls reduce setup time and operator training requirements.

The new Sunnen SV-2010 AXYS CNC honing system is designed to solve the challenge of honing large, heavy parts such as cast iron hydraulic valve blocks and bolted assemblies common to heavy duty machinery used in the mining, off-road, and construction industries. These parts are historically difficult to fixture and hone, and the SV2010 AXYS sets a new industry standard for cost-efficient production of these applications.

The machine is built around Sunnen's field-proven SV-2000 series honing column. This flexible system supports both single-pass and conventional reciprocating honing, and can easily be customised to specific production needs. The system integrates the vertical honing spindle with a high-resolution (20 million pixel) industrial camera and a heavy duty i5 CNC controlled servo X-Y table to facilitate precise bore positioning (accuracy to 0.02 mm).

The operator loads the part, hits the start button, and the system automatically finds the centerline of each bore. The machine then automatically hones each bore to spec, in sequence. The operator is free to complete other tasks while the machine completes the part, exponentially increasing operator efficiency and productivity. Easy to use, intuitive controls reduce setup time and operator training requirements. The advanced high-torque output (7.5 kw) servo honing spindle allows the machine to short stroke or dwell in any part of the bore. The system's automation and precision honing technology deliver the lowest cost per honed part, while hitting tight bore tolerances.

Machine weight is approximately 6,350 kg (7 tonnes) with a rugged, solid cast iron base and honing column, to reduce vibration,



increase rigidity and enhance performance. The system handles parts with bore diameters from 15-65 mm. The part maximum envelope is 600 mm (L) x 300 mm (W) x 300 mm (H), and the maximum part and fixture weight is 800 kg.

Other features include fully enclosed guarding with a large opening for easy part

loading/unloading, "lubed-for-life" oversized stroke guideways to ensure superior performance and long, trouble-free life, NFPA79 compliant wiring and compliance with the European machinery directive (CE). The machine workspace allows room for expansion and automation, such as optional post-process brush and air

gauging stations. Left and right-side access to the system allows for easy production line automation.

Sunnen also provides the tooling, abrasives and cutting fluids to keep production running smoothly. The SV2010-AXYS typically uses Sunnen's new MC shell type multi-stone tools, developed specifically for larger applications. The tools use CBN or Diamond Metal Bond stones. The team at Sunnen can help determine the optimal tooling and abrasive combination for specific applications.

Designed to solve the challenge of honing large heavy cast iron hydraulic valve blocks and bolted valve assemblies weighing over 450 lbs (200-300 kg), common to heavy duty machinery used in the mining, off-road, and construction industries. The SV-2010AXYS vertical honing machine automatically finds the centerline of each bore and hones all bores in sequence.

This machine consists of a SV-2010 honing column integrated with an i5 CNC controlled X-Y servo table coupled with a high-resolution camera to precisely move into position and hone large heavy parts such as cast iron and bolted hydraulic valve bodies. These parts have been historically difficult to fixture and hone, the Sunnen SV-2010AXYS sets a new industry standard for these difficult applications. The operator loads the part, starts the machine, and the machine automatically hones each bore. The operator is free to complete other tasks while the machine completes the part, exponentially increasing operator efficiency and productivity.

Machine specifications

Sunnen Professional Honing Program: full

honing functions with Windows controls, reduces setup time and operator training requirements

Powerful i5 CNC control system for precisely locating the bore under the honing spindle for easy operation

20 million pixel industrial camera combined with i5 CNC control for precise bore positioning with accuracy to 0.02 mm
Machine weight approximately 6,350 kg (7 tonnes) with a rugged, solid cast iron base and honing column, reducing vibration for enhanced performance, increased rigidity, and optimum precision

Servo CNC-controlled X-Y worktable with precision 7.5 kW high-torque output servo honing spindle

Advanced servo stroke honing spindle control allows the machine to short stroke or dwell in any part of the bore "Lubed-for-life" oversized stroke guideways ensure superior performance and long, trouble-free life

NFPA79 compliant wiring
European machinery directive compliant (CE)

Features and benefits

The proven performance of the Sunnen SV-2000 series honing column. First sold in 2012, there are now over 140 SV-2000 series machines in service

Easy-to-use, intuitive controls reduce setup time and operator training requirements
High-resolution industrial camera working in

conjunction with a heavy duty CNC controlled servo X-Y table facilitates precise bore positioning under the honing spindle

Fully enclosed guarding with a large opening for easy part load/unloading
Machine workspace includes room for expansion and automation such as the inclusion of optional post process brush and air gauging stations

Left and right-side access allowing for easy production line automation

Sunnen also supplies the tooling, abrasives and cutting fluids to keep production running smoothly every day.

The SV-2010AXYS vertical honing machine utilises new MC shell type multi-stone tools developed specifically for applications where large heavy castings and bolted assemblies with bores requiring honing. These parts are typically a single part with multiple bores to be processed.

Part specifications

Bore diameter: 15-65 mm
Part maximum envelope: 600 mm (length) x 300 mm (width) x 300 mm (height)
Maximum part and fixture weight 800 kg

For additional information on Sunnen honing systems, tools and abrasives, contact:

Sunnen Products Ltd
Tel: 01442 393939
Email: hemel@sunnen.co.uk
www.sunnen.com



Hone in on a world first

SSP has launched the MU-Tools honing machine. Being shown for the first time at MACH 2022, the Mu-Tools type Mu-HS1 single spindle and Mu-HS2 double spindle machines have been developed to perform high precision honing operations.



These machines are very flexible and can be easily adapted for small series up to large production volumes. The honing range starts at 0.6 mm diameter up to 80 mm diameter, with honing lengths up to approx. 210 mm, depending of course on the shape of the workpiece.

All types of Mu-Tools honing tools can be used on these machines. The QR codes on the packaging boxes can be scanned and the detailed honing tool information can be transferred directly to the program. The machine software can analyse the data of each tool and display the state of wear of the tools at any time, indicating the number of parts machined per honing tool.

The chassis of the Mu-HS1 and Mu-HS2 machines is identical and allows the machine

type to be configured very quickly. In addition, reinforced elements have been integrated into the side parts, in order to connect an automatic workpiece loading system. As an option, a camera can be added to record the setup of the fixture(s) and the position of the lubrication pipes.

The spindle has been developed by BBN Mécanique, a specialist in high precision spindles. The maximum proposed speed is 8,000 rpm for a torque of 11.4 Nm. The expansion system is integrated into the spindle and controlled by a micrometric screw system. Specific sensors are connected to the expansion motors, as well as to the spindle motor. They allow the recovery of data on torque, heat and current, in order to analyse the cutting forces between the tool and the material as accurately as possible.

The honing movement is carried out by a table coupled to a linear motor, allowing a 350 mm stroke and a honing stroke of 210 mm. Depending on the geometric defect in the workpiece bore, it is possible to set several honing strokes at different positions in the same program.

The workpiece clamping systems can be mechanical or pneumatic. A new version of flexible floating clamping is offered, in order to reduce costs. This is a basic cardan with a 3D printed insert made of a composite material as hard as aluminium. This clamping system makes it possible to produce a cardan in less than a week and to carry out tests at a lower cost.



A control wheel and four push buttons are available to interact directly with the part program, without having to reach through the safety barriers and stop the cycle. The external coloured LEDs show the status of the machine and also the progress of the honing cycle. The interior white LEDs provide sufficient brightness in the work area and are adjustable via the control wheel. The Beckhoff 12" Touchscreen control panel (industrial PC) allows an excellent view of the honing values. Entering parameters is simple and very intuitive plus information about the Mu-tools honing technology is included in help pages and explanatory images.

SSP Technology is a UK-owned company based in Melbourne, Derbyshire. It is the exclusive UK distributor for Pemamo honing machines, Schneeberger grinding machines, Palmary, Dama grinding machines, Wimmer cut-off machines, Schilling part-marking systems and now Mu-Tools.

Its mission is to be the manufacturing industry's first choice for specifying and delivering grinding and honing machinery of outstanding quality, supported by exceptional knowledge and great service at a competitive cost. Through working in a collaborative capacity with its principal suppliers and customers, SSP's aim is to help them grow and prosper.



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There's more than one way to machine a bore. **Only Sunnen has them all.**

No matter what your bore machining application...from primary hole drilling to final finished bores...we have a turnkey solution for you.

Deep hole machining. Sunnen manufactures a full range of machines, tools and accessories for deep hole drilling, trepanning, counter boring, form boring, skiving/roller burnishing...even Sandvik-style replacement cutters, cartridges and pads.



Honing. From manual, tool-room hones to automated, high-production systems, Sunnen will optimize your honing process with a conventional multi-stroke or single-pass system designed specifically for your application, including machine, tooling, abrasives, cutting fluids, bore gages and automated parts handling.

Skiving and Roller Burnishing. For cost effective bore sizing on hydraulic cylinders and other high-production applications, Sunnen's new SHDS-series machines are significantly faster than traditional honing, yet deliver precise tolerances and quality surface finishes.



Lapping. When bore specifications call for extremely tight tolerances, Sunnen's SVL-series automated bore lapping machines bring increased productivity and consistency to what has traditionally been a manual process.

To find out about the latest technology in bore sizing and finishing, visit Sunnen.com or contact your local Sunnen representative.

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Robots in metal cutting

German manufacturer KADIA Produktion GmbH + Co has been designing deburring robot cells based on 6-axis industrial robots for many years. In the meantime, a new trend is emerging: solutions with an even higher value-added component, i.e., with general machining processes such as milling, drilling or thread cutting. The robot is thus no longer just part of a deburring machine.

The Nürtingen-based company pursues two concepts with its Deburr-Robot-Cells: either the robot grips the workpiece and moves it to fixed tools, often brushes, or it guides the tools itself, such as milling tools. The latter case is the bigger challenge. One example is the deburring of large gears (Fig. 1). The term deburring is no longer quite appropriate for this application; it is more a matter of edge shaping. The gears are given chamfers of up to 5 mm. The tool used for this is a solid carbide end mill. Programming is complex because the cutters follow the involute contour of the tooth flanks.



Fig. 1: Gear machining - more than deburring: the edge shaping process of large gears. Using solid-carbide cutters, the robot provides the teeth with chamfers of up to 5 mm. It follows the involute contour of the tooth flanks exactly

A further development in recent years has been Deburr-Automation-Cells in which the robot performs comprehensive handling

tasks in addition to deburring. In this configuration, it works together with machining centres, i.e. it places the components, removes them again and, if necessary, also acts as an interface for neighbouring system parts such as quality or washing stations. Deburring is then just one task among several.

These tasks are joined by others. That's why KADIA is now offering a third category of robot systems as an application: Machining-Robot-Cells. "More and more customers are asking whether it is possible with the robot, for example, to also apply a thread or a flat surface," explains Jannik Weiss from deburring machines sales at KADIA. The customers' plan is to avoid reclamping operations. If the deburring robot, which often continues the process chain after mechanical processing, can take work away from the other processing machines, a lot of time can possibly be saved. "We are repositioning ourselves a bit as a result," explains Henning Klein, managing director at KADIA. "Since we have accumulated many years of know-how with our automation solutions with robots or with our Deburr-Robot-Cells, the step to becoming a supplier for robot-assisted mechanical processing is no longer a big one."

Cost-effective machining solution

In principle, a 6-axis industrial robot is suitable for a wide range of machining technologies: drilling, milling, thread cutting, etc., dry, wet or using minimum quantity lubrication is possible. The main advantage is that the robot is a comparatively low-cost machining solution. With it, all exposed sides of a cubic workpiece can be easily reached. If the same number of degrees of freedom is to be achieved with a machining centre, much more complex 5-axis machine concepts are required, which results in high costs. In addition, a robot can alternately pick up grippers and tools and is therefore suitable for multifunctional scenarios.

The limitation of a robot for mechanical processing is its comparatively low rigidity. It cannot offer the repeatability of precision guides available on a machining centre. The further the arm reaches out, the less accurate the result. Its use is therefore limited to applications with correspondingly

large tolerances and small chip depths. However, there are certain adjustments and parameters that can influence the results.

The programming can compensate for deviations from the ideal path at the reversal points within certain limits. "The process development department at KADIA determines which parameters need to be optimised and how. We take the necessary time for this so that we can give the customer a capable process at the end," emphasises Jannik Weiss.

Example: milling of car battery housing trays

One application for which a robot is ideally suited is the machining of the parting surfaces on aluminium housing trays for holding vehicle batteries. These housings, made from extruded profiles with crash protection structures, are effectively the successors to fuel tanks. The quantities required are increasing rapidly. Due to the required surface requirements and tolerances, a machining centre would be oversized. A robot, on the other hand, meets the dimensional accuracy requirements and fully exploits its cost advantages as well as its flexibility.

KADIA recently developed a corresponding machining concept for an automotive manufacturer. The task in detail: milling of the parting surfaces with subsequent brush deburring so that the frames can later be bolted and sealed with a steel cover (Fig. 2). An important detail of the customer's requirement was flat-milled surfaces with low waviness. The customer specified the quality of the surfaces with $R_z < 20 \mu\text{m}$ / $R_a < 4 \mu\text{m}$.



Fig. 2: Workpiece - tray construction made of aluminium profiles for holding vehicle batteries. The task of the robots is milling over the connecting surfaces for a cover to be attached later

The solution: one cell with three robots (Fig. 3). To meet the cycle time, two robots are required on one side of the workpiece,

where the machining volume is larger and one is sufficient on the other side. The setup requires less than 80 seconds for complete machining, i.e. milling including brush deburring. In case a future workpiece variant with further details would have to be machined, the cell still offers space for a fourth robot.

Tests carried out in advance with milling tools (Fig. 4) showed that minimisation of vibrations is the big issue when defining almost all machining parameters in robotic cutting. The cutting geometry, macro- and micro-geometry, for example, are important adjusting screws, since they have a decisive influence on the cutting forces. Among other things, the depth of cut is a key criterion; the application engineers limited



Fig. 3: Robot cell for battery trays - the cell designed by KADIA with three 6-axis industrial robots for processing battery housing trays for electric vehicles



Fig. 4: Test setup with dummy workpiece - KADIA carried out extensive test machining on dummy workpieces in advance. This enabled the optimum machining parameters to be determined

this to 2 mm to reduce vibrations. At the same time, they optimised the cutting speeds and feeds so that chatter marks are avoided (Fig. 5). The cutting edges are cooled during machining by means of minimum quantity lubrication. Programmable spindle units mounted on the robotic arms are responsible for analysing the cutting data. They form a 7th axis. The solution described above achieves a surface finish of $R_z = 10 \mu\text{m}$ / $R_a = 2 \mu\text{m}$. The required surface finish by the user are thus undercut by a factor of 2.

Simple operation

At first glance, a cell with three robots is a complex system. However, its operation is simpler than expected. KADIA designs the cells with usability in mind; the operating staff does not need to be a CNC programmer or a robot specialist. Jannik Weiss continues: "Any skilled metal worker who understands a technical drawing is able to operate our robotic cells. Only one

tolerance, the operator can quickly and easily correct the corresponding workpiece and tool coordinates on his own.

KADIA Produktion GmbH + Co has provided specialist solutions for honing and deburring processes for more than 50 years. Founded in 1959, KADIA started as a manufacturer of honing tools. It didn't take long for the first honing machine to be developed by KADIA in 1969. Subsequently, the company needed to expand and the production of the first deburring machine followed in 1981.

All images (c) KADIA



Fig. 5: Surface - With the optimum combination of cutting speed, feed rate and depth of cut, the robot produces better surfaces than required. Chatter marks remain absent

master point is defined for each machining detail. This is easy to correct. The approach paths and transition movements to the next feature are pre-defined. Every process-relevant dimension on the workpiece can be read in plain text from the drawing." It follows that if a workpiece is out of

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FINAIDS appointed UK agent for Lissmac

Finishing Aids and Tools Ltd has recently been appointed the UK agent for Lissmac Maschinenbau as part of a transformative leap into the capital machinery market. Since acquiring Steelmaster in 2012, Lissmac has been at the front of grinding and deburring innovation and its SBM range offers solutions for almost every application. The SBM range can process both sides of materials up to 50 mm thickness at the same time (wet or dry) and this super-efficient design is proven to reduce the cost of processing punched, laser, water, plasma or autogenously cut parts by 60 percent or more against traditional grinding units.

Each machine can be configured to include a barcode system and electronic gauge to automatically set up the machine to process parts based on the parameters of frequent work, avoiding downtime by removing the need for the operator to make manual machine configurations. The abrasive media are also designed with speed in mind and all consumables can be replaced with speed (and ease).

As the sole manufacturer of wide belts in mainland UK, FINAIDS has sought to complement machinery sales with their own abrasive processes for surface grinding and deburring on all wide belt machines. Having been inducted into 3M's Value-Added Reseller (VAR) program, FINAIDS can offer belts in all major 3M materials up to 1,370 mm wide including Durable Flex Scotch-Brite™ and convert materials from



Ekamant, Starcke, and DeerFOS. This allows FINAIDS to design abrasive processes for your application that best suit your current machinery configurations.

"Our new and exclusive partnership in the UK with Lissmac is our way of broadening our horizons in a post-pandemic world whilst offering customers the opportunity to maximise the super tax deductions in the lead up to March 2023. We now offer technical sales on the road, material conversion from multiple suppliers and the Lissmac agency is the final piece of the puzzle for us" says Rhod Howcroft, managing director at FINAIDS. "As part of this expansion, we can offer machine servicing, repairs, and spares for all types of wide belt machinery on top of consumables for the Lissmac range. With each machine offering, FINAIDS will also include decommissioning of used machinery, options for business finance and a fixed one-year warranty period for all Lissmac spare parts and consumables. The Southern



FINAIDS branch in St Neots, Cambridgeshire is also being expanded to house a machinery demonstration area for potential customers to come and test the machinery and processes as part of the quotation process."

In addition to the Lissmac agency, FINAIDS has also appointed a new member of staff, Armin Berndt, formerly of Southern Engineering Equipment, as its dedicated Lissmac sales representative. "I couldn't be more delighted with how things have started for me at FINAIDS," he enthuses. "We have hit the ground running and are already receiving serious interest in the Lissmac SBM range as the two-sided processing function of the Lissmac SBM range sells itself."

For more information on the Lissmac range of machines, the 3M Avenger range (384F, 784F, 984F), technical assistance, quotation or to arrange a visit from one of FINAIDS' technical sales reps, contact:

FINAIDS
Tel: 01480 216060 (South)
Email: sales@finaids.com
or 0161 705 1300 (North)
Email: burysales@finaids.com

You can also take the Lissmac Virtual Fair at www.lissmac.com which has a walk around for all machines in the range.



A quarter million eggs through a machine that has to be burr free

"How many eggs do our machines processes per hour? About 250,000, from sorting to packaging," says Martin Teunissen, manufacturing manager at Moba. The Barneveld-based company is a world leader in making egg-sorting machines. A crucial factor is a good finish of the machines. "The eggs must not break."

Barneveld is known for its poultry farming. As the name-giver of the Barnevelder chicken breed, with the weekly egg market (where the national price of eggs is still determined) and the Dutch Poultry Museum within its borders, it has a deserved reputation. Beside the motorway near Barneveld, there is a big egg in the meadow. In 1947, it was ideal ground for Job Mosterd to start egg grading machine manufacturer MoBa (Mosterd Barneveld). Now a multinational company with 800 employees.



Today, egg sorting machines are complete industrial solutions, recognises Martin Teunissen. "From sorting to packaging," he explains. The latest model, the Omnia XF2, processes a quarter of a million pieces per hour. The egg is picked up from a step, placed on the machine, individually checked for breakage, weight, colour and then packed. Don't the eggs break? "No. Our strength lies in handling an egg in an efficient, safe, hygienic and fast way," he explains.

A large part of the machinery is stainless steel sheet metal. "At Moba we have our own manufacturing department, where we cut stainless steel parts and structural parts in sheet metal ourselves. Because we want to supply our customers with nicely rounded and directionless sheet metal, we need a good machine. That is why we have two 42 RB series from Timesavers in our flow, so that we can deliver perfectly and our customers don't cut themselves on our sheet metal," says Martin Teunissen.

The machines have been set up to work as efficiently as possible. It is a continuous process, where the products flow through the line. You no longer have to go from behind the machine to the front to further process your products.

The 42 RB series is an all-round deburring machine, which is equipped as standard with a good sticking mat with vacuum and can be equipped with an additional number of up to 3 wide belt or brush units. It has a multi-rotating brush unit with eight brushes that deburr and round off evenly around the edges of the metal. This makes it possible to achieve a radius of 2 mm on mild steel and even more on softer materials such as aluminium.

For Moba, the tool life of the brushes was very important. Martin Teunissen continues: "What is the cost of a machine hour? What is the total cost of ownership? How long will the brushes last? I would

already be satisfied with 1,000 machine hours per brush set. In the end, it turns out to be 3400. So the TCO is very low. We thought we would have to replace the conveyor belts every few years. The reality is that the conveyor belts have been there since the beginning. Even after twelve years."



Moba and Timesavers have a long-standing relationship

Timesavers has been supplying the Barneveld-based company for over twenty years. "The relationship has always been very good. They offer us the right service and answer our production questions. So we also see that over the years their product has grown along with their business, especially linked to the customer's wishes. For example, we first had a disc machine and a pre-grinder from Timesavers. In 2009, we asked Timesavers if they could help us get a better edge round of the sheet metal. So they came up with a deburring machine that used the brush principle."

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ActOn CHEF system deburrs 10,000 parts per hour in a 1-step process

Leading supplier of technology metals acquires British-built ActOn CHEF Machine to improve in-house surface finishing process

A leading global supplier of technology metals and manufacturer of complex assemblies and machined products has acquired an ActOn CHEF Machine to improve its existing surface finishing process. The British-built CHE50 machine has allowed the company to achieve a more repeatable finish and cope with a higher throughput of parts. The finishing process developed by ActOn Finishing enabled the client to deburr 10,000 parts/hour.

The project background

ActOn's customer required a more effective way to degrease and remove sharpness on Molybdenum parts, before the plating stage. At the time of the initial contact, the client was finishing 8,000 parts/batch using a traditional barrel finishing machine and the full process took nine hours. During the first hours, parts were deburred and degreased and the last hour was used to separate the parts from media. This was not only extremely labour intensive but meant that with an increasing output, capacity was an issue.

A fast and cost effective finishing process using CHEF Technology

ActOn carried out the finishing process trials from the beginning with the Centrifugal High Energy machine. This technology allows for finishing components in a shorter time, whilst removing the need for a long time for separating parts and media.



Using an ActOn branded abrasive ceramic media and liquid finishing compound, manufactured for cleaning and degreasing of ferrous metals, parts were finished in just 45 minutes. The processes allowed for 10,000 parts/batch to be deburred and degreased. The unload and separation of parts took just a few minutes over an automated vibratory separator which the barrels of the machine unload onto after the finishing process. To ensure parts do not rust post processing, these are ran through a centrifugal drier to remove any moisture.

As a result of the successful trial the customer decided to purchase the CHE50 finishing technology. The system is HMI/ PLC controlled and it includes 100 finishing recipes which makes the machine easy for the operator to use.

CHE50 machines are equipped with four hexagonal shaped barrels. Each of these barrels are loaded manually with parts,



media and a water/compound mix as per the recipes set up in the system. The CHE50 also includes an integrated temperature monitoring system to ensure that any overheat within the barrels will result in the machine coming to a stop to prevent any damage to the barrel liners.

This finishing technology incorporates a direct drive mechanism which generates high G-forces resulting in shorter processing

times in comparison with vibratory finishing. High Energy finishing can be 15-20 times faster and produces superior finishes. This process time advantage meant that the customer was able to process 10,000 parts in one hour, in comparison with 8,000 parts in nine hours.

To make the finishing process even more efficient, ActOn Finishing integrated in the high energy system, a vibratory separation system. Upon completion of the process, parts, media and the mix of water and compound are discharged from the barrel into the vibratory separation system and separated via the screen.

The result

The surface finishing process enabled the customer to process 10,000 parts in one hour, in comparison with 8,000 parts in nine hours.

The trials showed a 98 percent pass rate compared to an average of 93 percent using the previous finishing process.

The finishing process produces a repeatable and high quality finished product.

According to Adam Cook, process/continuous improvement engineer at H.C. Stark Ltd: "Acton finishing's professional service and expertise in designing and installing our new HE Deburring process is critical to us delivering the high-quality product that our customer expect."

ActOn Finishing Ltd

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Compact brushing and deburring system

Deburring, honing and surface polishing in one machine

The BSEco is a planetary brush head machine for deburring and edge honing solid burrs on parts measuring up to a nominal maximum diameter of 250 mm and is an efficient and precise brushing and deburring system for cost-effective one-sided machining. The machine is particularly suitable for precision components, such as stamping and fine blanking, flat turned and milled, sintered, laser and waterjet parts, as well as polishing of indexable inserts where there is a requirement for high surface quality and parts free of all burrs.

Highlights include:

- Efficient and economical deburring
- Easy to handle
- Manually operated basic version
- Optional fully controlled with automatic brush measurement, including compensation for the wear of the brush
- Modular investment with options



- Two processes at the same time in one run
- Can be automated including data management (Industry 4.0)
- Consistent even deburring and radiusing of contours in a continuous process
- Efficient application of small and defined radii on precision parts from the areas of sintering, punching, turning and tapping

Characteristics of the machine are:

- Minimum space requirement with maximum throughput of deburring and edge honing precision parts
- Part-optimised holding of the workpieces through transport belts and pull-down

magnet or link conveyor with workpiece carriers, cages of nests

- Wide range of parts, thanks to the conveyor system that is easily adapted to the parts
- The machine is versatile, thanks to the height-adjustable brush head
- The right workpiece option for every task, whether deburring, honing or polishing

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Celebrating 50 years of excellence in cutting tool manufacture

US cutting tool manufacturer Tool Alliance celebrates 50 years of highly successful business in March 2022. During this time, the company has grown steadily and in the process has built an enviable reputation for the quality and durability of its solid carbide and indexable carbide cutting tools.

Tool Alliance makes extensive use of CNC grinding machines from various manufacturers, but has chosen to standardise the machines' control systems on NUM's Flexium CNC platform and NUMROTO software, primarily for reasons of performance and production efficiency. Tool Alliance is one of the largest licensees of NUMROTO in the United States.

Founded in 1972 and still privately held, Tool Alliance operates a number of company-owned factories, with its principal manufacturing facilities located in Huntington Beach, California and in Fort Myers, Florida. The company's cutting tool products and services include such renowned brand names as Ultra-Tool, RoundTool Laboratories, Tungsten ToolWorks, Routco and Mil-Tec. All five brands are sold worldwide, and are supported by shared research, design, engineering, manufacturing, marketing and sales facilities.

The owner and President of Tool Alliance, Dave Povich is no stranger to the cutting tool industry. A past president of the United States Cutting Tool Institute (USCTI), he has worked for the company since 1987: "NUM is our CNC technology partner, which creates a win-win situation for both companies. We benefit from having a direct technical input to NUMROTO software development, while NUM gains valuable

feedback on the design and production of the very latest cutting tools."

Tool Alliance's innovative Ultra-Tool Series 365 high performance end mills are a case in point. Designed specifically for the machining of exotic materials, these solid carbide tools feature a patented variable-helix geometry combined with a proprietary edge preparation/PVD coating combination that allows for world-class dynamic milling of tool paths, including most slotting cut applications. The tools are produced on high performance 5-axis CNC grinding machines using NUMROTO, employing monitored tool run-out, real-time deviation compensation and the latest diamond abrasive technology utilising advanced wheel truing equipment.

Mark Wortsman, Tool Alliance's technical director, says that collaborating with NUM has multiple advantages: "The NUMROTO team is very supportive and always amenable to suggestions, which makes life a lot easier for us, as well as our customers. For example, we recently suggested adding categories for collets, and some new features for wheel probing and automatic 3D collision checking; these have all been implemented in the latest version of NUMROTO software.

"We consider the 3D-simulation capabilities of NUMROTO to be the most accurate in the tool grinding world. They help us to optimise tool programming by preventing any grinding errors that might otherwise be caused by imperfect wheel measurement or incorrect machine alignment. "Over the years we have built an extensive library of tools that we have produced with NUMROTO. The NUMROTO team has done a superb job of incorporating the library in a centralised industry-standard SQL database which can be accessed by any of our machines or programming stations. The database can store tens



of thousands of tool programs which can be accessed by several hundred users at the same time if needed.

"It is much easier to backup a single centralised database file instead of having to backup files from the computers on each machine. We perform automated backups several times a day, just to ensure productivity continuity in the event of a machine breakdown. Software updates are also handled very efficiently. As soon as a key NUMROTO update is available, we can bring all our machines, regardless of make or model, up to the same software revision level."

Many of Tool Alliance's CNC grinding machines are equipped with automatic loading systems to facilitate overnight production. In fact, some run for two days in a row without interruption and without the need for any manual compensation. To keep the tool dimensions within tolerance, the company relies on the NUMROTO software's 'measurement in process' feature, which automatically measures tools after grinding and applies appropriate compensation.

NUM will be exhibiting at the GrindingHub trade fair in Stuttgart, **Hall 7 - Stand 7A50**

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Optimised machining requires precise cutting edges

The preparation (rounding) and surface quality of cutting edges are usually measured using probing measuring methods. However, these are cumbersome and can damage cutting edges. Tool manufacturers, tool grinders and production companies work much more simply and reliably with the innovative, »µFocus« non-contact optical measuring and inspection devices from ZOLLER.

Tools with properly rounded, perfectly smooth cutting edges are particularly advantageous when machining difficult materials that subject the tools to heavy wear, such as heat-resistant steel and nickel-based alloys for turbochargers and fiber-reinforced plastics. They process reliably to a high surface quality and achieve long tool lives. However, until now it has hardly been possible to reliably measure the preparations and the surfaces of the cutting edges in a repeatable manner and to evaluate them according to standardised criteria.

This has now been achieved with the »µFocus« optical measuring device from E. ZOLLER GmbH & Co. KG in Pleidelsheim. It measures robustly and reliably in the usual workshop environment. The personnel in the workshop can easily operate the device and assess the measurement results without further specialised knowledge. This makes the optical measuring device ideal for tool manufacturers, tool grinders and in-house tool preparation in manufacturing companies. With little effort, specialists can measure cutting edges quickly and reliably. Using the colour graphics, diagrams and tables output, they can evaluate the quality of the cutting edges. This ensures that only



The ZOLLER »µFocus« for measuring the cutting edge preparation and the surface quality of cutting tools



The blue light beam records the surface quality of the tool in the chip space

tools that exactly meet the requirements for the specified cutting edge preparation and surface quality are provided.

Optical measurement is simple and reliable

Sebastian Riesner, specialist for optical metrology, describes the non-contact, microscopic measuring method realised by ZOLLER: "We use confocal metrology. Here, we scan the cutting edges to be measured with a light beam on a surface measuring 1.0 mm x 0.8 mm at 1.3 million pixel resolution in several height steps. The light reflected from the surface of the cutting edges at different angles is collected by lenses and imaged on a sensor. Based on the intensity of the light striking there, it is possible to create an accurate image of the height structure of the surface being viewed." To measure, the operator simply has to focus the measuring optics on the surfaces of the cutting edges.

Stable device structure

The »µFocus« measuring instruments are designed as benchtop devices. Optics and mechanics for generating and focusing the measuring light beam and for evaluating the reflected light are integrated in a compact, robust housing. The latter is vertically adjustable in the Z-axis by 300 mm via a linear measuring axis. Suitable fixtures for picking up and holding the tools to be measured can be arranged on the worktable, which is provided with numerous standard tapped holes. ZOLLER offers several clamping systems for this purpose, including one that holds tools with cylindrical shanks of 3 to 32 mm diameter in a spindle with a hydraulic expansion chuck via reducing sleeves. An adjustable stop positions the tools in the longitudinal



The blue light beam is focused on the cutting edge of the tool

direction. In addition, a combination of a 360° rotary table and a cross table with 35 mm travel in X and Y axes is available, for example. For exact, fast and simple alignment of the tools, the cross and rotary tables have a sensitive micro-adjustment (vernier). The tools can be rotated around their longitudinal axis so that any area of the cutting edge can be easily captured and measured. As a further option, a holder for indexable inserts is available.

Sophisticated software automates measurement process

"Precisely measuring microstructures on cutting edges requires, above all, robust, repeatable measurement processes. That's why we have largely automated the measurements with the help of our »pilot« software," reports Sebastian Riesner. During measurement, the operator is intuitively guided and guided via icons. This allows him to clearly preselect the geometries to be measured using graphics.

After automatically focusing the measuring light beam, the sensor detects the cutting edge to be measured. The software automatically evaluates the measurement results. It displays different, selectable representations of the measurements on a high-resolution colour monitor. On the one hand, this concerns the optical image of the measured surface, and on the other hand, a height structure in a 3D image, which can be resolved down to about 0.03 µm and is illustrated by different colours.

In order to be able to quickly assess the information when measuring cutting edge rounding, the operator specifies the individually desired resolution of the height structure. Algorithms integrated in the software use this information to calculate a

clear, colour-differentiated 3D image. From this, the radii of the cutting edge rounding can be read quickly and conveniently. In addition, the software optionally outputs roughness diagrams in accordance with the standards for roughness profiles ISO4287 and ISO13565 or for surface-based surface roughness ISO25178-2 and ISO16610, or tables with concrete measurement data. Sebastian Riesner says: "Thanks to this software, users of our »µFocus« measuring device can analyse and evaluate the cutting edges and surfaces of cutting tools very quickly and reliably. On the one hand, this serves quality assurance, while on the other hand, this information can be used to immediately readjust and optimise the rounding of the cutting edges."

Microscopic measurement increases process reliability

Sebastian Riesner adds that the »µFocus« measuring device can be used to safely and reliably assess the microscopic geometries of the cutting edges during tool grinding and subsequent cutting edge preparation, thus ensuring their properties: "Our measurement technology ensures that

manufacturing companies no longer have to rely on the promises that have been made in the past, but instead obtain exact and reproducible measurement data on the microgeometric properties of their cutting tools. Measurement thus makes a decisive contribution to maximum process reliability. On the one hand, this applies to the grinding and rounding of the cutting edges at the tool manufacturer and on the other hand to the use of the tools in production," Sebastian Riesner summarises.

ZOLLER is certified according to DIN EN ISO 17025:2018 and is thus authorised to self-certify the produced devices according to this standard.

With enthusiasm for inspection and measuring technology, E. ZOLLER GmbH & Co. KG., based in Pleidelsheim near Stuttgart, has been developing innovative solutions for more efficiency in the manufacturing process for more than 75 years. More than 40,000 presetting and measuring machines with internationally unrivaled software solutions have been installed worldwide to date.

Today, ZOLLER offers everything for efficient and reliable tool handling in the



Sebastian Riesner, specialist for optical metrology at the »µFocus« inspection device

machining process. Throughout the complete tool life cycle, tools are physically and digitally recorded, measured, managed, stored and inspected with ZOLLER solutions. An international network of subsidiaries and representatives guarantees the highest service quality through personal customer support.

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VOLLMER premieres new grinding technology at MACH

Following its world exhibition premiere at EMO last autumn, VOLLMER gave its UK exhibition debut to the new VGrind 360S grinding machine for the complete machining of carbide tools last week at MACH 2022. This exciting new machine appeared alongside the VOLLMER CHX/HS and the VOLLMER Loroach Powerstar machines for sharpening circular saw blades.

Setting the standard in both the machining of solid carbide cutting tool and saw blades, the new VOLLMER innovations drew interest from cutting tool manufacturers at the UK's showpiece manufacturing event. The new VGrind 360S is the perfect solution for manufacturing cutting tools for automotive, medical, aerospace and general subcontract manufacturing industries. The 5-axis CNC grinding machine can be used to machine carbide tools with a diameter up to 25.4 mm and, depending on the machine kinematics and the equipping of the grinding wheel packages, it can even be used for tools up to 150 mm diameter.

What sets this grinding machine apart is that it has more precision and power, thanks to its innovative linear induction motor and linear slides on the X, Y and Z axes. By moving from ballscrews to the linear induction motors and slides, the VGrind 360S reduces maintenance costs by utilising



magnets that do not make contact - eliminating wear. Furthermore, the enhanced kinematics deliver improved precision and higher surface quality on the cutting tool.

Simple and intuitive operation is central to the VGrind 360S concept and, for customers to fully exploit its potential, VOLLMER has created an ergonomic platform whereby users can operate the control panel comfortably whilst having full visibility of the

work envelope. Operation via the keyboard or touchscreen allows for precise machining of the tool and the multi-function handwheel ensures even more flexibility as it can be freely positioned on the enclosure. This design allows the setting of a required axis without using the control panel.

On the VGrind 360S, the groundbreaking vertical double-spindle concept that has been proven on previous machines, now features an oriented spindle-stop for the first time. Known as spindle indexing, this always stops the spindle at a specific position and the result is a reduction of axial run-out errors and concentricity issues whilst offsetting wear in the HSK holding system. Another new feature is a heat plate exchanger to efficiently cool motors and spindles, which in turn leads to increased thermal stability. This effective cooling concept has now been optimised to demonstrate absolute perfection when processing tools to the tightest of tolerances.

The VGrind 360S incorporates VOLLMER's trusted operating concept and can be operated unmanned around the clock thanks to automation features such as a pallet magazine, free-arm robot or chain magazine. The options for automation include the HP 160 pallet magazine for up to 900 tools with a double gripper to

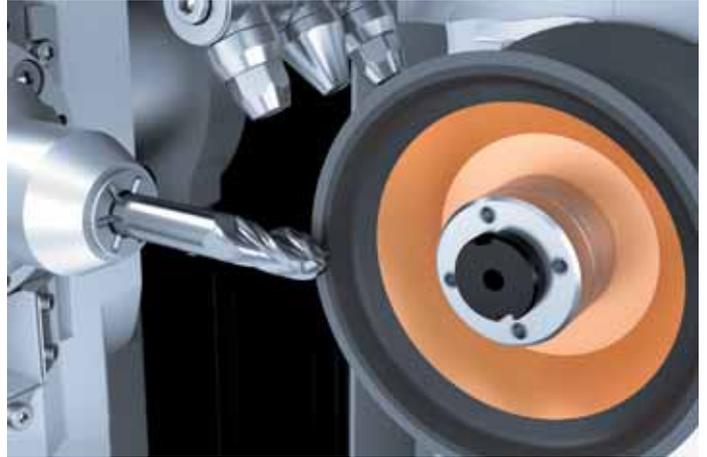


guarantee fast changeovers, the HPR 250 free-arm robot for the automatic machining of tools with various shaft diameters and the HC 4 chain magazine that has space for 39 HSK-63A tools or up to 158 shank-type tools. This automation also extends to the 8-tool grinding wheel changer that ensures you always supply the right grinding wheel for the job at hand with no manual intervention. From this optional addition perspective, VOLLMER has everything covered for maximum productivity and performance.

Optional features include the flexible loading automation options for carbide tools, grinding spindles available with direct or belt drive, automatic gripper compensation as an in-process solution, wheel compensation probes, automated changing of intermediate sleeves with bayonet, an automatic stacking unit that enables the abrasive grinding wheel to be opened during the grinding process and much more.

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.

The VOLLMER Group currently employs approximately 750



workers worldwide, with around 550 of these at the main headquarters in Biberach alone, including more than 50 trainees. The company invests around eight to ten per cent of its turnover in the research and development of new technologies and products. As a provider of technology and services, the VOLLMER Group is a reliable partner to its customers.

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It's time to future-proof your cleaning processes

by Elizabeth Norwood, senior chemist, MicroCare LLC

Successful manufacturers understand the importance of implementing critical cleaning into the production process. Parts cleaning is essential to many industrial procedures. For example, it is critical for effective surface finishing or before processes like coating or electroplating. Cleaning, however, is becoming increasingly difficult to address as companies look for ways to not only clean effectively and efficiently, but also within ever-changing economic and environmental guidelines. Add to this the fact that products are becoming increasingly smaller and tolerances are getting tighter and the challenge increases further.

Manufacturers must modify their cleaning processes to ensure they have the longevity to clean successfully and sustainably. It is important that companies address and adapt in order to stay current, competitive and profitable.

A long-term cleaning solution

A cleaning method that is regaining popularity as an effective and sustainable long-term cleaning solution is vapour degreasing. When used with advanced cleaning fluids it is extremely effective at thoroughly removing contamination from parts. The low viscosity and surface tension ratings of modern vapour degreasing cleaning fluids, combined with their volatility, clean parts very effectively even inside blind holes and tiny openings that other cleaning options like aqueous cleaning cannot easily infiltrate. This ensures that all the surfaces of the finished component are effectively cleaned and ready for further processing or packing. In addition, these advanced vapour degreasing fluids are typically an environmentally sound option. Most successfully meet the regulatory requirements stipulated by governments and other agencies governing the use of cleaning fluids in modern manufacturing.

Some traditional or legacy cleaning fluids do not work with new environmental restrictions and workplace safety rules and with regulations and guidelines changing regularly, many of the favoured cleaning fluids that have been used for years are now becoming defunct. Traditionally, fluids



Vapour degreasing, in combination with modern, advanced cleaning fluids, makes parts cleaning simple, consistent and sustainable

containing nPB (n-propyl bromide), TCE (trichloroethylene) and PERC (perchloroethylene) were an effective and economical method of cleaning. However, toxicity standards are tightening and their use is becoming problematic in some regions.

Aqueous cleaning is also under scrutiny when it comes to sustainability. Although still a popular cleaning choice, it has a significant environmental impact. It uses hundreds of gallons of non-renewable water, generates a wastewater stream that requires expensive treatment and requires large amounts of energy to clean and dry parts.

Manufacturers are starting to understand the impact of these cleaning processes and are moving away from legacy fluids and aqueous cleaning to find better alternatives that are more resource efficient, easier to maintain and less hazardous for workers and the environment.

Operation advantages of modern cleaning fluids

Vapour degreasing, in combination with modern, advanced cleaning fluids, makes parts cleaning simple, consistent and sustainable. The facts are clear:

Effective cleaning: modern fluorinated

cleaning fluids are lab-tested to ensure the cleaning results are reliable, consistent and the same, if not better than legacy solvents. Because of how they are formulated they easily clean small, complex parts and can be engineered to clean delicate parts that would otherwise be negatively affected by aggressive formulas.

No equipment upgrade: in many instances if a vapour degreaser is already in operation, modern cleaning fluids can be operated in the existing equipment, using the same methods. Once the vapour degreaser is emptied and cleaned, the replacement cleaning fluid is simply added to the machine.

Enhanced production: modern cleaning fluids boil at a lower rate than legacy solvents. This means parts come out of the vapour degreaser cool enough to immediately handle. Additionally, the fluid has a low viscosity. This allows the fluids to flow back into and out of tight part spaces like blind holes and small gaps between parts. The fluid quickly evaporates, leaving all components dry and residue-free, both inside and out. This enables workers to move on to the next production process sooner, improving the overall throughput and productivity.

Energy savings: many next generation

cleaning fluids have a lower boiling point and heat of vapourisation than their legacy counterparts. This translates to less energy consumption, resulting in an overall energy cost savings.

Improved safety: many of the new cleaning fluids are nonflammable helping to improve safety in the workplace. New sustainable cleaning fluids used in a vapour degreaser also have impressive worker exposure limits. Permissible exposure levels for sustainable fluids are about 200-250 parts-per-million (ppm), compared with TCE which has a 100-ppm PEL or nPB that is rated at just 0.1 ppm. The lower the ppm the bigger the risk to health, so sustainable cleaning fluids are significantly better for the safety of exposed workers.

Environmentally sound: modern vapour degreasing chemistries are created with low-VOC formulas, which are ozone-friendly and comply with many directives including United States EPA regulations and European F-Gas and REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) legislation. Importantly, they offer improved environmental properties without compromising the performance.

Easier maintenance and recycling: modern sustainable cleaning fluids do not require the stabilisers, scavengers or weekly acid acceptance testing required of legacy brominated or chlorinated solvents, reducing overall maintenance costs.

Addressing sustainable cleaning

Maximising productivity means looking at all aspects of the manufacturing process. This includes cleaning. In today's demanding manufacturing environment, parts must leave the production floor perfectly clean, dry and ready for post-processing. Oils, dust, metal particulate and other production debris need to be removed to ensure further processes are successfully completed. One of the best ways to achieve parts cleanliness is by using a vapour degreaser and modern cleaning fluids. This method not only addresses environmental, worker and expenditure concerns, but is flexible and adaptable to ensure cleaning procedures are future-proof.

Author information:

Elizabeth Norwood is a senior chemist at MicroCare, LLC, which offers precision cleaning solutions. She has been in the industry more than 25 years and holds a BS in Chemistry from the University of St. Joseph. She researches, develops and tests



Vapour degreasing with specialty cleaning fluids removes even the most tenacious oils, waxes and greases



Toxicity and environmental standards are tightening around some cleaners in some regions

cleaning-related products. She currently has one patent issued and two pending for her work.

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MecWash launches MWX300 system at MACH 2022

MecWash used MACH 2022 to launch its brand new MWX300 aqueous cleaning system. The machine is designed to be compact for low volume specialist applications, with high cleanliness standards, perfect for the aerospace, electronics and medical sectors.

John Pattison, managing director of MecWash, comments: "MACH was the perfect launchpad for the MWX300 and we were thrilled to have attended with a new system. The MWX300 is a smaller version of the MWX400 and uses the proven technology that we have developed continuously since its release in 2016."

The MWX300 chamber size is 300 x 300 x 400 mm long, compared to the MWX400 chamber of 400 x 450 x 600 mm.

John Pattison continues: "The smaller MWX300 offers a combination of precision cleaning and durability, with a reduced footprint. We offer a wide range of bespoke options to fit each customer's exact cleaning demands and automation requirements."

The MWX300 utilises ultrasonics, combined with high flow washing, rinsing and vacuum drying to provide the highest quality of component cleaning and drying available. The machine is designed to provide higher ultrasonic power to clean intricate to clean even the most complex components. The cleaning system features enhanced accessibility for maintenance with internet connectivity allowing remote troubleshooting and easy system updates.

The robust design ensures the MWX system is equally effective at washing heavy machined castings and precision engineering, delivering consistently high cleanliness standards for industrial cleaning challenges.

John Pattison continues: "MACH is the jewel in the British engineering calendar, and after the two-year hiatus, we looked forward to meeting customers and acquaintances again. Coinciding with the release of a new cleaning system, it was the perfect timing for MecWash, and the team were excited to attend."

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



A MecWash MWX aqueous cleaning system installed at Croom Precision Medical

components. Its capabilities include laboratory analysis of complex component cleaning issues and specifying or developing specialist detergents, plus the ability to design special processes and parts washers for particularly difficult cleaning challenges.

World class parts washing technology

MecWash parts washers are used in the aerospace, automotive, defence, general engineering and medical industries. The company 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.

For further information about the new MWX300 and MecWash Systems Ltd, contact:

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Kemet International provides intelligent aqueous cleaning solutions covering a wide range of industry demanding applications.

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Kemet has a dedicated test centre with the latest equipment including the new Versa Genius+ system packed with a host of features available for testing. It aims to ensure all requirements have been considered and ensure the necessary equipment is specified. Aqueous cleaning can be challenging and the key to an effective and efficient solution requires both the chemistry and equipment to work in harmony.

Kemet has over 300 cleaning solutions, designed specifically to meet the needs of know applications and their regulations. It also has the resources of its partners at NGL's Laboratories where the chemists study, formulate, develop and manufacture



cleaning solutions. Assisting in process validation and approval of preliminary tests, the results and checks save time in the development of customer projects, and guidance and assistance in preparing specifications for equipment investment.

The latest equipment from partners and industry leader FinnSonic includes:

The new Corus Activa ultrasonic cleaner with a built-in loading platform. This answers the need to clean complex large heavy components without a fully automated transport system. The sturdy platform makes loading and unloading of parts easy and safe. The platform also provides



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The Sonett automatic single-chamber cleaning machine. A compact multitasking single-chamber cleaning machine, it cleans particles and soluble contaminants from components using spray, immersion, ultrasonic, basket rotation, hot air and vacuum techniques. It is excellent for bulk materials or complex components with blind holes and small clearances.

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Vapour degreasing - a simple guide for production engineers

This simple guide for production engineers discusses why vapour degreasing is the most effective and economical process for cleaning of manufactured components:

Now is a good time to review your existing cleaning processes or upgrade current equipment. In the autumn Budget 2021, the Chancellor, Rishi Sunak, announced an extension of the temporary increase in capital allowances which allow the cost of capital assets to be written off against taxable income. The 130 percent super-deduction and 50 percent first-year allowance are very generous but only available for a short time. This will allow companies to not only lower their corporation tax bills but improve productivity and reduce operating costs for cleaning processes.

Vapour degreasing is the simplest but most effective degreasing and cleaning process which, until recently, has been subject to little change since it was first invented in the early part of the last century. This is a very mature chemical technology which legislation is now effecting changes so fundamental that the more accurate name for the process "condensation cleaning" should be used to reflect the improvements in equipment design, chemistry, reduced emissions, economies in usage of solvents and the subsequent environmental acceptability compared to the open topped tanks so ubiquitous in factories and workshops worldwide. The alternatives in equipment design offer differences in technology, which guarantee the continuing use of this process in the future, need to be considered and understood.

The cleaning tank in the corner of most engineering shops hides a very well researched process using sophisticated chemistry. Its popularity is in its simplicity. The tank sump is heated, fitted with cold coils around the internal surfaces at the top to retain the vapour. Fill to a few centimetres with a non-flammable solvent able to dissolve contaminants, boil to form a vapour three to four times heavier than air to fill the tank. Hot solvent vapour condenses on the cooler target parts at workplace temperature. The hot liquid solvent dissolves oil and grease and other contaminants. Used solvent returned to the sump re-vapourises continuing the cycle until parts have achieved the same temperature



as the vapour when, with no further condensation, the process is complete. Simple but perfect. Highly productive and economical, parts removed from the cleaning process are clean, warm, and dry in five to 10 minutes.

Historically chlorinated hydrocarbons have been the solvents of choice for the "Condensation Cleaning" process. Compatible with most materials of manufacture, stable in constant use, producing a non-flammable saturated vapour heavier than air at a temperature greater than ambient.

In Europe, the United States and in other advanced industrialised economies increasingly stringent legislation to control emissions of VOCs, especially solvents, has led to new formulations for paints and other coatings where water replaces most of the solvent. In the early days the quality of water-based paints was not as good as traditional solvent-based coatings, but innovation has driven the development of new polymers with results as good as, if not better than, the solvent-based originals.

As with coatings, cleaning systems have had to change. With increasingly demanding standards of cleaning required for precision engineering, electronics, optics etc solvents are often first choice, for reasons outlined above, but these have been targeted by regulators and alternatives are encouraged by the relevant authorities and law makers often without

serious consideration of unintended consequences.

For example, water-based cleaning is encouraged as the obvious alternative, but this has many disadvantages compared to condensation cleaning as although the machines are simple and relatively cheap the processes require multiple heated tanks for immersion or spray processing or long programmed cycles in batch machines for cleaning, rinsing, and drying. Water-based processes are slow, energy intensive and occupy more floor space than solvent-based condensation cleaning equivalents where only one tank with a small footprint is needed, delivering shorter process times and, most importantly for the environment, using minimal energy.

The ideal cleaning process would be "condensation cleaning" using water but due to the physical characteristics of the water vapour/steam and the inability to carry onto the surface of the targeted parts surfactants to remove the oil, grease and soils and the difficulty and expense of rinsing and especially drying this can only ever be a dream. Historically, chlorinated hydrocarbons have been the solvents of choice for the "condensation cleaning" process. Compatible with most materials of manufacture, stable in constant use, producing a non-flammable saturated vapour three to four heavier than air at a temperature greater than ambient.

Traditional solvents such as

trichloroethylene exhibit all these characteristics. However, concerns about its carcinogenic properties and the danger to operators by exposure, led to a continuing search for a safer alternative. 1,1,1 trichloroethane based solvent formulations became popular in the mid part of the last century as a safer replacement. An excellent solvent, safer for users, it proved to be depleting the protective ozone layer around the Earth and was subsequently banned. With the development of the REACH legislation in Europe, trichloroethylene was again allowed with restrictions and stringent controls for use in authorised machines which control emissions to very low figures close to zero.

EnviroTech have been supplying vapour degreasing solvent formulations for 40 years constantly responding to increasingly stringent regulatory requirements for environmental and safety laws and the need for improved cleaning standards.

ProSolv®5408e is a new sustainable solvent blend with near zero OPD (Ozone Depletion Potential) and GWP (Global Warming Potential) for high performance degreasing and cleaning which ticks all the boxes with the perfect profile for a vapour degreasing solvent. Soft on the environment and safer for users with high performance, improved cleaning, and lower costs. Lower boiling point, economical with energy with low solvent losses, faster production, reduced costs, easy handling. Exceptionally low surface tension to penetrate micron sized holes and close contact surfaces. Sustainable and secure for future use as your 'forever solvent'.

As with all legislation for chemical use, regulation and restrictions drive development of associated processes and equipment. Sealed tanks are now standard with many different designs available. The most common are discussed below:

The single tank hermetically sealed machines favoured by some manufacturers uses a process tank to contain the solvent and a separate storage tank/vapour



generator. Baskets loaded with parts to be cleaned are introduced from the top or through access points on the side of the tank. Lids or doors hermetically seal the tank. Solvent is pumped into the process tank where agitation, ultrasonics or pumped liquid is circulated through the parts. Used Solvent is removed to the vapour generator, condensing coils controlling the vapour are linked to coils located in the vapour zone which, when the cycle is complete, collapse the vapour. The process tank is emptied. Controlled air introduced to process tank is then recycled through carbon absorption units to remove traces of solvent until the concentration is within regulatory standards when the lid is released for the basket of parts, clean and dry, to be removed and replaced with a further basket.

Variations of process within the hermetically sealed tank are possible using sprays of cold or hot condensed solvent, immersion with or without ultrasonics and revolving baskets to cover most of the problems experienced when processing machined and fabricated parts. Continuous external distillation of the contents of the vapour generator is also an option depending on contamination.

The alternative technology is much simpler and uses well tried techniques not requiring the long recovery times of the hermetically vacuum sealed processes. The multilevel system uses a standard vapour degreasing tank design with a sealed loading section above the process tank.

Components to be cleaned loaded in work baskets or jigs are fed to the load section by hand or conveyor, an internal platform raises and lowers the baskets in controlled cycles.

Loading complete, the load enclosure is sealed to completely isolate the process. Then seal on the process tank is opened and the basket automatically lowered into

the cleaning section which can be simple condensation cleaning or immersion cleaning with or without ultrasonics or power sprays. Revolving baskets can also be added to improve cleaning in blind or through holes or oil ways in castings and fabrications.

On completion, the basket rises to the area where the condensation coils are located, and parts allowed to drain and dry, basket raises into the load section when the process tank is sealed. A fan circulates air within the load area which can be recycled through carbon absorption systems if no external exhaust is preferred.

As baskets entering the loading space contain parts drained and dried only very small amounts of solvent are carried in the exhausted air which is monitored to ensure compliance with appropriate legislation. When this is complete, the seal opens fully for removal of cleaned components. The loading section can be fitted with top or side seals allowing baskets to flow through on conveyor systems or be removed by hand or hoist. No solvent enters the work area.

Both processes will produce parts cleaned to the highest standards but the choice of which offers the best solution needs a little more consideration.

The hermetically sealed vacuum process is complicated with the need to move liquids in the machine. It is relatively slow as the carbon adsorption process has to remove high levels of solvent from the recirculated airstream from the process tank. This is inefficient as adsorption rates for carbon fall rapidly with increasing saturation. Final levels of solvent in the tank when the lid or loading door opens will be dragged into the workshop and the area where the operator is working. Long process cycles reduce throughput.

The simpler multilevel systems where movement of liquids is not required are more efficient and offer much faster process times. Cost of manufacture is also reduced as no liquid movement or vacuum is involved. The extracted loading section ensures no leakage of solvent into the work area giving complete safety for operators and factory staff.

Both designs of process machines fully comply with the emission regulations of the EU and US authorities.

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Laser cleaning by EMAG LaserTec

Effective cleaning processes in a very small space

Many workpieces need to be “clean” for the next production process to start. The choice of cleaning method plays a crucial role here. It must be configured in such a way that just the right amount of energy and time is used to satisfactorily remove whatever soiling or coating is present; the motto is “no more than necessary.” This is where EMAG LaserTec laser cleaning excels. The parameters of this process can be flexibly configured and perfectly adapted to the degree of soiling as well as the desired result. In addition, only defined areas and geometries are cleaned or de-coated. This makes for very efficient processes.

Laser cleaning uses a focused laser beam that is moved over the area to be cleaned by a scanner and machine axes. All the particles present, whether oils, oxides, paints, or technical coatings, can be removed in this manner and the reaction products then extracted by suction. Parameters like the output and pulse frequency of the laser, its feed motion and track width, as well as the machining time, are precisely adapted to the degree of soiling and the desired level of cleanliness. As a result, the machine only processes defined areas like welds, glue joints, contact pads, and much more. The rest of the component remains untouched, which keeps running costs very low. In contrast, washing processes permanently consume energy to keep the washing solution at a specified temperature. They also require additional drying and flushing processes that slow down the entire production process and are also susceptible to faults. Laser cleaning has none of these problems.

Complete solution in a very small space

The specialists at EMAG LaserTec have built perfect mechanical engineering solutions for this effective process for some time now. The core of the solutions is the LC 4 laser cleaning machine for components with a diameter not exceeding 200 mm. It includes all the components needed for the process, in a space of just 4.5 sq m. Efficient operations are ensured by a highly efficient 200 w laser that is only switched on for a few seconds for each component. The very short pulse duration ensures an equally short interaction time, which keeps surface damage to a minimum. The short pulse duration also enables high pulse peak power if needed. In turn, this property can be used to achieve certain surface properties on the component, such as improved adhesiveness.

The machine can be used in end-to-end production lines as well as alone. To this end, it features a turntable that is separate from the work area. It is loaded and unloaded by an automation system or just manually without interrupting operation. Optionally, two components can be clamped simultaneously, while two others run through the cleaning process. This results in decreasing throughput times and no interruptions in the material flow. The modularity of EMAG mechanical engineering, creating customer-specific system solutions with building blocks, is the key to its success. This means that the high-quality components used are well proven. This goes for the LC 4 too.

EMAG software simplifies the process

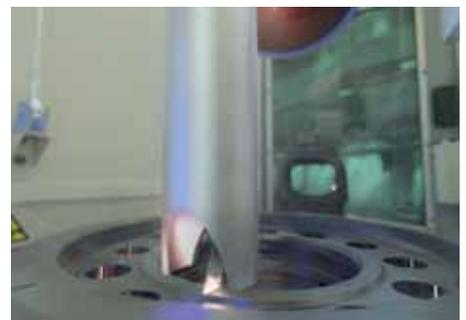
The EC Clean software from EMAG plays an important role in the success of the cleaning process. With the help of this control software, laser cleaning is an easily managed process. The system operator can make all relevant settings like laser and scanner parameters, geometry, and feed rate with this solution. EC Clean also aids with selecting settings. In concrete terms, this means the system operator can concentrate on a parts geometry, track width, and cleaning energy



The turntable is separate from the work area and can be unloaded or loaded using an automation system or manually without interrupting operation



A glimpse into the machining area of an LC 4 laser cleaning machine from EMAG. The process removes all traces of oils, oxides, paints, or technical coatings



The laser cleaning process is completed in a few seconds

instead of becoming bogged down in complicated calculations. Everything else is automatically calculated or taken from the internal technology database.

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YOUR EXPERTS IN COMPONENT CLEANING

Cleaning system integrated into production line

Individual parts cleaning for around 240 different hydraulic components in the production cycle

When restructuring the production facility, a new interlinked production line was built for the industrial hydraulics division of a leading manufacturer of drive and control technology. The production line, which is designed for fine machining approximately ten component families, has an EcoCvelox from Ecoclean integrated into it. Fitted with a CAD/CAM interface, the highly-flexible modular cleaning system is capable of individually cleaning around 240 different parts in a targeted manner in the production cycle.

A leading international supplier of drive and control technology, Bosch Rexroth AG ensures efficient, powerful and safe motion in machines and systems of all sizes and types. The company, based in Lohr in Bavaria, Germany, combines worldwide practical experience and expertise in the market segments of mobile applications, equipment engineering and manufacturing, and factory automation. Its product portfolio encompasses mobile & industrial hydraulics, electric drive & control technology and transmission technology as well as linear & assembly technology, including software and interfaces for fully networked applications.

One production line for different component families

Following a production restructuring measure, the industrial hydraulics division based at the company's headquarters now focuses on complex, technically sophisticated products manufactured in lot sizes of one to approx. 5,000 units. In order to manufacture these quantities, which are low compared to conventional series production with lot sizes of 100,000 parts, adapted production capacities were called for. "Consequently, we have constructed an interlinked production line with seven processing machines. The line enables us to fine-machine parts from ten different component families with around 240 material numbers and unit weights of between one and twelve kilograms in a fully automatic process," explains Erik Müller, the overall project manager responsible for implementing the new production line at Bosch Rexroth. In this production system, process-specific workpiece carriers function



Consisting of three modules for targeted high-pressure deburring, cleaning and drying, the system processes around 240 different part variants. The integrated CAD/CAM interface made it much easier to generate the 35 part-specific deburring/cleaning programs used so far

as a defined interface with the respective machine. Workpiece handling, i.e. clamping and removing the parts, is carried out by robots.

Complex demands on the cleaning solution

To remove residues from upstream machining processes, a cleaning system is integrated into the fine-machining line. "In the past, parts from different component families were cleaned in separate systems. With the new concept, we needed a cleaning system that could be used to clean the highly diverse range of parts and lot sizes. We wanted to be able to generate part-specific cleaning programs quickly and easily. We also needed to comply with the particulate cleanliness specifications stipulated for each product as well as to ensure a surface tension higher than 38 mN/m within the specified cycle times of 16 to 55 seconds," says Eva Nowak, project manager for cleaning technologies at Bosch Rexroth, describing some of the requirements which had to be met when selecting the new cleaning system. The project team decided on the EcoCvelox from Ecoclean, which was still under development at the time. This was preceded by discussions with several different cleaning equipment manufacturers.

Modular design, flexibility and targeted high-pressure cleaning with CNC programming were the convincing factors

The decision to opt for the EcoCvelox was,

on the one hand, based on the design with standard modules for targeted high-pressure deburring, cleaning and drying. This enables the system to be easily enlarged if throughput requirements change. On the other hand, the wide range of components can be flexibly handled by feeding the parts on different workpiece carriers. The carriers are transferred from one processing unit to the next by a highly dynamic linear system with a wear-free motor integrated as standard. "The alternative to this would have been a system with robots picking up the parts and moving them past the various lances. A huge number of robots would have been required in order to achieve this within our short cycle times. The humid atmosphere in a cleaning system also means that the robots would have needed more maintenance, which would have reduced system availability," adds Erik Müller. The EcoCvelox also scored with its CAD/CAM interface, which is integrated as standard and is the same as that found on machine tools.

Equipment and processes tailored to requirements

A system consisting of three modules: targeted high-pressure deburring, cleaning and drying, is integrated into the production line at Bosch Rexroth. Due to the short cycle times, the high pressure unit has an optional second Y-axis for parts handling. As a result, parts can be loaded and unloaded at the same time as the machining process takes place. The module also includes a high-pressure turret designed for four tools, which is currently fitted with two tools



In the production line, nine different workpiece carriers function as interfaces with the respective machines for the approximately 240 different component variants

adapted to the application. The cleaning and drying units have a second chamber, further contributing to extremely short cycle times thanks to parallel loading and unloading.

For the cleaning step, the parts made of forged steel or grey cast iron are clamped onto the workpiece carriers by robots in series operation. The parts can optionally be clamped manually. A total of nine different workpiece carriers are used to hold the approximately 240 different components. Between one and four parts are placed on each carrier, depending on the type of component to be cleaned. "It took a huge amount of brain power to get so many parts from different families onto one workpiece carrier. Ecoclean's and Bosch Rexroth's design departments worked together extremely well on this," notes Eva Nowak.

Cleaning is preceded by a honing or deburring process. Since the latter also involves the machining of external edges, the high-pressure deburring module is mostly used at present to selectively clean drilled holes with the turret lances. A part-specific pressure of up to 600 bar is used. "Removing internal burrs with the EcoCvelox is a technological leap we are



After cleaning, a robot removes the parts and takes them to the next processing step

currently keeping up or sleeves. Once the new fine-machining line is fully interconnected and running smoothly, we will start optimising the processes, which also includes deburring," explains Erik Müller.

To clean the parts in the downstream cleaning module, the processes of injection flood washing, spray cleaning and selective rinsing (all combinable) can be used. In the drying unit, the parts are first blow-dried with high-velocity air, and then vacuum-dried. The parts then pass through various cleanliness checks. "The line must be cleared for the products of each component family. To this end, we carry out particulate

cleanliness inspections according to VDA 19 and surface tension checks. Other important criteria include paint adhesion and corrosion protection," states Eva Nowak.

Cleaning programs generated quickly and easily

The CAD/CAM interface has proved to make things much easier, not only when it comes to optimising the process parameters but also when it came to generating the 35 part-specific deburring/cleaning programs used so far. This is because design data about parts can be transferred to the programming step, which is carried out offline. The program is then simply imported into the line control system. This allows programs for cleaning/deburring future product families and new parts to be integrated as effectively and economically as those for machining parts with a lot size of one.

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AGTOS – 20 years of competence in turbine wheel shot blasting technology

by Ulf Kapitza, head of business development & marketing AGTOS

One of the leading manufacturers of turbine wheel shot blasting systems is turning 20. This is a good time for looking back and ahead to future developments in blasting technology.

The founding team of AGTOS started with even two factories in 2001. From day one, the machines were designed in Emsdetten, near Münster. Even the first employees already had several years of experience in blasting technology under their belt upon which to build and colleagues with new ideas and approaches joined the ranks. The innovative company quickly grew to become an internationally recognised and reliable business partner for all areas of turbine wheel shot blasting technology. Naturally this also includes the new blasting machines. All common types of shot blasting systems involving rubber belts, monorails, roller conveyors or wire mesh conveyors are part of the product range. From the beginning of the company, customers with special requests and particular requirements have been well served. Machines are adapted to meet the dimensions and requirements for transporting the workpieces. High-quality shot-blast surfaces and efficient machines remain the constants.

High-quality turbine technology

Designed inhouse and patented turbine



The AGTOS Headquarters in Emsdetten

wheels in high-performance turbines are at the heart of each shot blasting machine made by AGTOS, and they have been satisfying even the most demanding requirements thus far. This is a considerable accomplishment since machines from AGTOS are often used in three-shift operation. High-performance turbines are available in two sizes, with a wide variety of

material combinations and performance capacities. All blasting objectives are covered this way, ranging from cleaning to deburring, from roughening to hardening to surface finishing of the most varied materials.

Second-hand machines

A novelty on the market back then was the active marketing of second-hand blasting machines from different manufacturers. With a focus on the welfare of the customer, these can be used to manage short-term production bottlenecks, tight budgets, and extended delivery periods with ease. Second-hand machines are also equipped with CE certification, plus the supply of spare parts and the provision of services are ensured as well.

Spare and wear parts and reliable service

Customers must be adequately supplied with high-quality wear parts since the use of abrasives results not only in changes to the workpiece surfaces but also to specific parts of the blasting machines. A large warehouse has been built for this purpose at AGTOS' headquarters so that many parts are ready



The AGTOS plant in Konin

to hand, even for machines from other manufacturers. Professional staff members at the customer service department maintain contact with customers and manage worldwide consultancy services and shipping. This is where the coordination of routine maintenance work takes place and where ad hoc service calls are quickly and reliably planned.

Precision filter technology

AGTOS cartridge filter units reliably extract and isolate the dust that is generated during the blasting process. This is where a special system is employed for the replacement of filter cartridges. A push and pull system is used to establish the correct contact pressure and it facilitates user-friendly cartridge replacement.

Conveying systems

The monorails, roller conveyors, feeders and other conveying systems required for the integration of AGTOS blasting machines are included in the delivery.

The future: new trends in blasting technology

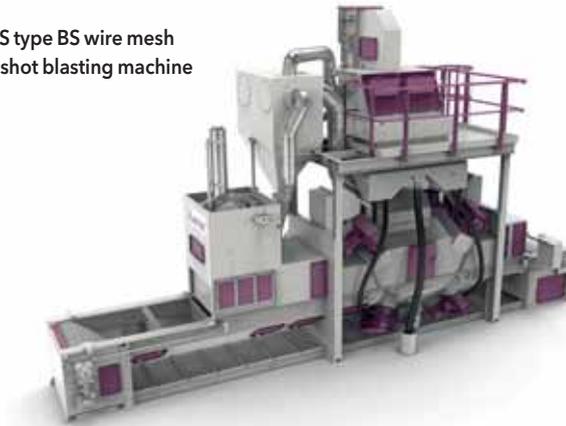
Many customers need more than high-quality, reliable and efficient blasting technology. There are new trends in blasting technology, and AGTOS has always been instrumental in the further development of new trends.

This includes the acquisition and analysis of many machine data to enable the operating company to check the current and ongoing condition of the machines. This way it is possible to prevent inadvertent disturbances, potential downtimes and associated higher costs. The operating company also has an overview of the current overhead costs, which are substantially impacted by the cost of energy and abrasive consumption and machine maintenance requirements.

AGTOS is collaborating with other companies and the largest association of machine manufacturers in Germany, the VDMA, to enable future communication of shot blasting machines with other systems required in further process stages. A task force is dedicated to defining parameters for a common, branch-specific interface to accommodate an OPC UA for shot blasting systems.

OPC UA stands for "Open Platform Communications Unified Architecture" and it is a standardised, secure communication protocol for machine-to-machine

An AGTOS type BS wire mesh conveyor shot blasting machine



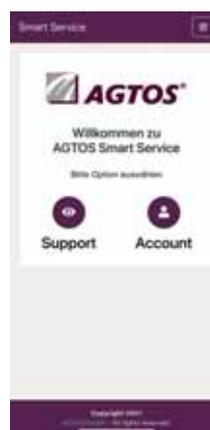
communication and industrial automation. The OPC UA branch standard for blasting technology supports interoperable production processes with blasting methods.

Using the time of the Coronavirus pandemic wisely

The economic impact of the pandemic has also affected the sales of AGTOS shot blasting machines. Immediate steps were taken, however, and a programme to revamp the product lines has been implemented. The range of the individual machine type offerings has been revised, and the functions and features of the machines have been restructured. Basic functions are recognisable as such and additional features are presented as options. This serves to benefit the customers at large who are provided with state-of-the-art shot blasting machines at a fair price. In terms of visual appeal, a new attractive colour scheme has been implemented for shot blasting machines from AGTOS.

AGTOS Service app

The new AGTOS Service APP provides new customer benefits. It is available for download at the usual Android and Apple stores. Using the app, AGTOS service technicians can give tips and instruction in the case of maintenance and repair work. These can be translated simultaneously on request. The service



The AGTOS Service app

technician sees exactly the same as the person onsite. This way, the situation can be best appraised and analysed. Supplementary documents such as drawings, illustrations and photos can be shared to provide detailed explanations. The entire activity is documented so that it is available for later digital (replay) purposes.

Other investments into the company

Both AGTOS locations, the Emsdetten headquarters and the production facility in Konin, Poland, have been expanded and modernised. The showroom at the Emsdetten production facility has been upgraded most recently. An ERP system to link both locations was introduced two years ago. Modified process sequences also resulted in organisational adjustments. We will continue to work even more closely together on a transnational level.

Further investments are anticipated. A new laser cutting machine has been purchased to be installed at the beginning of the new year. Production workflows will be further optimised upon completion of the software integration.

The most important resource for a forward-looking business is its workforce and caring for it continues to be at the centre of our activities. Consequently, we are going to reorganise and update the offices at both production facilities and equip them with the latest technology. Comfortable and ergonomic workstations are already in place.

The described measures aim to lead the company and its workforce into a safe future.

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Automation is key for titanium plating from Sifco ASC

Calling on its expertise and experience of selective plating, SIFCO ASC has developed a bespoke range of automated solutions for the plating of titanium. The proprietary process gives customers a consistent, repeatable means of enhancing titanium alloys for use in mission-critical components. The new process overcomes a key challenge in the use of titanium for certain applications. Despite its high strength and light weight, titanium's poor resistance to abrasive or adhesive wear makes it unsuitable for use as, for example, aircraft landing gears and automotive internal combustion engines.

This can be overcome by plating the titanium, which enhances its performance characteristics, including improved lubricity, corrosion resistance and conductivity, as well as heat reflection and emissivity. Unfortunately, titanium is notoriously difficult to plate, largely because of an oxide film which forms the moment it becomes exposed to oxygen. Existing plating techniques to overcome this challenge have proven to be highly corrosive, potentially poisonous or short-lived in their effectiveness. This is why SIFCO ASC undertook extensive experiments with TI 6-Al 4-V and TI 6-6-2, two of the world's most widely used titanium alloys, to perfect a more efficient plating process.

The result is a plating process which includes surface pre-treatments of mechanical finishing, followed by an etch, activation, and finally the introduction of a thin layer of nickel. This pioneering approach brings all the benefits of selective plating, including versatility and convenience, together with enhanced safety and component quality.

The biggest challenge for SIFCO ASC was to avoid oxidisation and therefore costly scrappage of compromised titanium. The electrolyte solution must flow continuously over the component at all times, but this problem could be eliminated through automation.

"Titanium offers almost unlimited potential to drive improvements in the reliability and performance of mission

critical components," explains Derek Kilgore, engineering manager at SIFCO ASC. "Yet while this benefit is within reach, it has also proved challenging to grasp, largely because of the complications surrounding the plating process.

"These challenges can be essentially removed through investment in automated systems. Combining the ease and convenience of selective plating, they not only reduce human error, but also introduce vital benefits in terms of quality, repeatability and traceability or data logging, as well as productivity and user safety."

The use of automation also makes the process more repeatable, an advantage for mission critical applications where absolute and consistent quality is demanded. It is also fully traceable, making it easy to identify specific components should there ever be the need to investigate or recall specific products.

SIFCO ASC can offer titanium plating as a contract service either on-site of a customer's premises or at a job shop.

The automated system designed by SIFCO ASC uses a portable TechnoPlate®, a programmable power pack which not only allows repairs to be plated in situ, but also stores the volts, amperage and amphere hours, eliminating the risk of human error and oxidisation. Additionally, for



non-titanium applications, SIFCO ASC can design, specify, deliver, and commission simple workbenches or fully automated workstations with robotic systems to handle components, anodes and solutions through RFID and barcode tagging. The only human intervention necessary is programming and replenishing solutions.

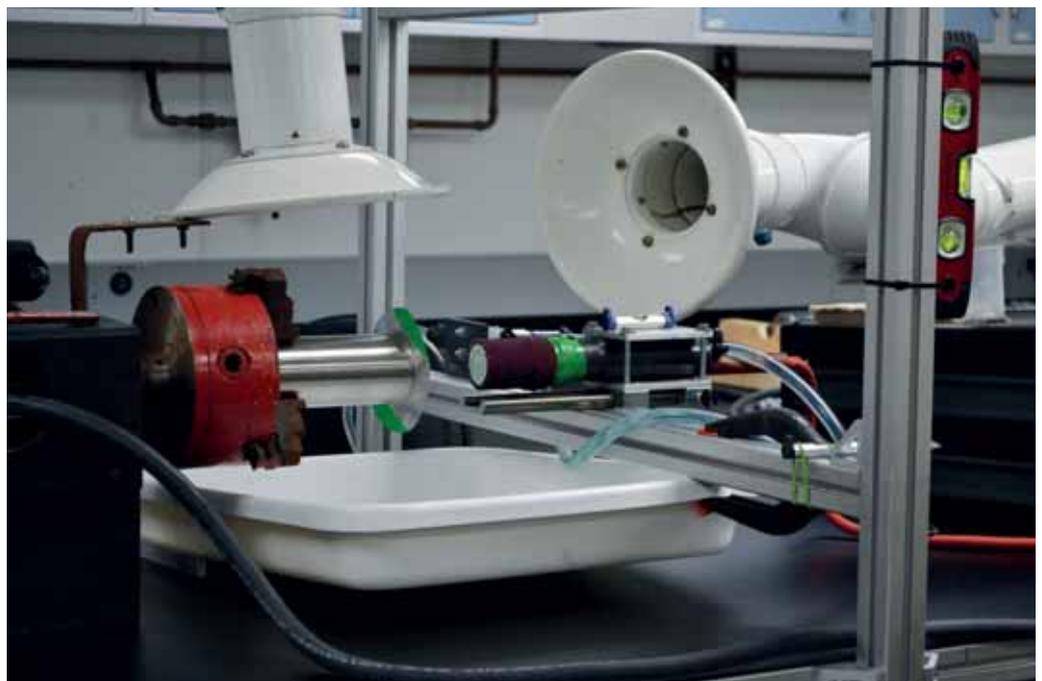
For more information on how SIFCO ASC can help customers with their titanium plating and automation requirements, visit <https://www.sifcoasc.com/automated-plating-systems/>

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Tenova to supply STC furnace to Grand Blanc Processing in US

High quality processed wire production facility entrusts Tenova for the integration of its furnaces equipment

Tenova, the leading developer and provider of sustainable solutions for the green transition of the metals industry, has been contracted through its subsidiary Tenova Inc. for the turnkey supply of a roller-hearth type STC® (Short Time Cycle) furnace at Grand Blanc Processing's wire processing facility located in Holly, Michigan. The project will mark the third STC furnace installation for the facility and the new furnace will be seamlessly integrated with the existing furnaces in operation. Furnace start-up is expected to take place at the end of 2022.

The 26 metric tonne batch STC furnace will be used to spheroidise, anneal and stress relieve Grand Blanc Processing's high quality wire products. The new furnace will include Daido Steel's (Japan) advanced nitrogen control technology. The nitrogen control system will reduce nitrogen consumption by up to 30 percent per cycle and reduce fuel consumption by 2 percent per cycle. Tenova Inc. will also design and supply three product cooling tables as well as the complete control and automation package.

Tenova Inc. has been a licensee of Daido Steel's STC technology for over 35 years. The energy efficient STC furnace provides low product variability and superior temperature uniformity.

Tenova launches its new corporate website

The new digital platform aims to spotlight the company's forward-looking approach to enable a sustainable future for the metals sector, as well as to enhance proximity and interaction with stakeholders.

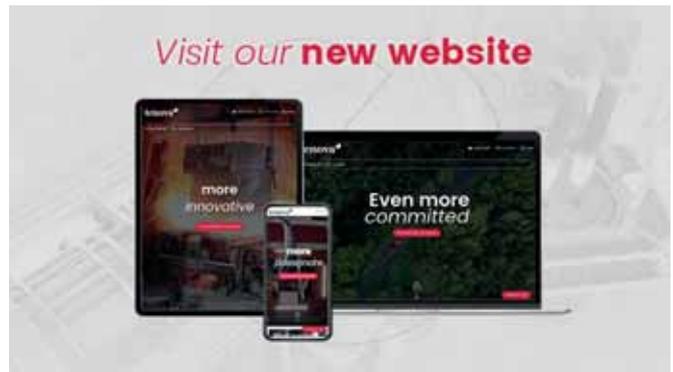
"Due to the changing environment we operate in, we felt the necessity to better represent our distinctive positioning and vision of the future. Therefore, we started from the roots of our identity, conducting internal analysis and precious listening activities of our stakeholders. The result is very adherent to Tenova's nature: a dynamic platform where users can easily reach out to us, discover how innovation drives our company and know more about our strategic vision," says Sara Secomandi, Tenova chief communications officer.

The new website is designed as a digital hub, focused around different stakeholders, targeting their specific needs with direct access to dedicated portals and customised paths to find the contents of interest, with special attention to multi-device accessibility.

The company's premium technology portfolio can be navigated through multiple entry points, whereby technical information is complemented by more descriptive and narrative contributions to lay the focus not only on "what we do", but also on "how and why we do it", diving into the creative processes and values behind the products and projects.

To enhance proactive dialogue with stakeholders, contact forms are available all over the website, creating a direct link with company experts and increased touch-point opportunities.

The substantial presence of Tenova people, through their first-hand testimonies, articles, and contact cards, is the real value



added to the website. They are the protagonist, representing the most important asset of the company.

The new communication tool aims to reflect the renewed and reinforced commitment to supporting and enabling a sustainable future for the metals sector and, ultimately, to bringing a significant contribution towards the safeguarding of our planet and its inhabitants.

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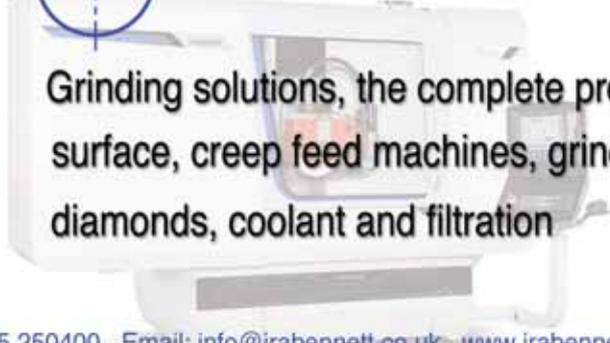
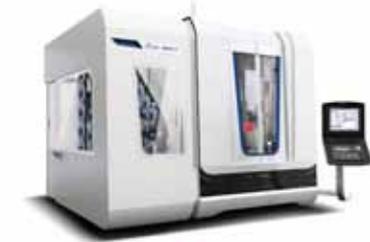
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