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Specialising in the design and manufacturing of high-precision grinding machines for cutting tools, the Swiss company Rollomatic also offers laser machining centres to provide its customers with even broader solutions for manufacturing ultra-hard tools and new possibilities.

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Rollomatic is a private Swiss company specialising in the design and manufacturing of high precision CNC machines for production grinding of cutting tools, cylindrical grinding and laser cutting of ultra-hard materials. It is customer-oriented and it provides complete manufacturing solutions for the grinding of precision tools and parts, including wheel dressing and measuring finished parts.
Its manufacturing methods and precision assembly is based on its passion for Swiss engineering and craftsmanship. Its philosophy is demonstrated by its teams in all stages over the life of the products, from design, through assembly and lean manufacturing and all the way to service and client advice and support. It strives to build a relationship of trust and cordiality with customers in a spirit of partnership.

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Curtis Machine Tools celebrates 50 years of engineering excellence in precision grinding solutions

Curtis Machine Tools (CMT), a global leader in engineered grinding solutions, is proud to celebrate its 50th anniversary

Since Douglas Curtis and his son Rick founded the company in 1973, CMT has been dedicated to providing high-quality, custom engineered machine tools for high volume precision manufacturing to customers worldwide.

Throughout its history, CMT has continuously evolved and adapted to meet the changing needs of its customers. In the 1970s, the company recognised the demand for "as new" machine tools and its rebuilding service became established and thrived. This was primarily due to its unwavering commitment to quality, along with excellent customer support.

Assembly workshop 1973

The 1980s marked a turning point for the company, as CMT identified the need for greater productivity in addition to accuracy and reliability. Embracing advances in industrial control systems, the company retrofitted electronic control systems to existing machines, enabling automation of parts handling and enhancing quality control through proprietary and bespoke gauging solutions.

The 1990s saw CMT taking on increasingly ambitious projects, involving design, prototyping, manufacture and integration with third-party equipment. Processes included grinding, honing, component assembly and test, along with design, manufacture and integration of entire production cells. Parts handling became a significant aspect of the business, with modularised systems applied to multiple stages in part manufacture. Post-sales service support continued to expand, with a dedicated team being established to take care of customers requirements. This included full-service support for entire manufacturing facilities

As the new millennium approached, CMT focused on design and manufacture of specialist grinding equipment as well as the implementation of automation systems respectively. With ground-breaking machines, such as the Universal Centreless Grinder for challenging centreless applications, face grinders with high cutting forces for diamond and precise high-speed contouring cam-ring grinders being among some of the products being developed.

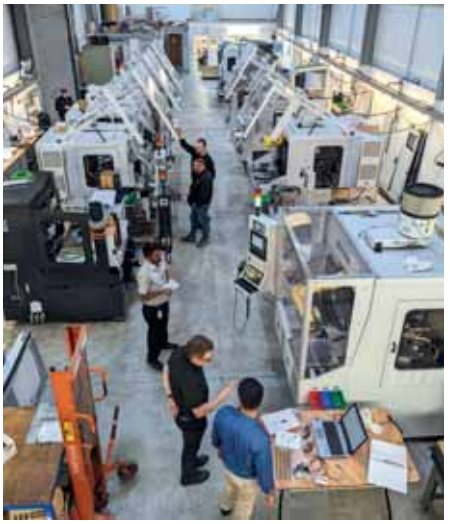
In 2005, CMT's continuous commitment to machine development led to the birth of the Vector, a cylindrical grinder for small parts. The "grinding in a box" patented machine design made it easy to contain high-pressure grinding fluid and waste material from the process. The Vector became established as the most compact 5-axis, fully automated CNC cylindrical machine available. The Vector rapidly became popular with automotive customers that wanted to integrate a cylindrical grinding machine within a production line.

The Vector became a significant milestone for the company, with its versatility and adaptability to different customer requirements leading to numerous machine variants and successful implementation in various market sectors.

Today, Curtis Machine Tools stands as a testament to over five decades of expertise and innovation in machine tool design and manufacture. The company remains dedicated to investing in internal development projects, cutting-edge technology and attracting talented and innovative engineers. By continuously improving and advancing the Vector machine, CMT ensures it meets and often exceeds customer application requirements across existing and future market sectors.

Assembly workshop 2023

"Doug and Rick's guiding philosophy and determination to provide the best products and service have been the foundation of our success," says Michael Scarfe, managing



director of Curtis Machine Tools. "As we celebrate our 50th anniversary, we are grateful to our customers for their trust and support. We look forward to many more years of delivering exceptional engineered grinding solutions and contributing to our customers' success."

Introducing the Vector family: Next-level grinding machines for enhanced productivity

In 2005, a comprehensive market survey revealed that more than 90 percent of all grinding applications involved a grinding length of less than 75 mm, with the primary market being high precision fuel injection components and turbochargers.

Responding to this valuable insight, CMT swiftly developed the innovative Curtis Vector range, featuring a maximum grinding length of 100 mm and an integrated 3-axis loading system, specifically designed for high volume cylindrical grinding projects that typically yield between 250,000 to 1,000,000 + parts per year.

The initial introduction of the ground-breaking Vector grinders took place in 2006, when CMT successfully sold them to a client in India specialising in grinding diesel injection components. Since then, the Vector range has undergone continuous development, enabling CMT to offer a diverse array of options for workpiece

presentation and holding, combined with meticulous process refinements involving high speed super abrasives, grinding fluids and machine parameters.

The Vector series has firmly established itself as the market leader in terms of production performance. One key aspect crucial to optimising cycle times on high volume grinding machines is the reduction of 'dead time' to a minimum. Here, the VECTOR TWIN stands out as the most advanced machine in the range, featuring two work spindles mounted in an indexing drum. This unique configuration allows for simultaneous loading and grinding operations, resulting in remarkable cycle time reductions of up to 80 percent.

Simultaneous grinding in the right-hand dirty area and loading in the left-hand clean area result in concurrent grinding and loading operations. The workhead drum's index time is an impressive 1.2 seconds, guaranteeing a spark-to-spark time of less than 2 seconds.

The loading position also facilitates secondary operations, such as brush deburring, post-process diameter gauging, pre-process length positioning, washing and laser marking etc.

Thanks to the fixed grinding guard the coolant and grinding debris are fully contained and the machine is capable of grinding at 140 m/s with coolant pressures up to 100 bar. The guarding system also allows for the part pick/place locations to be situated close to the work spindle, allowing for seamless integration of the loading system into the machine without any risk of contamination.

The Vector: Setting the foundation for excellence

At the core of the product family lies the Vector, a highly efficient production grinding machine that incorporates an integral loading system. With its compact design and state-of-the-art technology, the Vector provides a solid foundation for exceptional performance and precision.

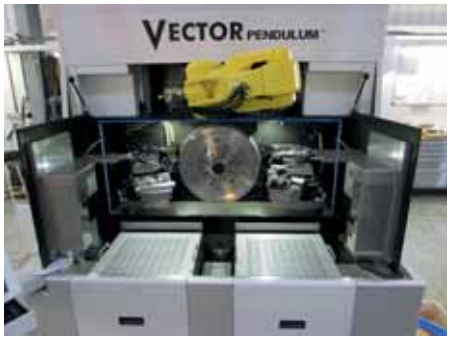
The Vector Twin: Unleashing concurrent productivity

Building upon the strengths of the Vector, the Vector Twin introduces a twin-spindle workhead, enabling simultaneous loading and unloading whilst the grinding process is in progress. This innovative feature eliminates idle time, maximising productivity and enhancing operational efficiency.

The Vector Quad: Doubling productivity with simultaneous grinding

The Vector Quad patented technology represents a revolution in production grinding. Equipped with a four-spindle workhead, it facilitates the simultaneous grinding of two workpieces, while allowing for seamless loading and unloading operations. This remarkable machine concept effectively doubles productivity, delivering exceptional results

The Vector Pendulum: Versatility redefined



CMT has ingeniously developed the Vector Pendulum to meet the diverse needs of the grinding machine market. By incorporating a workhead on each side of the grinding spindle, this remarkable machine enables two separate grinding operations to be carried out simultaneously. Loading and unloading take place at one workhead, while grinding is performed at the other. The Vector Pendulum offers the flexibility of straight or angle approach grinding, supported by a range of workholding options

The Vector Nano: Precision for the future

Addressing the increasing demand for precision in cutting-edge technologies, CMT presents the Vector Nano. Specifically designed to meet stringent sub-micron tolerance requirements, the Nano combines high mechanical rigidity with excellent damping. Its hydrostatic grinding and workhead spindles are liquid-cooled for superior thermal stability, enabling the achievement of extremely high cutting speeds.

The Vector GFS (Grind From Solid): Streamlining production processes

The Vector GFS incorporates a unique bar feed loading system, allowing the workpiece to be ground directly from standard or hardened bar stock. By eliminating the need for turning and separate hardening operations, this groundbreaking machine saves time and resources, providing a more efficient production solution.

The Vector Rotary: Enabling complex spherical profiles

Designed to meet the demands of intricate blended spherical profiles, the Vector Rotary features an additional servo motor-driven "B" axis mounted to the single spindle workhead. This advanced capability unlocks new possibilities for producing complex profiles with exceptional precision.

The Vector Concentric: Unmatched concentricity and versatility

When concentricity is of utmost importance, the Vector Concentric shines. This machine excels in grinding slender shafts and is equally adept at grinding both sides of a gear shaft simultaneously. Its innovative design, where the workpiece is rotated between rollers and driven against a fixed stop, ensures exceptional concentricity and precise results.

The Vector Polygon: Redefining precision grinding

The Vector Polygon's standout feature is its state-of-the-art workhead, specifically designed to deliver exceptional versatility and precision. By incorporating a programmable 'C' axis, operators gain full control over simultaneous axis movements, allowing for dynamic interpolation and the seamless creation of complex off-axis forms or specific geometric profiles.

In summary

Vector machines offer comparable grinding times to cutting-edge counterparts, reducing loading time by over 80 percent compared to conventionally loaded machines. They contribute to cost reduction, improve quality, ensure reliability, reduced maintenance and set the standard in demanding manufacturing environments.

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Grinding away the mythology of recycled steel

Thomas Björk, PhD, group technical specialist for Ovako Sweden AB, outlines a recent research program that shows both recycled steel and ore-based steel are equally good as raw materials for automotive crankshafts.

Historically, a number of automotive industry OEMs have been reluctant to use recycled steel for their crankshafts. This is despite its considerable potential to reduce the carbon footprint of their products. The reason is an historic belief that engine crankshafts should be manufactured from ore-based steel, mainly because it performs better during the grinding operations necessary to create high-quality bearing surfaces. Recycled steel is considered by some to be more susceptible to "grinding burns". This is a type of thermal damage that decreases surface hardness, introduces tensile residual stress and shortens fatigue life.

A number of major players in the industry decided it was time to challenge this by carrying out a test program to benchmark the performance of recycled and ore-based steels. With financial support from the Swedish government, a three-year project was devised: Grindability of recycled steel: automotive crankshafts (CRANK-STEEL).

It was coordinated by Chalmers University of Technology, with project members including Volvo Group, Volvo Cars, Scania, Bharat Forge, Ovako and RISE IVF.

How to assess the grindability of a material?

The first challenge for the project was in how to assess the grindability of steel. This is because there is no grinding-specific definition.

It was therefore decided to use the general concept of "machinability". This describes the ease with which a certain material can be machined under given process conditions and it may be assessed by one or more of the criteria:

- Tool life & tool wear
- Material Removal Rate (MRR)
- Cutting force
- Surface finish
- Chip shape

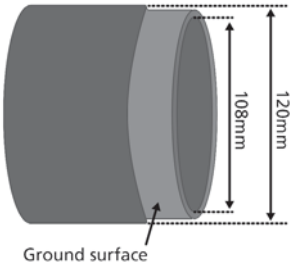

Figure 1: The workpiece used for the grinding tests

Grinding tests

To carry out the tests, tubular, hardened workpieces (see figure 1) were fabricated from bars in a steel grade used regularly for forging. These were divided into two groups from different steel makers:

- Steel production based on recycled material.
- Virgin ore-based steel.

These two materials are nominally identical. However, some small differences were observed that influenced the test results, even though they remained within the specified parameters.

The test pieces were hardened by austenitisation at 870°C for one hour followed by water quenching and tempering. Three main indicators were used to assess the grindability of the two materials:

- Specific energy - Is there a difference in energy required to grind the materials?
- Wheel wear - Is there a difference in how the grinding wheel wears down?
- Surface integrity - Are there differences in the surface integrity of the ground surfaces?

The tests were carried out using a grinding machine. They comprised cylindrical plunge grinding with 1/3 of wheel width:

- Grinding 3 mm off the radius in a single pass.
- 16 plunges in total per material, with decreasing infeed.
- Three measurements of the wheel profile for each test piece, at the start, halfway point and at the end.

Specific energy

The specific energy used during the tests was calculated as shown in Figure 2. This shows that the specific energy required to grind both the test materials was broadly similar.

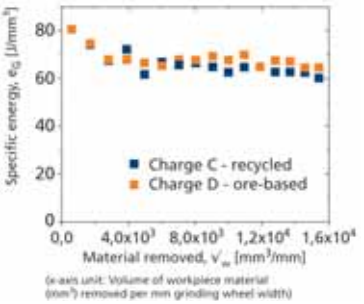

Figure 2: Results of specific energy calculations

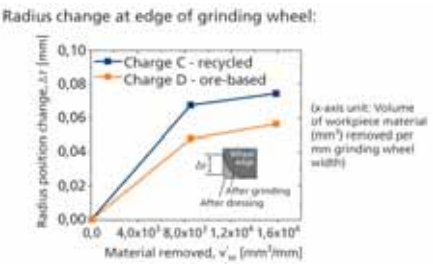

Figure 3: Wheel wear tests

Wheel wear

Wheel wear was assessed by measuring geometrical changes in the grinding wheel as increased amounts of steel were ground away. This is shown in figure 3.

It is clear that there is a larger radius change and hence wear for grinding recycled material. However, it should be noted that the observed changes in the radius are smaller than the CBN grit size, 181 µm grit diameter.

There could be a number of possible reasons for the different wheel wear rates. Clearly, the mechanical and thermal loads on both materials are similar, as indicated by the similar specific grinding energies and residual stress profiles. Therefore, it is most likely that hard non-metallic inclusions influenced wheel wear.

Surface integrity tests

The surface integrity tests were carried out using the same grinding parameters as the wheel wear tests. However, the workpieces were switched from time to time to focus on the effect of the workpiece material and

exclude the potential effect of changing wheel topography.

Surface integrity was assessed using Barkhausen Noise (BN) measurement. This is a non-destructive method involving the measurement of a noise-like signal induced in a ferromagnetic material by an applied magnetic field.

An increase in BN is usually connected to more tensile residual stresses and/or decrease in hardness, tempering, the result of grinding burns. In contrast, a low BN is associated with compressive residual stresses and/or high hardness.

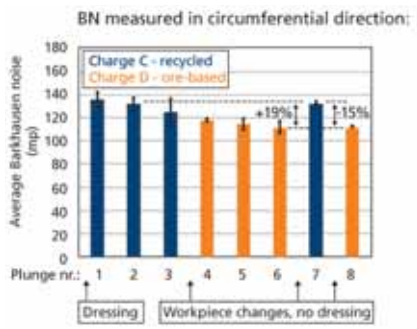

Figure 4 – Results of Barkhousen noise (BN) analysis on ground surfaces

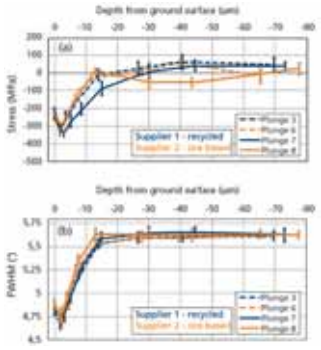

Figure 5 – X-ray diffraction measurement of residual surface stress

The results shown in figure 4 show a clear difference between the recycled and ore-based steels, indicating different surface integrities and suggesting worse grindability of recycled material.

To investigate further, X-ray diffraction measurement of surface residual stress was carried out – with the results shown in figure 5. These did not confirm the indications given by BN and the stress profiles are very similar for almost all measurements.

Full Width Half Maximum (FWHM) values are an indication for the surface hardness and deformation of the material. The plot shows that there are no differences between the materials and plunges, suggesting that similar surface hardness and deformation is present in both materials.

Further investigation was carried out since it has been reported that, apart from residual stresses and hardness, BN is affected by material microstructure. The microstructures of the two materials were therefore compared.

The tests showed a slightly lower bulk hardness for the recycled batch and similar martensite morphologies for both materials. However, there was a difference in the average size of the prior austenite grains. These were larger in the recycled steel and studies report that larger grains result in higher BN.

As a next step, BN measurements were performed on metallographic samples taken from the workpieces. The goal was to minimise the influence of surface deformation/stresses and instead measure the bulk material's BN response. The results show, as in the grinding tests, a higher BN for the recycled steel batch. The conclusion is that the increased BN level is an artifact of grain size rather than resulting from the grinding process.

Summary and conclusions

The test program has enabled a number of conclusions to be drawn:

- When considering the likelihood of grinding burn occurring, when using dedicated CBN wheels to grind automative crankshafts, the steel sources, whether from recycled steel or ore-based steel, are equally good.
- Among the grindability measures, wheel wear was seen to be higher for the recycled steel as compared with the ore-based batch. The reasons for varying wheel wear and grain size differences are due to micro-constituents in the materials (inclusions and carbon nitrides) and not related to macro-properties such as hardness.
- Barkhausen noise analysis appears to be sensitive to microstructure, especially grain size. This can lead to possible misinterpretation of increased BN levels of a ground surface as thermal damage. To avoid this, an unground reference sample from the relevant steel supplier should be used to calibrate the parameters for the Barkhausen test equipment.

Implications of the grinding test program

For automotive OEMs, the positive results of this test program will help remove the barriers to using recycled steel. The implications for sustainability could be significant. It is hard to put an exact figure on how much steel is used each year in the manufacture of crankshafts. But we do know that some 90 million internal combustion engine vehicles are produced each year. Therefore, a conservative estimate is that the annual use of steel for crankshafts is in the order of several million tonnes, most of it currently ore-based. An industry-wide switch to recycled steel for crankshafts could save millions of tonnes of CO_2 a year.

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Tooth flank grinding with EMAG SU

Gear grinding is currently attracting a lot of attention, especially in the production of components for electric drives. Production planners are demanding new solutions for a perfect surface that assures their necessarily smooth running at high speeds and heavy torque loads.

To see how a high-tech niche machine builder implements these requirements, one need look no further than EMAG SU "tooth flank grinding" machines. The gear grinding machine specialist, based near Bologna Italy, developed the G 160 model, for example, which features a special "virtual" axis concept for microscopically near-perfect surfaces. At the same time, the integrated material handling technology keeps the cycle times down to a minimum. Take a look at the concept details that makes EMAG SU such an outstanding gear tooth flank grinding solution, as well as the many other winning designs.

Electromobility is booming and the competition to have the best solution is accelerating. Almost all automotive manufacturers launched new EV models in 2022. What does this mean for the production planning by OEMs and suppliers? "On the one hand, they have to effectively deal with growing production quantities, yet, still have to guarantee an ever-increasing level of quality, because the high torque load of an EV electric motor results in special requirements for tight tolerance dimensions and surface finish," explains Alexander Morhard, technical gear support specialist with EMAG SU. "This development is particularly noticeable in the machining of tooth flanks on shafts and gears. Here it is important to achieve dimensionally accurate results in the micron, µm, range, because even minimal ripple in the surface finishing of the components can cause interference noise in the drive performance."

G 160: minimal chip-to-chip times

With a wide range of technological innovations, EMAG SU demonstrates how quality can be improved in this extremely precise application. The company offers a large range of machine tools that cover the entire gear tooth cutting process. Tooth flank grinding, with the alternative cornerstone procedures of "generating grinding" and "profile grinding" is a key

area of application. With "generating grinding," for example, the gear geometry is continuously "generated" by a combination of multi-axes, high performance machine motions and well-maintained grinding wheels. EMAG SU's G 160 model is the fastest machine on the market for components up to module 3 with a maximum outside diameter of 160 mm. The G 160 speed is made possible by an innovative slide axis concept with two parallel workpiece tables that take turns moving at high speed, with the help of durable, high performance linear motors, to the grinding wheel. During the time that one component is being machined, the loading robot inserts a blank into the other spindle, after first unloading the completed part, as needed. Self-centering alignment, or "meshing," of the grinding wheel to the rough-cut gear component takes place directly on the workpiece spindle, at load position, in parallel with the main machining operation. This results in a chip-to-chip time between the grinding processes of only 1.6 seconds, a very small value compared to grinding machines with turntables, where in some cases up to five seconds pass for the same process. Here it is important to note that the actual grinding time needed for a typical component, such as a planetary gear wheel, is only about 10 seconds. The difference between the chip-to-chip times between grinding is therefore a real game changer. The floor-to-floor time is significantly reduced, by about three seconds, more than 20 percent and the output quantity is massively increased. This is a decisive factor in the planning of high-volume manufacturing in the growing electromobility market.

Axis concept prevents "ghost frequencies" on the surface

What also sets apart the technology of EMAG SU is the exceptional surface qualities that the innovative axis concept that the G 160 makes possible. Contrary to many other generating grinding machines, it has no tangential axis. Instead, the Y- and Z-axis "generate" a "virtual" tangential axis through a simultaneous movement. As a result, the point of contact between the grinding wheel and workpiece is around 100 mm closer to the pivot point of the swiveling axis, which is beneficial for the swiveling behavior during the grinding process. The wheel point of contact varies, thereby smoothing the gear form for better "mesh" and higher bearing ratios. The result is visible in the surface structure of the finished component, as the "ghost frequencies" in the micron range mentioned above vanish almost entirely. Additionally, gear form profile deviation is very low, as measured by the FFA value (Force-Field Approximation). The improved finish and form of the gears is due in no small part to the high rigidity of the G 160 and the innovative techniques of EMAG SU. Numerous shafts and gears wheels of the electric drive systems benefit from this quality.

G 250: short cycle times and maximum flexibility

Another interesting machine concept can be found in the G 250 machine of EMAG SU, which is suitable for components up to module 7, with an outside diameter of 250 mm. Axle drive gears, gear wheels or shafts with a maximum length of 550 mm can be produced with this solution, using generating grinding or profile grinding, with short cycle times. To this end, the machine is equipped with two table spindles to minimise idle time during the manufacturing process. "Additionally, the flexibility of the machine was very important to us," explains Alexander Morhard. "For example, the G 250 can also be equipped with very small grinding wheels and worms." The G 250 HS variant also has a high-speed grinding head, which

makes 20,000 rotations per minute possible, if a small grinding worm is used.

Other advantages of this machine concept include:

- Generating grinding and profile grinding are performed on the same main grinding spindle, so that the machine does not suffer from heat development, like when auxiliary spindles are used for profile grinding. Additionally, the machine can be re-tooled for the alternative procedure within a matter of minutes.
- Generating grinding can also be used for machining workpieces with interfering contours, by using generating worms with a root diameter up to 68 mm. This results in very short grinding times. All other components can be finished with a small profile grinding wheel, with a size of up to 30 mm.
- Centring takes place in the loading position, in parallel with the main machining operation.
- The integrated dressing unit ensures process reliability.

For large components in trucks or in general gear manufacturing, the cost-efficient G 400 rounds off the upper end of EMAG SU's product range for generating grinding. It is equipped with a tool table for components with a maximum diameter of 400 mm and a shaft length of up to 750 mm. A feature that is important to many users: The machine can also be loaded from above, because the housing has an over-the-corner door.

Increasingly strengthening the market by contributing strengths

Short chip-to-chip times, intelligent axis concepts, thermal and mechanical stability, as well as high "user-friendliness," including self-explanatory, parametric input windows. With these quality characteristics, EMAG SU boosts the performance of tooth flank grinding procedures. To accommodate various grinding wheel sizes and types, a variety of spindles with the corresponding power and performance is available. Additionally, the technology can easily be combined with different automation technologies.

Alexander Morhard concludes: "We consider ourselves ideally equipped to supply machines for the grinding tasks needed in the field of electric mobility, as shown by a well-known French automotive manufacturer currently successfully using several EMAG SU grinding machines to generate gears. In the coming years, we want to continuously improve our contribution to the global requirement for precision gear grinding machines for the ever-increasing quality demands for electric vehicles."

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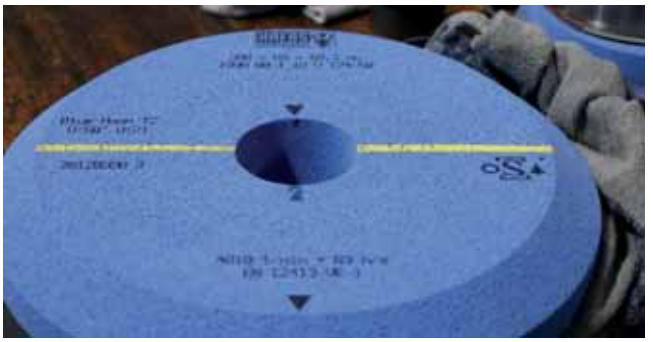
Premium solution for grinding large gears

Serial production of large gears requires a high level of quality, excellence and continuity in production. Particular emphasis is placed on maximum synergy between the grinding machine, the grinding process and the grinding wheel. After several successful trials on various Klingelnberg Höfler Rapid grinding machines carried out by Krebs & Riedel with customers in their production facilities, Krebs & Riedel has received several large orders for grinding large gears from abroad and has introduced the new premium grinding wheels with high process reliability. Krebs & Riedel is one of the world's leading manufacturers of grinding wheels for gear grinding in the automotive and EV sector. The family-owned company is also expanding into other sectors where large gears are manufactured with the new Blue Moon™ TZ premium product range.

In recent years, wind power has been an important factor in reducing CO_2 emissions. Wind turbines are getting bigger and more powerful, while production costs have to be reduced. This requires production methods that can produce the gears cost-effectively and in high quality, even with complex flank modifications. Gear sizes in wind power typically range from 800 to 4,000 mm. Some gears can even reach a diameter of 8,000 mm and weigh up to 100 tonnes. The most common size in the field of external gears is 1,200 mm in diameter and ranges from module 12 to module 52. The profile grinding wheels typically have a diameter of 100-450 mm.

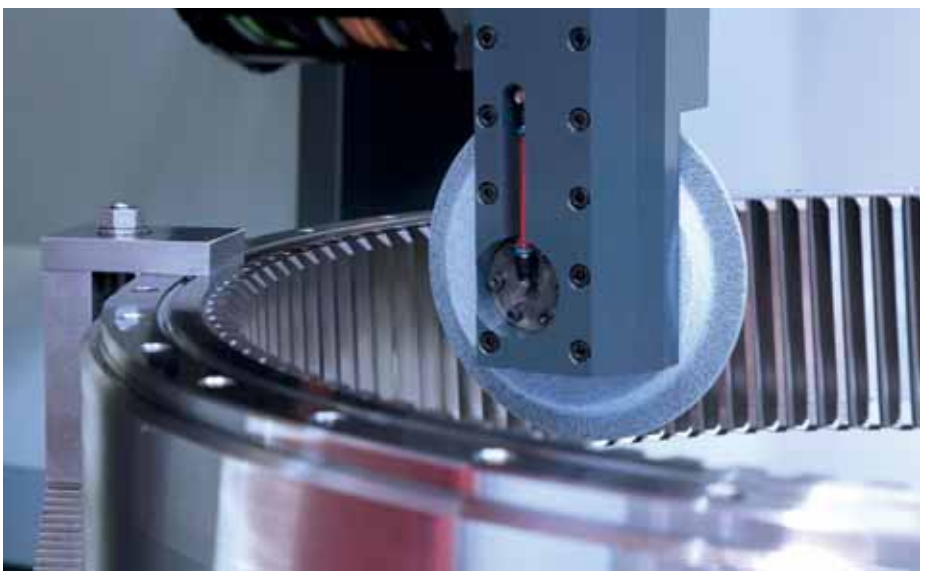
Only a perfectly ground gear geometry ensures optimum power transmission for high wind turbine efficiency and smooth running. Grinding burn must be avoided under any circumstances, because the forces in the gearbox are very high and tooth breakage is very expansive. High-precision gear quality is a matter of course at Klingelnberg and Krebs & Riedel. It increases the service life of the individual gear components and makes a significant contribution to reducing maintenance and production costs. To achieve maximum synergy between the grinding machine and the grinding wheel, Krebs & Riedel optimises the process with application support at customers sites around the world and offers, with the Blue Moon TZ, a new premium grinding wheel with a precision-shaped abrasive grain.



Blue Moon TZ is characterised by a very high cutting performance and a very high material removal rate. The homogeneous pore structure of Blue Moon TZ contributes to an extreme improvement of the entire cooling system during the grinding process. Due to the open structure, the entire grinding wheel is immediately flooded by the cooling liquid. Even with extreme material removal rate, the chip is transported away from the contact surface. This avoids heat input that could lead to thermal damage to the gear.

Following tests on Klingelnberg Höfler Rapid 2500 machines, Sigurd De Ridder, senior application engineer at Krebs & Riedel, had the following grinding results: A cooler grind and a longer tool life, combined with up to 20 percent faster grinding time compared to standard grinding wheels. The longer tool life and higher grinding performance helps to reduce costs while achieving the same, or even better, quality of the gear. On average of all dressing tests, Sigurd De Ridder achieved the following results: 20 percent longer dressing intervals, 30 percent less infeed, which also leads to a longer tool life of the dressing wheel.

The profile grinding machines of the RAPID series for large workpiece sizes are designed for component diameters up to 8,000 mm. Depending on individual requirements, they are equipped with an extended stroke range. In addition to the standard configuration, the machine is also available with a small grinding head to accommodate very small grinding wheel diameters. In all configurations, machines of the RAPID series can be converted from external to internal gears in a very short time by means of optional internal gear grinding arms. In addition, the special arrangement of the machine axes, a thermally stable and almost vibration-free machine bed made of mineral casting, as well as wear-free torque drives in the machine table and the grinding head for 5-axis grinding, contribute to the proven precision, consistent quality and enormous flexibility.



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Greater efficiency thanks to digital assistance systems in machine tools

In the private sphere, digital assistance and communication systems have become indispensable. In a professional environment, even outside of the office, supporting systems are increasingly gaining equal status. As a machine tool manufacturer, the UNITED GRINDING Group offers digital products that not only make work easier for its customers but also save time and money.

What makes working on machines in an industrial facility easier? "That I can get help quickly and easily when the machine stops" could be the answer from a machine operator. A maintenance employee may say: "I have an overview of all upcoming maintenance tasks and thus no longer miss any important schedules." The answer from the production manager might be: "I can also see whether all the machines in my production are running when I'm on the road."

Different user groups have varying demands on modern production. As one of the world's leading machine tool manufacturers, the UNITED GRINDING Group offers digital assistance systems that make work easier for various user groups.

Remote Service

Remote Service offers uncomplicated and fast assistance, for example, in the event of machine downtime. By triggering a service request, customers can request quick and uncomplicated help by pressing a button. This service request can be submitted by the customer via a smartphone and the corresponding Digital Solutions app or via the Customer Cockpit.

With a machine equipped with the modern C.O.R.E. technology, this is now even possible directly on the machine. In addition, a video conference can be conducted via the integrated camera in the C.O.R.E. panel. This again significantly increases the benefit provided by service support. The whiteboard function also makes sharing drawings and notes on pictures or documents easy. This way, the Customer Care Team can assist remotely, saving time and money.

Service Monitor

The Service Monitor relieves those responsible for maintenance by clearly displaying all the important maintenance tasks based on the current machine's operating hours. The Service Cockpit can even be used to centrally manage, monitor and document maintenance due dates for several connected machines. Only necessary maintenance work is displayed. Unnecessary work is thus avoided. On the other hand, the necessary work that ensures the smooth operation of a machine is not forgotten and thanks to this optimal maintenance and care, the availability and working life of the machine are increased which in turn has a positive effect on productivity.

Production Monitor

Production managers can monitor the production output of the machinery at any time using the Production Monitor. Production benchmarks, such as operating and non-productive times, production quantities and downtimes are displayed in real-time.

The latest version also supports the global communication standard umati UA4MT (Universal Machine Technology Interface for Machine Tools). Not only machines from the UNITED GRINDING Group but also machines from other manufacturers can be easily integrated into the Production Monitor, from anywhere and at any time, thanks to the Digital Solution App.

This overview makes it possible to discover optimisation potential in the production and operation of the machines.

Growing importance of digitisation

UNITED GRINDING Digital Solutions™ products were presented to an interested audience at the MECSPE 2023 trade show in Bologna.

As a result of the Corona pandemic, the overall importance of digital assistance systems has increased noticeably. Remote solutions were the only way to stay in contact with customers and provide assistance during lockdown periods.

During this phase, UNITED GRINDING had more than 2,500 remote deployments worldwide. The trend towards flexible working models and working from home or on the road has also driven the demand for app-based solutions.

Digital assistance systems are already an indispensable part of everyday production and demand will continue to rise. The UNITED GRINDING Group is continuously expanding the functionalities of its current products and constantly adding to its range of digital solutions.

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Reishauer RZ x60 Series Generation 4.0

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- Closed Loop Inspection through Onboard Inspection or through GDE Exchange with Gear Inspection Systems
- Intuitive Operator Interface with guided processes on touch screen

REISHAUER

Gear Grinding Technology

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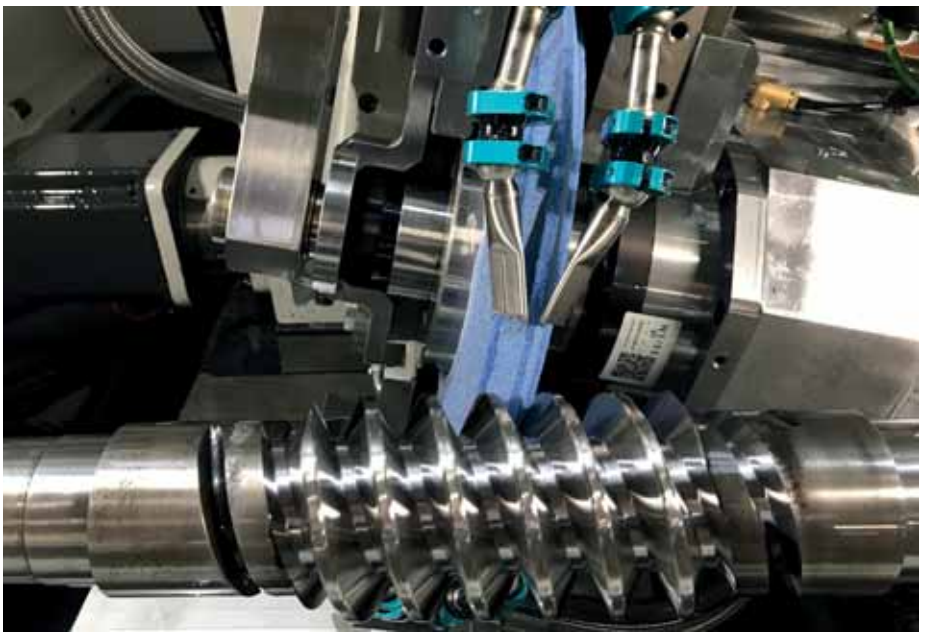
New PTG Holroyd CNC machine is first of kind to precision grind both worms and gears

Manufacturing high-accuracy worm gears and screws alongside precision spur and helical gears has traditionally required the use of two quite different CNC grinding machines. Thanks to PTG Holroyd's newly launched HG350-WG worm and gear grinding centre, however, just one machine can now complete both tasks.

"Since the launch of our HG350-G, gear-only, grinding centre in 2021, we've been investigating ways of bringing manufacturers of worms or gears, or both, greater levels of flexibility and efficiency in their manufacturing processes," comments Mark Curran, sales director of UK-based PTG Holroyd. "The result of a multi-million pound machine tool development programme, our new HG350-WG worm and gear grinding centre does just that. Taking the concept behind the PTG Holroyd HG350 range a stage further, the dual-capability 'WG' model has been designed not only for the one-off and batch grinding of high-accuracy worms and screws, but also for precision grinding spur and helical gears of up to 350 mm in diameter. Primarily, that means significantly improved versatility for manufacturers who need to quickly switch between grinding processes. Many other businesses will now only need to invest in one type of helical grinding machine tool while, for others, selecting a HG350-WG model will mean being able to expand their manufacturing capability to either worms or gears."

Designed from the ground up to bring greater levels of efficiency and accuracy to the production of specialised gears and tooth forms, this latest member of the PTG Holroyd HG350 family features an advanced version of the company's acclaimed HPMS (Holroyd Profile Management System) for rapid programming and seamless background calculations of both worms and gears. In fact, operators will only need to input the profile shape and size they wish to achieve for a precise dressing path to be created.

Just like all PTG Holroyd HG350-G gear grinding machines, the new HG350-WG worm and gear variant is controlled by Siemens' highly intuitive Sinumerik ONE future-proof CNC. PTG Holroyd was the first



UK machine tool manufacturer to embrace the benefits of the Sinumerik ONE control, a decision which has helped to equip its HG350 range with class-leading integrated safety and failsafe features, enhanced reporting of machine health and performance data and uncompromising levels of industrial security.

"Using the Sinumerik ONE CNC has also allowed us to equip HG350-WG models with Siemens' 'Create my virtual machine' and 'Run my virtual machine' software capabilities," adds Mark Curran. "When used in tandem with our own internal machine design packages, these features have enabled our teams to build virtual 'digital twin' HG350-WG worm and gear grinding centres on the desktop, then grind virtual gears and threads all while observing entire manufacturing cycles and testing safety and failsafe capabilities. The software also makes acceptance testing exceptionally straightforward, as our customers are able to sign off on their new machine before it has even been built. Then, following installation, they too can benefit from carrying out 'virtual' gear and worm grinding to ensure right-first-time results."

Maintaining PTG Holroyd's pedigree of delivering industry firsts, the new HG350-WG is believed to be the first machine of its kind to use Renishaw's Sprint 3D scanning probe, alongside Siemens' Sinumerik ONE CNC, for rapid precision scanning for infinitesimal profile corrections. "We have worked in close association with Renishaw and Siemens to use orthogonal data from the grinding machine's X, Z, linear, with C, turning axis, to create a virtual Y-axis for use by the Sprint probe," says Mark Curran.

PTG Holroyd's HG350-WG machines feature the high power required for deep grinding operations. A specially developed extended machine bed allows screws and worm shafts of up to one metre in length to be accommodated. Dedicated software compensates for helical twist and full topological capability comes as standard. Embracing the Sinumerik ONE CNC's Profinet capabilities, IO-Link communication technology will be offered with all new HG350-WG machines as will RFID scanning, an option that will be particularly suitable for machines destined for production cells, by helping ensure that virtually any component or tooling item that needs to be switched between manufacturing cycles, is correctly changed for each gear grinding operation.

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The new PERFECT DT touchscreen surface grinder

The PERFECT range of surface grinders already provides an extensive range from the compact 150 x 450 mm, 6 x 18", through to 1,600 x 6,000 mm grinding capacities along with rotary table, horizontal spindle ring grinders with up to 600 mm dia. Now, all models from the 250 x 500 mm, 10 x 20", size machine to the largest are available with the new PERFECT DT Series with a new control.

"Built on the established and proven machine construction of the conventional series, the idea behind the DT Series is to provide a more productive surface grinder offering superior machine control for the operator, via a touchscreen control." comments Simon Rood, director and general manager of RK International Machine Tools.

Based around the DT control, an LCD Touchscreen control panel, it features several grinding cycles installed as standard equipment, such as traditional surface grinding, plus criss-cross grinding and plunge grinding cycles.

Autocross stroke adjustment via the LCD touchscreen panel also becomes part of the standard machine as opposed to setting manually machine travel stops.

"With this new technology from PERFECT, the level of skill required to run the DT Series is not as demanding as per earlier grinding machines. With the ease-of-use of the interface on the HMI, the settings can easily be added to the control through simple data input."

Simon Rood continues: "Most conventional PERFECT surface grinders are equipped with the AD5 NC automatic downfeed control option which involves physical buttons to create the simplest of cycles. The DT Series now features an automatic downfeed control as standard equipment and all data inputs for the material removal and machine travels are carried out on the touchscreen display, we all can relate to a touchscreen control in today's world."

To assist in keeping the working area environment cleaner and safer, the backwater splash shield is standard equipment and a clear viewing window forms the machines table safety guard.

Figure 1: PERFECT PFG-3060DT (Saddle type) Surface Grinder

Figure 2: PERFECT PFG-50100DT (Column type) Surface Grinder

Fully enclosed machine enclosures are available with coolant mist filtration also providing increased machine operator safety.

Beneath the dedicated DT control, the mechanics of the machine have been updated with, in the case of the Column Series, 1,000 x 500 mm to 2,000 x 700 mm, an upgraded hydraulic motor for the X-axis along with a twin-cylinder arrangement to increase safety and productivity along with stepless variable hydraulic system that features on the higher specification DT series surface grinders.

"RK International Machine Tools have worked with PERFECT in the UK & Ireland for nearly 10 years and we believe it is important that, with just a few enhancements, the DT Series provides operators with a considerably more productive machine. Speaking with our customers on what improvements could be undertaken to bridge the specification between the entry level machines to the PERFECT ADP, PLC based machines, lead to the launch of the DT Series" concludes Simon Rood.

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AGS provides the solutions for major subcontract supplier

Coventry-based Advanced Grinding Solutions (AGS) has announced the sale of several additional grinding machines and Comat filtration systems to Smithstown Light Engineering (SLE) in Ireland. When installed this will mean that AGS will have supplied Smithstown with some £3.75m worth of grinding machines since it started work with them in 2021.

The latest grinding cell comprises of an additional Tschudin centreless grinding machine and a 6-axis Rollomatic grinding machine for grinding specialist medical parts along with a large Comat filtration system.

Smithstown, whose customers include DePuy, Zimmer Biomet, Stryker and Boston Scientific, to name but a few, has grown rapidly in recent years as the larger OEM medical manufacturing companies have sought to use specialist outside providers for higher value machining processes including grinding and surface finishing which is exactly the fields that AGS specialise in providing machine tool solutions to. Today, Smithstown offers its medical customers a true one-stop shop for all kinds of medical component manufacture and has mastered a huge variety of process's including internal and external grinding, jig grinding, turning, milling, electro polishing, EDM, various, laser cutting and welding, 3D printing and heat treatment.

Brian King founded Smithstown Light Engineering in 1974 as a machine shop, quickly growing into the design and supply of plastic injection moulds and press tools for the electronics industry. It later on moved into contract manufacturing for the medical device sector and in 2011 was taken over by his son, Gerard King. From there it has gained national and even international recognition and has more than doubled in size in the last two years alone.

Gerard King comments: "Most of our machines are no more than five years of age. We've got to get faster, more accurate and more cost-competitive and the only way to do that is to increase automation levels and be upfront with the latest machining technologies as they hit the market." As well as new technologies, Smithstown Light Engineering is also not afraid to employ new techniques.

Gerard King explains: "While a lot of companies in our sector are concentrating on traditional milling and turning, which we're also good at, we take on higher risk processes that aren't as commonplace to give a very wide service offering. Having a wide array of grinding disciplines is just one of our processes that's separating us from the crowd. You have to embrace the latest technology as indeed we do with our new grinding processes and we are using the latest, very fast linear axis drive type grinding machines from Tschudin and Rollomatic. We're trying to reduce the endpiece price to our customers and of course that's what our customers like to see; yearly cost reductions and a company that's going about providing those reductions.

The Rollomatic 630XW machine that's under order for SLE is designed for grinding many kinds of cutting tools with a more complex geometry whereby its additional 6th "A" Axis, which is unique within the industry, provides an improved accuracy on special tools with a possibility to incline the grinding wheels by up to 45 degrees. This avoids collisions, allows for easier programming and ensures demanding and highly precise geometric forms, such as those found on special medical tools, can be machined in a single operation. This machine will soon be joining multiple Rollomatic NP50 machines that are already in use at SLE.

The Rollomatic 630XW grinding machine has a general working range of grinding tools from 0.1 mm to 20 mm in diameter, has a high-speed multi-pallet pick and place loader with positions for up to 1,360 tools as standard and as standard a 6-position grinding wheel changer holding up to 24 wheels. The ultra-efficient synchronous grinding spindle motor provides constant rotation speed and torque regardless of the load on the motor and this combined with the latest linear motor technology provides benefits, such as an enhanced surface finish and reduced maintenance costs. The oil that's used for cooling the linear motors is the same as the coolant oil and this ensures constant thermal stability during production. The machine is also equipped with a touch probe that determines the exact location of the insert blank after clamping, in order that the software can grind the tool geometry according to the virtual centreline of the blank. This ensures that a run-out of just 2 µms can easily be achieved. As with all Rollomatic grinding machines it comes with its leading three years parts and labour warranty that is

part of the Rollomatic cell at SLE

typical medical parts ground on Rollomatic machines

provided by Rollomatic at no additional cost and also free of charge software and free unlimited software updates for life.

The Tschudin Cube centreless grinding machines enable end users, such as SLE, to achieve significant productivity gains and the machines particularly quick and flexible changeover times help to minimise machine downtime. What sets the Cube machine apart, in particular, is its very small size and radical open design for easy access. Users only need access to the rear of the machine to perform maintenance and servicing tasks, which means that several machines can be positioned together without any gaps.

The Tschudin Cube centreless grinding machine uses Tschudins patented W-axis which has the workrest blade mounted onto its own CNC axis that allows for parts to be loaded to it outside of the grinding area making loading efficient, fast and very safe. Traditional centreless grinding machines require parts to be loaded to a fixed work-rest blade that sits inside of the machine between the grinding wheel and control wheel making loading difficult, more expensive and sometimes unsafe. This also makes changeovers more complex and therefore lengthier. The Tschudin machine overcomes all of these issues and claims to be the world's easiest and fastest centreless grinding machine to set up.

The Cube's simple and low-maintenance machine design helps to reduce operating costs. The natural granite machine base and upper structure guarantee the best possible thermal stable, high-precision and a very safe grinding processes. Areas of application include plunge-cut grinding, grinding of several parts in a single cycle, oscillation of the component during grinding and through feed grinding. This versatility means that the Cube is suitable for a wide range of applications.

The Cube can be specified with a grinding wheel of 150 mm wide, option of 205 mm, with a 12 Kw grinding spindle for grinding up to 63 m/sec and is perfect for the production grinding of parts from 0.1 mm in diameter up to 20 mm in diameter and brings true sub-micron grinding capability for the centreless grinding of a huge variety of parts.

The multiple Tschudin machines in use at Smithstown Light Engineering are all equipped with FANUC robots for unmanned shift work whereby specialist medical parts are loaded from pallets, machined, and then placed back into pallets.

A high precision grinding machine requires the best possible filtration and the Comat super-filtration systems in use at SLE were specified and supplied by Advanced grinding Solutions Ltd, along with the machines and will keep the Rollomatic and Tschudin grinders in a perfect condition for many years to come. Comat manufactures super-filtration systems that deliver ≤ 2-3 µm filtration quality, making oil cleaner than unused oil as supplied new and 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 their 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.

Urs Tschudin with Gerard King at SLE

SUPERFILTERED OIL on a Comat System

Chris Boraston, MD at Advanced Grinding Solution's comments: "We have long since been involved as a major supplier of grinding and finishing machines to the medical industry and apart from selling many machines to the large OEMs, we have now gone onto supplying solutions to their major subcontract suppliers such as Smithstown Light Engineering as well. We see this trend continuing as the demand for machinery from forward-thinking and highly flexible companies, such as SLE, that are offering "one-stop shops" that encompass a huge variety of processes to their customers increases, as they pick up more and more business for manufacturing medical components of all types. This latest tranche of machines will join the many existing Rollomatics and Tschudin machines in use at SLE and we very much look forward to working with them on this and indeed on the many other projects that they are looking at."

AGS (Tschudin) can be contacted via its website: ***www.advancedgrindingsolutions.co.uk*** and SLE via its website ***www.sle.ie***

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Automated surface finishing is growing

Olli-Pekka Holamo, sales director for Flexmill, provides answers to five myths he and his team regularly hear about automated surface finishing

1. Grinding robot investment is profitable only with high-volume production, low workpiece variation and small product-mix

It is true that a high production volume, low workpiece variation and small product-mix shorten the grinding robot payback time and increase the Return on Investment (ROI). However, the latest advanced robotic technologies and Offline Programming (OLP) have revolutionised the scalability of robotic processing. New programs can be created and uploaded to the robot quickly, without disturbing an ongoing process and causing an extensive production break. OLP allows you to speed up grinding robot payback time and increase ROI even for small batches and high product-mix while minimising process downtime. Flexmill provides a complete process, tooling development and programming service for manufacturers and service providers to quickly create programs for an entire portfolio of unique workpieces.

2. Fixturing must be uniform for different workpieces otherwise an automated grinding robot doesn't make sense

How are parts presented to the process tooling? There are two basic methods: tool-to-part and part-to-tool. There are also two approaches for clamping the production part. Flexmill uses the same modular and proven concept to tackle part variations in both cases. Once the methodology is understood, the principles can be used for both grippers and pallet systems.

Fixturing has been one of the most challenging areas in automated grinding, especially with several unique workpieces. However, unique fixturing requirements are not a problem any longer. Flexmill provides innovative fixturing pallets or gripper systems with highly customisable clamping components, allowing fixturing workpieces of all types and shapes at any position. The pallets can be mounted on a conveyor, which automatically feeds the pallets and workpieces into an inbound buffer of the robot cell, waiting to be processed. After this is completed, the conveyor system removes the pallets and workpieces out of the cell.

3. With inconsistent workpiece geometries, the tool path must be changed frequently, reducing automation productivity

No two production parts are ever entirely identical, even if they have the same drawing number. This is due to manufacturing tolerances, such as varying cut lengths, material thickness, and air gaps. Also heat input twists the parts during welding. So, how to make sure the robot starts and ends the grinding at the correct location? How to ensure the grinding tool follows the contours in an identical way for all parts? Well, we can use the same technologies as in welding: mechanical probes and optical sensors can search for the critical positions and automatically re-position the robot movement accordingly before grinding. A force and compliance unit on the grinding robot takes care of two things: it keeps the contact force at the correct level and lets the disc or belt move up and down along the programmed path without losing contact.

4. Weld grinding robots can only handle consistent welds

Robotic grinding is at its best when processing known shapes and contours, repeated identically from one workpiece to another. However, sensors, software, and force control technologies have advanced dramatically and handling deviations is less of a problem today. For example, a weld grinding robot can now be programmed to dwell longer at high spots and pass lower spots faster to produce a uniform seam. Or, it can be instructed to start grinding with a low level of force and increase to a specified force level. The required parameter adjustments can be made automatically if the robot is equipped with specific sensors and software.

5. Operating a grinding robot is time-consuming and complicated

While building and setting up a robot application for grinding requires in-depth knowledge, experience and skills, operating the robot is relatively easy. The integrator simplifies the difficult tasks so that operators can quickly learn to control the robot. The daily operations on the shop floor do not require advanced technical skills, any operator knowing how to use a computer and click around with a mouse can learn to operate a robot. The intuitive user-interface takes the operator through the correct work steps of a grinding process. Robotic grinding has become the best way for manufacturers and service providers to increase productivity, quality and consistency while improving staff safety and avoiding workforce shortages.

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Liebherr automates disassembly of battery packs

In 2030, the batteries of an estimated four million electric vehicles will reach the end of their useful life. The lithium-ion batteries contain valuable raw materials and recycling them makes both ecological and economic sense. Up to now, however, the disassembly of the battery system has still been complex and expensive as the separation of the components is usually done manually.

This is where Liebherr-Verzahntechnik GmbH comes in. The company is developing strategies and processes for the automated disassembly of battery packs and is a partner in the federal government-funded research project "ZIRKEL", which investigates the entire circular economy of traction batteries.

Lithium-ion vehicle batteries are taken out of circulation once their total capacitance has reached about 70-80 percent of their original capacitance, state-of-health. The majority of these batteries are recycled and the raw materials are returned to the material cycle for the production of new batteries. Depending on their condition, a small proportion of the old batteries are reused in battery-electric vehicles. remanufacturing or in second-life applications such as stationary battery storage systems. When they have finally reached the end of their useful life, the new EU Battery Regulation stipulates recycling quotas and minimum quantities of reused raw materials in new production. The industry must find the most efficient

solutions possible for returning them to the material cycle, especially since the volumes of batteries returned will increase significantly in the future. The aim is to achieve a sustainable, CO_2-neutral battery production along the entire process chain with unlimited reuse of materials in a closed product life cycle. This is intended to minimise waste products and dependence on important primary materials.

High recycling rates through automation

Due to the relatively low quantities and large number of variants of diverse manufacturers and product generations, many disassembly and remanufacturing processes still take place manually today.

"We are almost talking here about a batch size of 1 in the return flow of battery packs," explains Jan Pollmann, development engineer for automation systems at Liebherr. In order to achieve a high recycling rate and to be able to process the increasing return volumes economically, it is necessary to automate the processes. Another aspect is occupational health and safety: automated disassembly ensures the health and safety of employees and excludes their exposure to high voltage, hazardous substances or fire risks.

Liebherr develops automated disassembly processes for battery packs

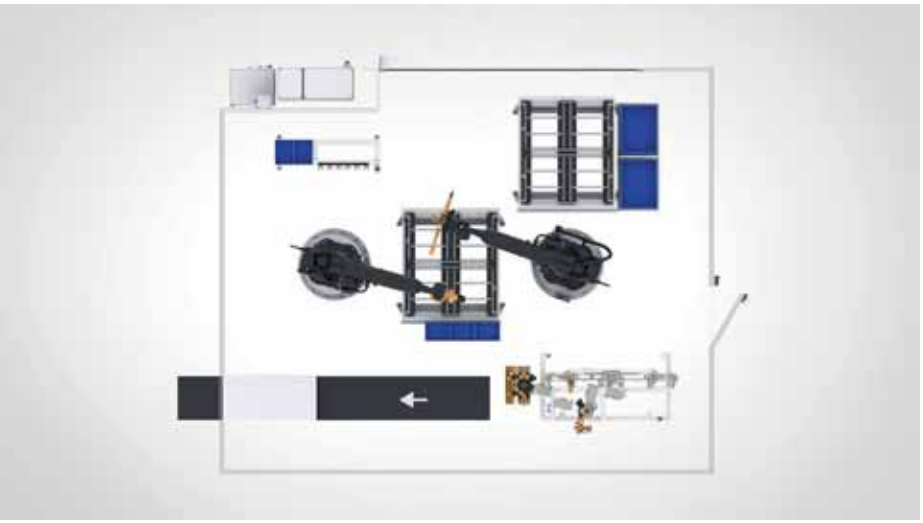
The "ZIRKEL" research project, funded by the German Federal Ministry of Education and Research (BMBF), involves an interdisciplinary consortium from research and industry to investigate the entire recycling management of batteries. As part of this project, Liebherr is developing strategies and processes for the automated disassembly of battery packs. The aim is to recover and recycle the highest possible proportion of raw materials by mechanically disassembling and sorting the components.

By removing valuable components or those containing pollutants at an early stage, the cost- and energy-intensive pyro- and hydrometallurgical processing of the so-called black mass, i.e. the raw material mixture that remains after the batteries have been shredded, is reduced.

Automation challenges

In addition to the variety of batteries, a

number of other challenges exist for an automated disassembly process: used batteries can be corroded, deformed or damaged. Contaminated components are sometimes difficult for vision systems to detect. Sealants, adhesives or heat-conducting pastes change their consistency and properties over time and may be difficult to remove. Risks such as high-voltage or hazardous substances must be taken into account. Finally, the disassembly of flexible parts such as cables or cooling hoses is difficult to automate. "In principle, the established assembly process runs backwards here, but it is many times more complex," explains Viktor Bayrhof, product manager for automation systems at Liebherr.



Pilot plant for the "ZIRKEL" joint project

Liebherr's first pilot plant will be installed at the Open Hybrid LabFactory research campus in Wolfsburg in July 2023. Liebherr will continue to support the project there and carry out further test series. The results will be incorporated into a planned industry guideline for recyclable battery product design. "We are pleased to be able to contribute our process expertise in the field of automation to this future-oriented project," explains Jan Pollmann.

The Liebherr Group is a family-run technology company with a highly diversified product portfolio. The company is one of the largest construction equipment manufacturers in the world. It also provides high-quality and user-oriented products and services in a wide range of other areas. The Liebherr Group includes over 140 companies across all continents. In 2021, it employed more than 49,000 staff and achieved combined revenues of over 11.6 billion Euros. Liebherr was founded in Kirchdorf an der Iller in Southern Germany in 1949. Since then, its employees have been pursuing the goal of achieving continuous technological innovation and bringing industry-leading solutions to its customers.

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More efficient grinding process thanks to automation

Whenever pumps are used, they become essential components for the reliability of a machine's overall performance. That's why pump manufacturer Scherzinger Pumpen, in Germany, describes its products as "the heart of high-tech" and promises "Scherzinger pumps keep your application running and meet all gear pump requirements."

The company was founded more than 80 years ago and produces customised pumps for automotive engineering, mechanical and plant engineering and power plant technology. The pumps are used for applications such as auxiliary heaters, chemical metering, two-component adhesive metering, or turbines.

Its portfolio includes gerotor pumps, external or internal gear pumps and vane pumps and its aim is to gradually increase the level of automation in production, so that employees who are tied up with simple tasks can work in more demanding activities. Another motivation for automation is to increase the efficiency of existing machinery.

When searching for a suitable automation solutions partner, the sought out a company with extensive automation and robotics experience in geographical proximity. As it turns out, EGS Automation in Donaueschingen is quite close to Scherzinger Pumpen. The company has been offering experience in robot automation since 1999 and had already installed more than 2,000 robots. EGS develops and implements customer-specific solutions, but also offers a large portfolio of standardised machine loading systems.

Further discussions revealed that one of the EGS standard automation solutions from its SUMO series was perfectly suited to meet the requirements. A standard solution saves costs since the engineering effort is significantly lower. Furthermore, the standard product line is tried and true as it has been used in various applications.

The SUMO Multiplex, a 12-fold palletising system, based on the paternoster principle turned out to be the perfect solution for Scherzinger. Component handling is performed by a MOTOMAN GP7 robot from

Yaskawa. This 6-axis jointed-arm robot has a range of approx. one meter with a payload of 7 kg and is compactly attached to the palletising system. The fast travel speed and high accuracy ensures fast, reliable and accurate part changes in the machine. The system was built with a side-shifting device that allows the entire unit to be shifted on its side in seconds, giving full access to the grinder. Additionally, this system can just as quickly be pushed back in front of the machine and precisely indexed so that it can resume automatic operation.

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DANOBAT provides the solution for MAN Diesel & Turbo

MAN Diesel & Turbo is a leading provider of large diesel engines for use in ships and is a leading supplier of diesel power stations and turbo machines. The company operates in more than 100 international locations and the range of products and services that it offers includes complete marine drive systems, turbo-machinery trains for both the oil and gas industries and process engineering, as well as turnkey power plants.

It approached DANOBAT looking for a complete solution for grinding different ship engine turbine wheels for each model of ship. These are parts of between 183-420 mm in diameter and 320-720 mm in length with blades made of Inconel. The process up to then consisted of using two machines: one for grinding the different diameters and faces of the shaft and the other for machining the blades, which required a different grinding wheel for each piece. These are parts of between183-420 mm in diameter and 320-720 mm in length with blades made of Inconel.

To find a solution for grinding this set of parts, DANOBAT presented the horizontal grinding machine model HG-92-2000-B6 with different systems in order to optimise the process to the maximum, so all machining operations could be performed on one single machine setup.

Among the most important features of this machine model are the following:

- Double wheel head assembled on a B axis. One setup, one finished part.
- New design of grinding wheel and contouring process. Grinding wheel designed by DANOBAT for grinding the different diameters of the blades using a contouring process, thus cancelling the need for different grinding wheels for each part model.

- Both spindles assembled on hydrostatic bearings. Maximum rigidity and maximum vibration damping capacity.
- Motorised tailstock with automatic programmable positioning and blocking. Part changing has a negligible influence on the setup time.
- Continuous dressing system, dressing the wheel during grinding, resulting in a significant increase of productivity.
- Several measuring systems.
- Software DAN-OP. A powerful technological development allowing very friendly conversational programming and powerful calculations. The standard HG-92 easily achieves the precision requirements for this project because of its construction and the gauging systems. However, the desired working methods demand for specific solutions:
- MDM absolute contact measuring system designed and manufactured by DANOBAT, suitable to measure in-process all and each diameter to be ground. At the end of the grinding cycle, in automatic mode and by program, all diameters, its geometry and faces can be measured and a Test Report can be issued.
- Touch probe showing the part clamped between centres with axial references.
- Blade measuring non-contact system by laser allowing to measure the different shapes of the blades, hence avoiding the use of measuring standards used previously for each type of blade. DANOBAT was able to offer a complete solution on one single machine for grinding different ship engine turbo compressors, providing great precision, surface tolerance IT5 and roughness Ra0,4, which made MAN Diesel & Turbo opt for this technology and entrust DANOBAT with this and future projects.

The Danobatgroup develops and supplies machine tools, turnkey lines and solutions for specific applications aimed at high-technology sectors and at customers with high technical requirements.

Its offering comprises of advanced machines ensuring high accuracy, reliability and productivity, designed to be able to handle the most complex machining processes. It provides advanced solutions for the manufacture of high value-added components which are developed in close collaboration with leading companies in their sector. This results in fully automated solutions and turnkey lines and advanced services based on the latest information and communication technologies.

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Tyrolit expands its abrasives portfolio

2023 marks another exciting year for Tyrolit with the announcement of its acquisition of EGELI EGESAN Abrasives.

In a highly competitive market, Tyrolit has identified a gap for an additional range of products outside of its current brands. Targeted at cost conscious professionals, this identification has led to the new Tyrolit EGESAN brand.

Founded 50 years ago, EGELI EGESAN is a leader in the fields of cut-off and deburring wheels, coated abrasives and abrasive tools for various applications, with an excellent reputation among its customers.

With an initial range of cut-off wheels, grinding wheels, flap and fibre discs launching onto the UK market in May, Tyrolit brand EGESAN has already been welcomed by customers with an extended range of bonded and coated products due to make their debut later in the year.

Pete Dufty, sales director for Tyrolit UK explains: "This acquisition allows Tyrolit to extend our product portfolio, providing us with additional access to the production of coated abrasives, as well as added comprehensive know-how. This opens up more opportunity for Tyrolit to provide an attractive price performance ratio for cost conscious customers and a complete range of products from a single source."

The extended range of Tyrolit EGESAN to look out for over the coming months includes:

- Bonded abrasives, cutting & grinding discs for foundry, stainless steel, metal and stone.

- Vitrified grinding wheels, bench grinding wheels, cylindrical and surface grinding wheels, saw sharpening wheels, scythe stones and cup wheels.

- Coated abrasives, flap discs, fibre discs, DA sander discs, abrasive belts and rolls, including wide belts, waterproof abrasive sandpapers and abrasive flap wheels

- Non-woven, flap wheels, mop discs and abrasive sponge wheels.

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New Mirka cutting and grinding wheels for efficient metal work

Mirka has introduced a new range of cutting and grinding wheels to make metal working faster and more effective. Choose from Mirka and Mirka PRO wheels according to your specific application, whether you are cutting metal sheets, profiles, pipes or solid metal, or grinding surfaces, edges or welding seams.

When working on stainless steel, it is important to choose suitable wheels to maintain chemical purity otherwise there is a risk of corrosion, pitting or reducing the strength of the material. Mirka's INOX wheels are designed for cutting and grinding of stainless steel without impairing the material.

Designed for high performance, Mirka PRO wheels combine long lifetime with high cutting ability and stability. Mirka's powerful rough grinding wheels are suitable for both steel and stainless steel.

In addition to cut-off and grinding wheels for metal, Mirka offers wheels for stone materials and specialty applications, including cutting rail steel. The range of Mirka wheels also includes cutting wheels for non-ferrous metals, with high cutting ability and short cutting times. Mirka's Multi cutting wheels are suitable for steel, aluminium, tile and clinker alike.

Pioneering surface finishing for 80 years

From humble beginnings to becoming one of the world leaders in the surface finishing industry, Mirka is celebrating its 80 year anniversary this year. For eight decades Mirka has been at the forefront of leading innovations in abrasives manufacturing.

Mirka was founded in 1943 in Helsinki by the engineer Onni Aulo, but due to the continuation war, production did not start until 1946. Since then, Mirka has grown and is today, headquartered in the heart of rural Ostrobothnia, Finland. With a network spanning the entire globe, the company has become a leader in the surface finishing industry.

Physically, Mirka is a very different company today compared to when it started. But its core vision is still the same: To give people, its customers, the opportunity to perform better and to get that perfect finish. This is something that also drives it in its daily operations, the strive to continuously improve what it does. The most important element of this has always been to listen to the voice of its customers.

During the past 80 years, Mirka has seen many milestones. From the opening of the first subsidiary in the UK in 1979 to pioneering dust-free sanding with the launch of Abranet® in 2001 and, not forgetting, the award-winning power tools. But even though this year of celebration will be about reflection and looking back at the journey so far, the eyes of the company are looking toward the future.

Mirka's CEO Stefan Sjöberg says: "We are proud of all the things we have achieved, but to stay relevant one must also look forward to the next big thing and here we see a lot of potential.

The Green Deal in the European Union and the green transition in the world, in general, are something that will shape how we look at things and how we do them. Not only for Mirka but for the entire industry.

The one who solves this puzzle will be relevant for many years to come. Looking at our organisation today, I am confident that Mirka will be here to celebrate its 90th and 100th anniversary as well.

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Master Abrasives' new Vitrified CBN range meets exacting geometrical tolerances economically

Midlands-based Master Abrasives is now offering a complete precision package under it's own brand with new cost-effective Vitrified CBN products

Master Abrasives is now offering a complete range of vitrified CBN products under its own brand, Master®. The company continues to develop a complete abrasive solution package by developing a full portfolio of abrasive products as well as working with named premium brands.

The new range of Master vitrified CBN products are offered from 1 mm up to large surface and cylindrical vitrified CBN grinding wheels. The internal range of vitrified CBN wheels can be supplied on threaded shanks, plain shank in steel or carbide and plain bore mounted CBN wheels. This range competes at the highest level in a niche market and productivity can be improved with Master products at a much lower cost.

Master Abrasives' solution is not only offering a premium quality product, but it is also supported by first class application engineers with a long history of engineering experience. Their commercial level experience confirms that top quality does not have to come at a premium price but is offered at a fair one. The range utilises the latest technology with CBN crystals sourced from around the world, blended and mixed into vitrified bonds that have been developed in house, to ensure it's a step above the competition.

Master Abrasives can also offer auxiliary products so that the engineered solution can be fully implemented with items such as the correctly designed carbide quills, dressing tools and systems.

Producing accurate small bores to exacting geometrical tolerance is not easy and requires abrasive products of the highest quality, which Master can offer at a rate that will ensure maximum productivity is achieved.

Contact Master Abrasives' team for more information and to assess your application requirements with professionals: sales@master-abrasives.co.uk

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

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Sunnen balances power with precision in new line of vertical honing machines

The new Sunnen SV-35 Series machines handle a wide range of bore diameters and parts weighing up to 1,325 lbs, (600 kg). It also features the all new Sunnen2 control system that, when combined with servo powered spindle and stroker, allows for true constant cross hatch surface finish from top to bottom of the bore. The flexible SV-35 is the ideal solution for contract machine shops, automotive performance shops, production engine remanufacturers and mid-volume production facilities.

The new Sunnen SV-35 Series honing machines balance power and precision to achieve expert results on a wide range of parts including engine cylinder blocks, liners and other applications that require a precision bore. The SV-35 includes a new in-house designed Sunnen2 control with simplified menus and storage of 1,000+ setups for quick and easy changeovers. The new control helps reduce labour costs and increases productivity, as multiple operators can be quickly trained to run the system. When used with the wide range of Sunnen-made abrasives, tooling and coolants, the U.S.-built SV-35 produces ideal bore roundness and surface finish in a variety of part types and materials at an affordable price.

The rugged 15.6-inch, 396 mm, colour touchscreen with intuitive controls provides a real-time display of the full-bore cross section during the process. Screen-selected languages include English, German, Spanish and Chinese. The control's programmable Auto-Dwell feature automatically corrects taper anywhere in the bore for unattended operation. Two-stage GH honing tools with diamond abrasives, CBN abrasives or PB brushes can combine roughing and finishing operations in one tool for high productivity.

Three new standard SV-35 models include two step-and-repeat-capable versions, allowing automatic bore-to-bore processing for in-line and V-block configurations. The step-and-repeat feature allows machine operators to complete other tasks while the machine hones the part automatically. A base SV-35 model has a manual X-axis for low-volume applications.

The SV-35's part diameter range is 0.75 to 8 in, 19 to 203 mm, depending on the tooling option. Sunnen GH-LF tooling enables the automatic step-and-repeat operation. The SV-35's capability to handle workpiece/fixture weights up to 1,325 lbs, (600 kg) and a large, 48 in x 30 in, 1,219 mm x 760 mm, work envelope provide versatility in processing larger parts and make it a workhorse honing machine, worthy of its Sunnen Cylinder King lineage.

The SV-35 includes spindle reversal, standard bore oversize setup, .010 in/.020 in/.030 in and automatic tool protection at the top and bottom of the bore, which verifies an unobstructed stroke before starting a cycle. A 4.55 hp, 3.4 kW, servo spindle motor, producing speeds from 50-600 rpm, is coupled with the 4.7 hp, 3.5 kW, servo ball screw system to produce up to 100 true vertical strokes per minute with a stroke travel of up to 27.75 in, 705 mm. This combination allows the SV-35 series to accommodate a wide range of applications economically.

The X-axis range is 32 in, 813 mm, of left/right travel for a wide range of part sizes and bore configurations.

In addition to the GH-LF tooling, required for automatic step and repeat operation, the SV-35 is compatible with all Sunnen's current large diameter tooling. This includes the DH Series diamond abrasive hone heads and brushes, GHSS single-stage hone heads with CBN or diamond abrasives and GHTS hone heads for two-stage honing with CBN or diamond abrasives and brushes.

The new vertical honing machine is equipped with standard LED lighting in the work area and has the latest standard safety features including light curtain, interlocked front door, guarding around the work area and safety PLC which limits setup speeds in all axes. An integral coolant system reduces floor space and includes twin PF filter cartridges in robust steel cannisters and a heavy-duty coolant pump. This system ensures clean honing fluid is supplied to the abrasive/part interface for optimum performance. Options also include a T-slot base plate, for custom fixturing, a heavy-duty manual rollover cradle for engine blocks and a crosshatch camera system for verification of the cross-hatch angle.

The SV-35 is backed by Sunnen's 3-year parts and labour warranty and is sold and serviced as part of a total solution that includes Sunnen-made abrasives, tooling, bore gauges and coolants.

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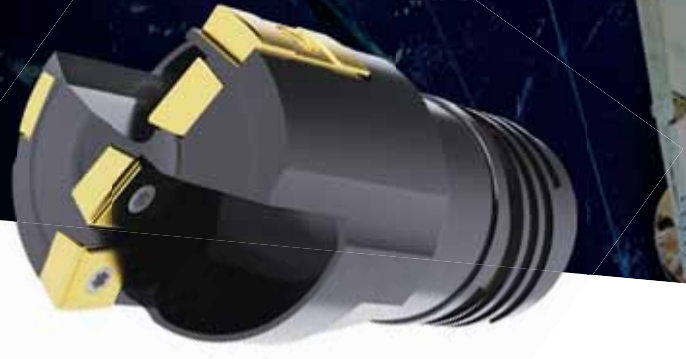
AT SUNNEN... WE ARE EXCITED TO BE BORING!

After 100 years in the honing business, Sunnen knows a thing or two about making precision bores. We apply that same engineering expertise to a full line of tooling for gun drilling, BTA drilling and ejector drilling applications.



Our inserts and guide pads are manufactured with the latest pressing and coating technology. Test data shows Sunnen products outperform other similar tools, offering:

- Higher feed rates for faster production
- Longer life for pads and inserts for increased up-time, even in super-alloys
- Superior bore finishes and precision sizing
- The lowest overall cost per hole

From machines to tools, we're the single-source supplier for all of your bore creation, sizing and finishing needs.

Ask about our Sandvik-style replacement tooling.

Our full lines include:

- GDex Indexable Gun Drill Tools (12-28 mm)
- MicroDex Solid Drilling Tools (12-28 mm)
- DirectDex Solid Drilling Tools (25-65 mm) *(Replaces Sandvik Corodrill®800)*
- CounterDex Counterboring Tools (35-216 mm) *(Replaces Sandik CoroDrill®818)*
- HellerDex Solid Drilling Tools (38-246 mm)
- TrueDex Solid Drilling Tools (63-184 mm) *(Replaces Sandvik T-MAX®drill 424.10)*
- FlexiDex Solid Drilling Tools (65-196 mm) *(Replaces Sandvik CoroDrill®801)*

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I23-02

Cost-effective honing solutions for small series, one-offs and prototypes

Honing on the BAZ

Fine machining honing is usually carried out on specially developed honing machines. For large quantities, there is no way around this type of machine. But what about small series or even individual pieces and prototypes? Nagel Maschinen- und Werkzeugfab-rik GmbH in Nürtingen, Germany, has suitable honing tools for machining centres (BAZ) in its range.

Component manufacturers who only have a manageable number of workpieces to hone each year understandably shy away from purchasing a classic honing machine. Two alternatives remain open and one is to outsource the work. This approach usually costs valuable time and requires the corresponding logistical effort. The second alternative, in-house machining on a BAZ, turning or milling centre, is faster and less expensive. Specially designed honing tools make this possible. "With optimised tools for machining centres, honing can easily be integrated into the portfolio as a further production technology," emphasises Markus Auch, technical sales manager at Nagel Maschinen- und Werkzeugfabrik GmbH. In addition to manufacturing conventional honing tools, the Nürtingen-based manufacturer of honing machines also produces these customised tools. According to the fine-machining experts, users come from all metalworking industries.

Honing on the BAZ is anything but an emergency solution. There is even a central advantage: the workpiece is already in a clamping device on the BAZ and does not need to be reclamped. This means that small honing allowances are possible, which benefits process reliability and bore quality. If necessary, the number of necessary honing operations and consequently the machining time is reduced. The bottom line is that the costs per bore are minimised.

Single stroke honing

Honing tools for the BAZ and related machine tools can be divided into two main groups: versions with and without expansion or infeed. Honing without expansion is also called single stroke honing or friction honing. The process can be performed with Hondornen or grinding pins. Although the classic cross-ground surface cannot be achieved with this process, high dimensional and form qualities with tolerances <1 µm can be achieved. The common diameter range is about 3-50 mm. Larger diameters rarely occur.

The experts at Nagel developed the so-called "Precidor tools" from precise and mandrel for single-stroke honing. The tools are either used after reaming or replace reaming completely, reaming honing. While reamers produce the chips with geometrically defined cutting edges, the material removal with hondorns takes place with full-surface or strip-shaped diamond coatings. Typical applications are bores with longitudinal grooves where the cutting edges of a reamer would get caught. Further examples are valve seats and guides, e.g., in hydraulics. If required, Nagel can also supply designs for stub bores or multi-stage processes. Most mandrels include wear compensation by means of an expanding mandrel. The mechanism is actuated at the adapter of the spindle pick-up. A knurl and a scale allow µ-accurate adjustment.

Especially for ream honing, i.e., to replace reaming, Nagel has developed low-cost DAL-E hondorns. "In principle, these are simplified precidor tools," says Markus Auch. Many users have to struggle with tool life problems when reaming. The reaming tools, on the other hand, offer a tool life that is about a factor of 10 longer than that of reamers. Another bonus is that they can be used on hardened materials. Equipped with a cylindrical shank as standard, these tools are also suitable for standard machine tools and even for hand-held drilling machines, e.g., to rework bores on large components. "The DAL-E Hondorns are cost-effective machining solutions for high-quality results," adds Markus Auch. Like the

Honing tool with mounting for the spindle in the machining centre or another processing machine. The equipment includes honing stones that can be expanded by coolant pres-sure and an optimal connection for air measurement. Picture: Nagel

The precidor tools from Nagel are available in a wide variety of designs with full-surface or strip-shaped diamond coatings

precidor tools, they can be readjusted, but not via an adapter on the holder; via an opening on the face.

Classic honing

Classic honing with the typical cross pattern is also possible on a BAZ and comparable machining centres, both with vertical and horizontal spindles. Compared to a classic honing machine, the general conditions on a BAZ are completely different and usually also vary. However, the quality requirements are constantly high. At the end of the day, µ-accurate results are required. The prerequisite for this is an optimally coordinated overall package. Being able to provide this to every user is a declared strength of the Nürtingen honing specialists.

NAGEL Maschinen- und Werkzeugfabrik GmbH is a specialist in the field of honing and superfinishing technology worldwide. Its innovative solutions have given customers a valuable technological edge for more than half a century.

The machines, tools and service in the field of honing and superfinishing enable the highest level of quality, productivity and process reliability on the production lines of its customers. According to the principle of simultaneous engineering we develop the ideal fine machining process parallel to the customer's product development and then deliver exactly the right solution to enable customers to reach all their targets.

In addition to the automotive industry, numerous other fields use NAGEL honing and superfinishing technology: from compressor building and mechanical engineering to the fields of hydraulics, pneumatics and medical engineering. NAGEL is a competent partner wherever demanding tasks in the field of precision machining have to be economically and efficiently managed.

As a company with international operations it can offer customers service worldwide. The company employs more than 1,800 employees at seven international locations.

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Experience the brilliance of Kemet's mirror-finish polishing technique

Kemet has established itself as a well-known brand in the diamond lapping and polishing sector. However, there are certain instances where using diamond alone does not yield the desired outcomes. In such situations, Kemet's COL-K products have proven to be a revolutionary option for polishing medical and injection mould inserts, resulting in a remarkable reduction of over 60 percent in polishing costs.

The COL-K series provides a consistent mirror-like polish in just two stages. The first stage involves pre-polishing with diamond, followed by a final polishing process using COL-K. When employed in conjunction with the recommended Kemet composite during the pre-polishing stage, it becomes possible to achieve a sharper edge on polished components, minimising the occurrence of "roll-off" compared to the standard diamond/polishing pad method. This is particularly crucial for small, polished components where achieving both flatness and a flawless finish is of utmost importance.

Kemet's KemCol 15 (Chemical Mechanical Polishing Machine), designed to complement its range of non-diamond super-finishing media, is an innovative addition. Based on the popular Kemet 15 bench-top model, the KemCol 15 incorporates stainless steel elements instead of painted components to ensure a longer lifespan and contamination-free polishing. The machine is equipped with a fully programmable peristaltic pump system and offers a choice between ceramic-faced or aluminium conditioning rings.

Kemet provides process trials to determine and recommend the most cost-effective and consistent solution for any application. Their expertise extends beyond flat surface requirements to include spherical and cylindrical surface finishing challenges.

By utilising COL-K products and the KemCol 15 machine, Kemet has revolutionised the polishing of medical and injection mould inserts by delivering a solution that is both cost-effective and repeatable. The combination of diamond and COL-K enables the achievement of sharper edges on polished components, particularly advantageous for smaller parts. Additionally, the KemCol 15 machine ensures extended durability and contamination-free polishing, guaranteeing a high-quality finish.

If you require a polishing solution that surpasses the capabilities of diamond alone, Kemet's COL-K products and KemCol 15 machine offer a range of cost-effective and consistent solutions for various applications. With its expertise in addressing surface finishing challenges, Kemet can provide valuable recommendations for your specific needs.

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Metallography and metallographic polishing

Metallography is a science that studies the internal organisation and structure of metal or alloy materials. It mainly uses metallographic microscopy or electron microscopy to research the internal structural changes and their impact on the performance of metals or alloys caused by chemical composition, processing conditions, heat treatment, etc.

Metallographic polishing is an important part of metallography, which is a prerequisite for analysing and studying samples. During the polishing process, there are solid abrasives or free abrasives between the polishing tool and the surface of the workpiece, where a certain pressure is applied to generate a complex relative motion. Thus, a thin layer is removed from the surface of the workpiece after the polishing process and then a very high precision and low surface roughness will be obtained. When the metallographic polishing reaches the testing requirements, the internal organisation and structure of the sample can be observed with a metallographic microscope.

The metallographic microscope is the main instrument of metallographic analysis and is specially used to observe the metallographic organisation of opaque objects such as metals and minerals. In the metallographic microscope, the illumination beam is from the direction of the objective lens to the surface of the observed object, reflected by the object's surface and then returned to the objective lens for imaging. This reflection illumination method is also widely used in the inspection of integrated circuit silicon wafers.

To observe the true internal structure and analyse it, most of the metallographic samples to be observed need to be ground and polished. During the process of mechanical grinding and polishing, the surface layer of the samples undergoes severe plastic deformation so the sample preparation technology is very important to metallographic research.

The determination of metallographic organisation is the core of metallographic analysis, which includes both qualitative and quantitative aspects. In conventional metallographic inspection, various metallographic inspection standards are used as the basis for determination.

After the metallographic sample is cut or mounted, a series of polishing works is required to get a bright polishing surface and then the metallographic organisation can be analysed and confirmed. Generally speaking, the polishing process includes three steps: rough polishing, fine polishing and final polishing.

After the sample is cut, the first step is rough polishing, which is generally carried out on the floor grinding wheel. The coarseness of the abrasive particle has a certain impact on the sample's surface roughness and polishing efficiency. During the infrared carbon and sulfur analyser rough polishing, we should also pay attention to the dipping water cooling to prevent organisational changes. Some samples can be installed directly on the fixture of the metallographic polishing machine without cutting or mounting and they have high flatness, so there is no need for a wheel rough polishing process.

Although the sample surface is smooth after rough polishing, there are still deeper abrasive scratches and surface processing deformation layers, which need to be gradually ground with different metallography polishing papers from coarse to fine. After this, the sample will be ready for further polishing. Metallography abrasive paper is an important material for polishing metallographic samples and the abrasives generally used are silicon carbide, aluminum oxide and diamond. During manual grinding, the abrasive paper should be placed on the glass plate and used from coarse to fine. For each replacement of sandpaper, the sample should be turned 90° and make the previous abrasive scratches completely removed. In addition to manual polishing, mechanical fine polishing can be done with a metallographic specimen polishing machine. But during the mechanical polishing, water cooling needs to be done to avoid overheating of the polishing surface. The abrasive type and particle size of metallography polishing paper are different according to the type of sample. For samples with higher hardness, such as hard alloys, semiconductors, ceramics and other materials, diamond metallography abrasive paper is required. For other materials with lower hardness, alumina waterproof sandpaper or electrostatic polishing film can be chosen.

The purpose of polishing is to remove the small grinding starches and surface deformation layer left by fine polishing on the sample surface so that the polishing surface becomes a smooth mirror surface without scratches, which is convenient for analysing the textural results and defects of the sample under high magnification microscope.

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Directionless finishing crucial for GEA Food Solutions

The manufacturing of packaging machines is high-tech. Just ask Allard van Haaften from GEA Food Solutions. The multinational's machine factory is located in Weert in the Netherlands and specialises in machines for packaging food and lollipops, both for production and packaging. A directionless finish is desired for these packaging machines.

Whilst a technician from GEA Food Solutions works on fine-tuning a lollipop packaging machine, Allard van Haaften is asked if he would like to give a demonstration. He is responsible for supply chain and operations at GEA Food Solutions.

He said: "We are in the test phase and only have a fraction of the capacity". Nevertheless, the lollipop packaging machine shoots packed lollipops into a collection tray and the machine is able to do it faster. "We do between 800 and 1,400 lollipops per minute," Allard Van Haaften continued: "This number depends a little on the shape and size of the lollipops."

Worldwide

GEA Group is one of the world's leading suppliers of machinery and systems for food processing technology and related industries. The company employs over 18,000 people and is located in 62 countries. At the technology centre in Weert, it is clear that high-speed packaging is no mean feat. But whether it is packaging chicken, nuts, lettuce, sweets, chips or lollipops; GEA offers a solution.

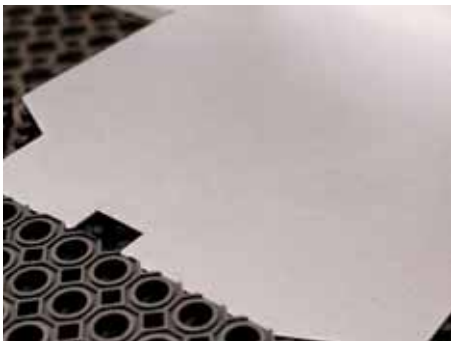
Easy to clean

How do they make the machines in Weert? The basis is partly stainless-steel sheet metal that comes in and goes to the laser cutting machine. After the sheets go through the laser cutting machines, they are further processed in a Timesavers 32 RB series. Allard Van Haaften explained: "The machines we make are largely made of stainless steel and anodised aluminium, because they have to be easy to clean. You don't want to find any residue from a machine in a food product. Parts have to be perfectly flat, completely deburred."

Timesavers machine

GEA Food Solutions has chosen the '32 RB series' after careful consideration. The 32 RB series is the compact dry wide belt grinder for deburring, edge rounding, finishing and/or laser oxide removal. Allard Van Haaften said: "We mainly looked for a machine that would allow us to finish as smoothly as possible. Products come out of the laser cutter, are tapped when necessary and are finished in the Timesavers machine. The finished products go through the belt onto the return table. The return table is proving to be very valuable because it allows us to ensure that the machine is employable by many people working around the machine. Further down the assembly line, the machines are assembled into full-fledged food packaging devices."

Directionless
Allard Van Haaften stressed that directionless finishing is important. "A machine that you don't finish directionless simply does not look nice. If you finish the sheet metal directionless, it doesn't matter how you put the sheets in the Timesaver. Moreover, you do not want deep surface scratches because then the plate gets dirty faster and is harder to clean. This is a no-go if you work with food products."



Meet the need
GEA Food Solutions has had the Timesavers 32 RB series in operation for a year now. Allard Van Haaften explained: "Within a week, everyone was able to operate the machine flawlessly. Together with

Timesavers, we examined how we could replace the existing machine with one that could both finish directionless and process very small parts. The promise was then made that we could finish a euro in terms of size. This was proved possible without any problems. We then went to the factory with lasered parts and did tests: how fast does the machine go, what grain size should we choose? This way, with Timesavers' help, we chose the machine that suited us best."

Brush selection
It was precisely in the area of brush selection and brush pressure that Timesavers' expertise came in handy; GEA Food Solutions is an expert in packaging machines, among other things, but not in deburring. Allard Van Haaften concluded: "We make a lot of single-piece operations and there is therefore a lot of variation. For us, the question was whether we could nevertheless use the same settings as much as possible. The sheets we process are generally between 1 mm and 3 mm thick. Sometimes we have pieces of 5 mms. We normally only use brushes for finishing and very occasionally a pre-grinding belt. You only need the pre-grinding belt if you need to remove a large burr. But rather not, because a grinding belt leaves marks anyway. And for us there is no debate, we want directionless."

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Innovation and new technologies from Q-Fin

Dutch manufacturer, Q-Fin Quality Finishing Machines specialises in the development, production and sale of machines for deburring, rounding and finishing sheet metal parts, as well as installations to extract grinding dust. The surface-finishing specialist aims to introduce at least two new innovations every year and is currently building a second hall, for handling solutions, at its new premises in Bergeijk, The Netherlands. It is part of a group of four companies which support Q-Fin with materials such as steel parts.

Founded in 2013 by Anton Bax and Koen de Waard, with a combined thirty years of experience in deburring and machine construction, it has already picked up several awards. These include the surface-finishing technology prize at EuroBLECH 2018 in Hanover and, in 2019, a Blechexpo award for its F200 XL small parts machine. This year, the F1200 XL with SmartLink was nominated for the Technishow Innovation Award.

Its head office, with showroom and demonstration centre, is based at Bergeijk (Noord-Brabant), The Netherlands. All its machines are assembled there, although all metal components, after engineering, are sourced from its sister companies in the group.

The last two years of the COVID-19 pandemic affected the company's turnover but also taught it new ways to communicate with its customers which it still employs today, such as online machine demonstrations.

The SER1200 Multibrush deburring system

Q-Fin has set itself the task of introducing at least two technology innovations every year.

In 2020, for example, its Q2S reversing unit, for automatically turning sheet metal, went into the test phase with a customer. Several reversing units have since been sold. In 2021, the company developed a machine for removing slag from metal parts which had been cut by plasma or oxyfuel. It also unveiled three new surface-finishing machines, as well as networked software, at the Blechexpo trade show in Stuttgart in November 2021. Last year, Q-Fin announced the world premiere of a new deburring machine, the SER1200 Multibrush deburring system, at EuroBLECH in Hanover, Germany.

The fully programmable, 'all-in-one' SER1200 Multibrush deburring system provides flat sheet-metal parts automatically with a wide range of finishes: deburring; grinding; edge rounding; oxide removal; directionless finish; line finish and Radius 2. All machining stations are individually adjustable and programmable for reproducibility of products and to eliminate the risk of operator errors.

The first two SER100 machines have already been sold prior to the official launch. Both will be sent to Dutch customers.

Market and user trends

Q-FIN sees much larger demand for automation and handling around its machines, as well as Industry 4.0 compatibility.

Q-Fin sold three large deburring lines with turnaround units last year. The lines comprise two deburring machines; two extractors; a turnaround unit and two input/output conveyors.

However, challenges such as high fuel/energy prices; the war in Ukraine; supply-chain issues and 'hard to get' parts/electronic components; increasing delivery times/prices and plummeting stock levels are currently hitting many manufacturers. In this respect, Q-Fin points to the lower power consumption of its machines (saving high energy costs).

Brushes, speed and pressure determine the power and efficiency of a deburring machine. This is what Q-Fin terms as GrindingPOWER®.

It works on the principle of the more compact the machine, the less throughput time. Add this to high throughput speed of the machines and the result, is significant savings in terms of labour hours. Q-Fin's R&D efforts are focused on improving process control around the machine.

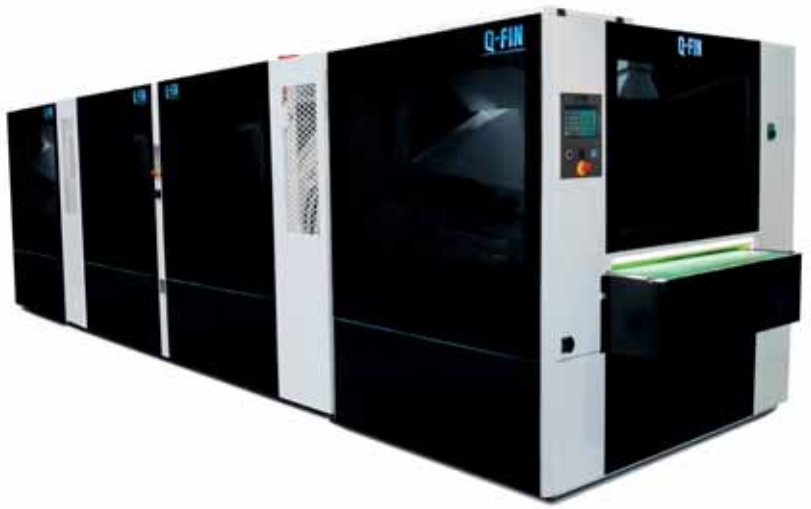
Q-Fin Knowledge Club

Q-Fin has set up all its machines in working order so that customers can test their own products by appointment at its Experience Centre in Bergeijk.

It acts as a knowledge centre for grinding and deburring techniques. Its customers can come for advice, such as the right use of brushes and grinding belts or for information on the correct machine settings. New customers can test machines in the

Experience Centre or can be put in contact with other customers for references.

Continuous innovation of machines and processes is part of the company's culture, as it expands its knowledge levels and shares this knowledge with users of its machines.



Automated deburring line

Q-Fin installed an automated deburring line at Willems Baling Equipment in Hapert, The Netherlands, last year. A novel feature is a rotating unit to automatically turn large workpieces or heavy sheet-metal parts. This enables the parts to be deburred and edge rounded on both sides, in one pass, rapidly and with high finishing quality.

The reversing station is for two-sided finishing of sheet metal parts, up to 600 mm, 1,200 mm and 1,500 mm wide. The Q2S turnaround station provides batch-wise, double-sided finishing at high throughput speeds. The system can be controlled by one operator. The Q2S turnaround unit is now part of the deburring line at Willems. It is positioned between two F1200 deburring machines.

The operator loads the 3 m long and 1,200 mm-wide table in front of the first machine. He enters the correct settings on the control panel on the front machine, which allows him to control the entire system. Sheet-metal parts pass through the first deburring machine and are deburred and edge rounded on one side. They come out the back of the machine and are conveyed straight into the turnaround unit.

A sensor registers that all parts are in the reversing unit. The two tables in the turnaround unit are next to each other and a carousel turns them at 180 degrees. All parts are then fed into the second F1200 deburring machine to process the other side of the parts.

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Still stuck with hand deburring?

Consistent quality and steady volume are vital concerns with hand deburring

No blueprint ever revealed, no engineer ever designed, a part with burrs. It is only after a process is selected for making a part that the burring issues become obvious. Veteran designers have learned that even when a deburring process is planned, chances are high that additional burr developments will require attention. In most cases, unanticipated deburring is needed in a hurry. A temporary hand-deburring solution is usually the immediate fix until a better solution can be implemented.

Hand deburring

If you are doing hand deburring as an ongoing solution, then poor quality, inconsistency, a high scrap rate and employee turnover are likely significant issues for your business. For hand deburring to achieve desirable results, considerable training must be provided. Maintaining a reliable pool of hand deburring workers is tough and you are always training someone new.

It is rare to find a person who can maintain production anywhere close to a theoretical or averaged cycle time. On the other hand, the positives of hand deburring are that you can always find a way to complete the job.

Manual gear deburring machines

Gear deburring machines require an operator to manually set up each deburring tool. Early models used single tools, usually an air tool holding a 3-inch diameter grinding wheel on a weighted, hinged lever. If the deburring of simple gears is your need, these early machines are still effective. However, since such machines generally use only one tool to chamfer gear teeth, the exit burrs need to be filed off using a manual lathe or similar method, before this deburring method can be used effectively.

By the 1980s, companies such as James Engineering came along and added up to four tools to these manual-machine designs, which enabled more tools to be used, resulting in a quicker cycle time. Removing exit burrs using this new manual-machine design was no longer a separate operation. This multi-tool advancement changed everything.

In the late '80s, James Engineering added its automatic wheel-wear compensation control feature and a unique raised-gear holding capability to further distinguish its early manual-machine models. Together, these additions made the flipping of gears an unnecessary step in the manual-machine finishing process.

Gears could finally be removed from a gear cutter and put onto the James Engineering gear deburring manual machine. Tool number one is manually set up to remove the exit burrs of the gear. Just a few degrees behind this operation, chamfer tools number two and three can be set up to put chamfers on both sides of the gear. Tool number four, an abrasive brush, can be used to remove the micro-burrs of the chamfered gear teeth, completing four operations and producing a completely finished part in a single cycle.

As the early manual-machine deburring systems gained popularity, people found that each tool took up to five minutes to set up, test, adjust the setup and retest and then run a batch of parts. These machines would

run cycles of 15 to 30 seconds a side for gears measuring six inches in diameter or smaller. Larger gears might have a cycle time of a minute per side. These types of manual deburring machines are still used today.

The negative to a manual-machine deburring system is that an operator with skill and knowledge of how to perform the manual setup for each gear type is required. Another drawback becomes clear if you are a job shop or production operation with multiple short-run batches. In these cases, you will spend a significant amount of time each day setting up a manual machine for new parts.

A common scenario is that a business wants to set up six parts each day on a manual machine. The operator spends 15 minutes setting up the machine, then 10 to 20 minutes getting the setup to produce the quality of part needed by tweaking the setup. On the surface, this timing doesn't seem bad; but losing three hours to set up the machine out of an 8-hour shift means you've lost 37 percent of each day's production time.

Today, we are in a digital, computer-controlled world where operators just want to download a program and run parts.

Not all manual gear deburring machines are the same. Many use pivoting axes, which are difficult to set up to achieve the desired results. Moving a pivot point for multiple axes means you have shifted all the axes of the tool you are trying to set up along multiple planes at once, a complex visual and spatial problem for an operator to solve quickly. Other machines introduced small openings, which make it difficult to see what is going on during the setup. If this method appeals to you, the best advice is to compare brand features and do your homework.

Focused deburring, chamfering and finishing

It was the introduction of the MAX System™ by James Engineering that gave birth to the phrase, Focused Deburring™. The MAX System eliminates the need for skilled operators to manually change setups from one part to another. All the machine operator needs to do is select the correct recipe from the inventory of recipes; press enter; load the part into the machine; then press cycle start. Run one part or 100 parts; select-enter-cycle start and run another one or 100 parts.

To run six different part types during an 8-hour shift, for example, takes less than 30 seconds to set up all six parts. The MAX can run six or 60 different parts in the course of one 8-hour shift and only lose a couple minutes total time to select-enter-cycle start as needed.

Once a part has a recipe, you never need to create another one and every time you run a recipe, the part that is produced is identical. A spur gear only requires five minutes to create a recipe and anyone can be trained to do it. No CAM Software or even CAD model is required. Everything is done from the MAX System machine interface.

Today's MAX System is composed of tool towers attached to the machine's roof. Each model comes standard with one to four towers and each can use up to six axes of fully synchronised motion. Each tower can have up to three tools capable of 1,000-ipm rapid travel, which makes quick work of complex motions. Additionally, the machines can be fitted with a 1,000-rpm rotary table.

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Fladder 300/GYRO HYBRID

One machine for grinding, deburring and edge rounding

The FLADDER® 300/GYRO HYBRID is designed for grinding of workpieces that require a calibration grinding on the surface and edge rounding. It removes laser spatter and burrs after laser cutting and punching. The edges are rounded in the same pass.

The machine has a modular structure with A = a grinding belt and B = the well-known oscillating FLADDER Gear head.

Workpieces are transported through the two grinding processes on a common conveyor belt.

Grinding of workpiece surfaces

In order to achieve optimal cycle times for the two very different grinding processes and to avoid unwanted heating of the workpiece, calibration grinding is carried out using a cross grinding belt.

The grinding belt is pressed against the workpiece by an oscillating contact wheel. The short contact time protects against impermissible heating and ensures optimal utilisation of the abrasive belt.

The workpieces can then be fed through the process at a speed determined solely by the extent of subsequent edge rounding.

2 Oscillating methods – starting with the sanding belt (A) and ending with the gear head (B)

Edge rounding

In order to create really even radii on all edges, the use of radially flexible sanding cylinders is a prerequisite. The structure and density of the cylinders must be selected specifically for the task.

Depending on the desired process time and the extent of the edge rounding, it is important to be able to freely select the spindle speed in the rage of 300-2,000 rpm, which is possible with the well-known oscillating FLADDER 300/GYRO.

The Hybrid-grinding machine consists of:

1 FLADDER 300/GYRO with extended conveyor belt:
B=1,300 x L=2,400 mm

1 Belt grinding section with the following technical data:

Abrasive belt dimensions: 300 x 6,000 mm

Sanding belt speed: infinitely variable up to 30 m/s

Motor power: 2 pcs. 2.2 kW installed in Ø350 mm drive drums

Contact wheel: Ø200 x 250 mm mounted on Ø40 cone

Lateral movement of the contact wheel:
Optional up to max. 1,200 mm
Max. workpiece width: 1,500 mm
Max. workpiece thickness: 50 mm

Dust extraction: 5,000 m^3/h

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New deburring machine

The Morgan Rushworth DFR 1350 flatbed deburring machine is a robust and cost-effective solution for deslagging and deburring profile cut parts. The machine can process parts in the thickness range of 0-40 mm and up to 1,350 mm wide. A conveyor with adjustable speed moves the parts through the machine while two pairs of oscillating wheels perform the deburring action. Different grit abrasives can be used in each set of wheels to achieve the desired finish. Heavy duty deburring wheels are also available for the removal of heavy slag.

The machine features an easy-to-use touch screen PLC control that adjusts all parameters including the conveyor speed, the thickness adjustment and the lateral and oscillating speed of the deburring wheels. Once processed by the machine, parts are ready to weld or move to the next stage of the manufacturing process.

From humble beginnings in 1872 manufacturing plate working machinery, Morgan Rushworth has become a leading supplier of high quality, high performance, specialist sheet metal and fabrication machinery, built to exacting specifications and standards.

Top class machinery, combined with outstanding customer service and a warranty-backed product support package, has made Morgan Rushworth the machine partner of choice for metal fabrication, engineering and manufacturing businesses across the UK.

The Morgan Rushworth name has always stood for excellence. 150 years on from the establishment of Rushworth and Co, Morgan Rushworth continues to set new standards in the metal fabrication industry.

From the belt driven section rolling machines of the 1870s to the state-of-the-art fully programmable XS fibre laser cutters of today, it continues to build on its heritage and values, ensuring its customers' operations run productively free of concerns over downtime or service issues, day in and day out.

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Two new to the UK machines on show at Walter Ewag UK Open House in June

Two cost-effective Walter Helitronic tool grinders will make their UK debuts this summer when Walter Ewag UK stages an Open House at its Warwick headquarters on June 27-29.

The Helitronic Mini Plus and the Helitronic G 200 represent the most affordable, yet very capable and highly accurate, models in the comprehensive range of tool and insert grinding, erosion and laser machines available from Walter Ewag UK. Both machines are designed for processing tools up to 125 mm diameter and both can utilise optional technology to capitalise on the rewards of increased automation.

In addition to showcasing the capabilities of these machines, the three-day Open House will, says sales director & general manager Phil Morris, also be staging daily workshops/demonstrations of a series of Walter's money-saving and user-friendly operation tool production and regrinding, as well as inspection technologies, including the: Rewards of integrated measuring; Benefits of non-contact laser contour checking; Use of remote network monitoring via digital services developed by parent company, United Grinding, plus how the powerful yet easy-to-use Helitronic Tool Studio software can simplify and speed up grinding/erosion times.

Helitronic Tool Studio will be demonstrated at the Open House on both the Helitronic G 200 and the Helitronic Mini Plus.

The latter can be used as a cost-effective 'basic' machine or as a fully automated model for the effective and efficient production of tools from 1 to 16 mm diameter, machining even complex geometries in a single clamping. The machine has a tool regrinding capability of up to 125 mm diameter.

A basic machine can be configured with a wide range of efficiency options and various loading systems, extending to become a fully-equipped 'high-end' tool grinder capable of all current and future applications in the small and medium tool diameter range.

The basis for the extraordinary flexibility of the Helitronic Mini Plus is Walter's unique gantry design where the economical production of geometries in a single set-up is guaranteed by a powerful HSK belt spindle with two spindle ends for up to six grinding wheels, as standard.

In addition, the revolutionary C.O.R.E., Customer Oriented Revolution, hardware and software architecture embraces the digital age by having intuitive operation that facilitates machine setup, operation, networking and maintenance.

The options available for the machine, for application-specific application, include an automatic grinding wheel changer for up to six wheel holders, maximum diameter 152.4 mm including coolant supply to ensure a safe wheel set change and maximum flexibility. In addition, for machines so equipped, a 'torque increase' option raises torque and removal rates by up to 60 percent for maximum productivity.

For automated use, users can choose between a Top Loader or Robot Loader, with the latter accommodating up to 7,500 tools, depending on the type of tools or tool diameter. Maximum tool weight is 5 kgs and maximum diameter is 125 mm.

Integrated into the workspace, Top Loader is a space-saving and cost-effective solution and, depending on tool diameter, offers up to 500 tool locations. The loader is suitable for tools of 3 mm to 16 mm diameter and, for example, can accommodate 500 tools of 3 mm diameter on its Walter-standard robot pallets.

Top Loader is also the automated tool magazine of choice for the Helitronic G 200, a compact unit with a footprint of less than 2.3 m^2 and a machine designed for processing tools up to 125 mm diameter.

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.

Its 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 is available with a swivelling, multi-function touch panel having a 21.5-inch monitor.

To register your interest in the Open House, contact Phil Morris, sales director and general manager on 01926 485047.

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1ST MTA
Machine Tool Accessories

Why the VOLLMER VGrind 340S is the machine of choice for medical industry tool manufacturers

As one of the world's most heavily regulated industries, the medical sector and the manufacture of everything from pharmaceuticals and healthcare aids to surgical instruments, implants and prosthetics to dentistry, everything has to adhere to the most stringent of standards. So, when it comes to surgical cutting tools for the industry, the leading OEMs and their supply chain rely upon production machines from VOLLMER.

With a pedigree unsurpassed in cutting tool production, the latest VOLLMER VGrind 340S is the machine of choice for the medical industry. Here, rotary tooling application engineer and VOLLMER of Americas resident medical expert, Carlos Becerra explains why.

While many industry segments utilise tools manufactured from materials like HSS, carbide and PCD; tools for surgical applications and orthopaedics are often manufactured from stainless steel. The main reason is that when surgeons are undertaking procedures like bone and cartilage drilling, grinding or shaving; carbide tools have the propensity to break or create excessive heat during operations. The ultra-hard characteristics that make carbide perfect for many manufacturing processes are also the same attributes that make them unsuitable for invasive procedures. Surgical tools are generally manufactured from 17-4PH, 420, 440A, 455 or M2 tool steel with lengths from 50 to 250 mm and diameters from 0.3 to 12 mm. And here lies the challenge...

With small diameters and a stainless grade with a likelihood to deflect during machining, precision production can be a challenge.

The steady rest & 'run-out'

The steady rest is the single most critical factor in producing cutting tools to a standard beyond that made on rival machines. The innovative steady rest on the VGrind 340S supports the tool and prevents tool deflection during grinding. Any tool deflection will have an adverse impact on not just the precision of the tool, but also the 'run-out'. Surgeons' hand tools typically operate at high speeds, exacerbating the 'run-out' impact of cutting tools. Run-out can result in reduced accuracy and even excess heat generation if a tool is rubbing against a bone instead of cutting. This can adversely affect the well-being of the patient. Run-out of up to 5 mm is common in tools that are not precisely manufactured with a supporting steady rest to prevent deflection. Not only can excessive run-out generate excessive heat, but it can also diminish precision where and when we need it most. Furthermore, excessive vibration in the surgeon's hand tool can lead to... well let's not think about those consequences.

To categorically eliminate this obstacle, the steady rest on the VGrind 340S provides support under the tool to prevent deflection but it also provides a supporting finger over the tool body support to eliminate movement. However, VOLLMER has taken this innovation a step further, providing two steady rest points, and not just one. The steady rest system supports the cutting flutes of the tool as well as the cutting tip of the tool. With typical tool shank diameters for hand tools being 4.5 mm and the cutting flutes often much smaller, the potential for deflection grows with decreasing tool diameters.

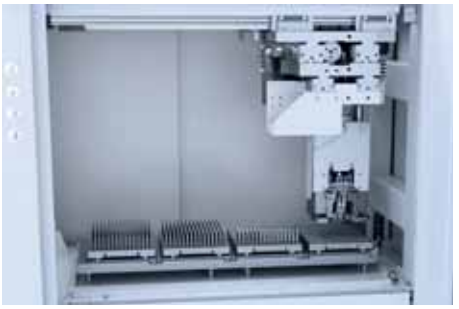
As you would expect from VOLLMER, we have doubled down on eliminating deflection, such is its importance and potential for disrupting the quality of cutting tools manufactured on the VGrind 340S. To eliminate deflection, VOLLMER has also introduced automated tool run-out compensation. Integrated into the NUMROTO control software, the run-out compensation cycle will utilise a measuring probe during operation to probe tools in multiple positions around the diameter of the tool. Taking live 'in-cycle' measurements, the VGrind 340S will automatically measure the tool and re-calibrate the programme to accommodate and eliminate any tool deviations caused by deflection. This in-process cycle can be programmed to run at intermittent periods throughout a production cycle. So, for tools with critical

dimensions, probing can be integrated into the production of every tool or, if the operator prefers, every 10, 20 or 50 tools.

Automation

The OEM recipients that specify medical and surgical procedure tools often require high production volumes that can be in the region of 5,000-off. To support precision volume production, the VGrind 340S is supported by the HP160 automated tool loading system that can accommodate up to 900 tools. The HP160 loading system on the VGrind 340S facilitates 900 tools with the medical standard 4.5 mm diameter shanks. The number of tool positions decreases depending upon the shank diameter.

Not only does the VGrind 340S accommodate up to 900 tools, but manufacturers can also set the machine to run multiple programmes sequentially without manual intervention. So, if a company needs to run a batch of 50 3-flute tools and then 500 2-flute tools of different diameters and geometry that are then followed by other tool variants, the VGrind 340S can easily accommodate this. The



result is unmanned operation, reduced costs and around-the-clock production, all with complete process stability. Having supported medical companies for several years, I can comfortably say that the technology in the VGrind 340S has been able to manufacture 100 percent of the tools that I have encountered to date.

Flexibility

To produce 100 percent of the tools that I encounter daily, the VGrind 340S not only delivers astounding productivity, technology and process stability but running through the very DNA of the machine is a high level of flexibility. The VGrind is the only machine to incorporate multi-level machining with two spindles located on its A-axis. Feeding this paradigm leap in innovation is a grinding wheel package that accommodates up to 8-wheel sets. With eight different wheelsets, the VGrind 340S can automatically change from a flute grinding wheel to a gashing wheel, cup wheel, a 1A1 wheel for relief and OD grinding or any other type of wheel.

This flexibility enables the VGrind 340S to produce an unparalleled variety of cutting tools with zero manual intervention. With in-process grinding wheel probing and automated wheel dressing; long periods of precision lights-out production can be achieved regardless of the multiple tool types required. The flexibility of the VGrind 340S is complemented by the next-generation V@DISON IoT digital solutions and the NUMROTO tool grinding software to enable customers to stretch their imagination with cutting tool design.

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Beat them to the punch with ANCA TX7 and TXcell Linear

One important strategy in remaining competitive in your business today is ensuring you have the tools to adapt to your shifting markets, having the flexibility to adopt new technologies and reap the benefits that they offer. Punch manufacturers around the world know this fact and are seeing the benefits of using ANCA TX7 Linear and TXcell Linear for their production needs.

To begin with, TX7 Linear or Txcell Linear needs to be kitted up with the right tools and accessories to do the job. ANCA has developed several accessories and options that explicitly meet the needs of the punch grinding application.

- iPunch: dedicated punch programming software gives you complete flexibility on punch geometry and grinding process parameters.
- iBalance: on-machine wheel balancing software.
- Rotary wheel dresser units fully supported by ANCA dressing software

delivers in-process dressing to keep your wheels running true and sharp.

- Auto adjusting coolant nozzles that change position as the wheel diameter reduces.

These accessories are necessary for any good punch grinding machine. So, what makes punch grinding on ANCA TX7 Linear so different? Starting with the basics, TX7 Linear is a 5-axis grinding machine, compared to the 3-axis grinder more traditionally used for punch manufacture. Having these extra degrees of freedom on your grinding machine translates to greater freedom in what applications you can put through it.

In the case of punch manufacture, a traditional punch grinding machine would have been capable of grinding only the outside form of the punch with a single wheel. The TX7 Linear now offers you so much more. Punches will typically have a series of separate machine operations that need to be performed to complete the tool.

So, what operations on the tool require all the additional investment and effort? After OD grinding a punch may require a roof-top or whisper shear on the punch. Additionally,

a tool index mark or feature may also need to be included near the shank of the tool. Typical punches include a single radius dressed into the grinding wheel to create a gentle transition between punch section of the tool and its shank, but in some cases, additional reinforcement radii are added.

Finally, there is the inclusion of ejector holes in the end face of the punch that requires not grinding but drilling operations. With two-wheel packs available on the 5-axis TX7 Linear, undertaking several of these operations in a single setup is now possible. But take the next step to a TXcell, with its offering of nine up to 24-wheel packs, and all these operations can now be done in a single setup, something that was never possible on a standard punch grinding machine.

The TXcell robot used for changing wheel packs is also used for automated loading of tools, which means you can keep it running for those unattended shifts. Having more than one wheel pack on the machine brings other benefits too. By using different roughing and finishing wheels, grinding operations can now be optimised for stock removal or fine surface finish. The TX7 Linear and TXcell Linear are also ideally suited to the use of CBN grinding wheels. Using a much smaller wheel diameter, up to 200 mm (8") on TX7 Linear and 300 mm (12") on TXcell Linear, CBN not only delivers superior grinding feed rates compared to conventional abrasives, but also requires less frequent wheel dressing. Both properties ultimately save you time and money.

Many customers manufacturing punch tools can demand the highest possible accuracy in terms of dimensional tolerances and surface finish quality. The TX7 Linear and TXcell Linear machines can meets these demands easily to grind punches within 2-3 microns with a surface finish of less than 0.1 Ra (Roughness Average).

Keyhole punches – a key benefit of ANCA's premium TX machines

The TX7 Linear and TXcell Linear have one final trump card to offer the punch grinding application: keyhole punches. These punches typically feature much more complicated OD profiles including concave forms and require a fundamentally different approach to grinding them. Small diameter wheels with form profiles and run at high RPM; the TX Linear machines handle this with ease. Dedicated keyhole punch software allows you to control every detail of the keyhole punch geometry and grinding process.

This means the possible punch applications on TX7 machines have been opened to an entirely new segment of the punch-grinding market, giving you more opportunities to be making money from your investment. In fact, if business in the punch-grinding industry turns down to such a point the machine has spare time available, then re-tooling your machine to ANCA's bread and butter application of drill or endmill manufacture is a simple exercise.

ANCA's TX7 Linear and TXcell Linear offer you a complete step forward in enhanced punch production flexibility and automation. Diversity like this not only opens new markets and business opportunities, but also delivers future commercial security.

In 1974, ANCA co-founders Pat Boland and Pat McCluskey bought a mini-computer to turn their passion into a business venture. Considered mini or small for the time, it was in fact as tall as them at a cost of $4,000 which, in '74, could buy an inner city apartment. Their basic idea was to replace the hardwired controls of the time with a standard computer. Adding the computer to NC thus CNC resulted in a much more powerful and flexible technology than the hardwired logic designs that were current at the time.

Today ANCA is a thriving business with over 1,000 employees and is a leading manufacturer of CNC grinding machines, motion controls and sheet metal solutions. While the global headquarters remain located in Melbourne, Australia; due to the niche market that it services, it exports 99 percent of its products with customers in over 45 countries and offices in the UK, Germany, China, Thailand, India, Japan, Brazil and the USA as well as a comprehensive network of representatives and agents worldwide.

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Hill Helicopter's quality 'takes off' with ACCRETECH

Given the extremely competitive environment global aerospace manufacturers operate within, as well as ensuring the precision capabilities of their quality control equipment, the speed and operational efficiency of the sector's inspection aids are becoming ever more important. The recent installation of an ACCRETECH SURFCOM NEX surface and contour measuring machine at the premises of Hill Helicopters illustrates the advantages aerospace manufacturers gain when they are able to achieve rapid, high-precision inspection results.

Staffordshire-based Hill Helicopters has pioneered a reimagined approach to delivering and supporting safe, exciting luxury private aircraft ownership at an affordable price. The company call this approach General Aviation 2.0. General Aviation 2.0 (GA2.0) extends far beyond the aircraft. It represents an end-to-end ownership experience delivering the aircraft customers have always wanted and combining it with all the support needed to get the best out of private aviation.

Dr Jason Hill, founder and CEO of Hill Helicopters recently unveiled the HX50, a new UK-built, five-seat, turbine-powered helicopter concept. To enable the extremely efficient, high-precision surface and contour inspection of its in-house manufactured components Hill Helicopters recently purchased a SURFCOM NEX 240 DX-13 from ACCRETECH UK.

ACCRETECH machine in use with components in foreground

Explaining the reason for the recently installed machine, Mark Webb, lead production engineer at Hill Helicopters says: "Hill Helicopter literature describes the HX50 as delivering of a whole new experience in safety, performance, adventure, comfort and elegance. It isn't a coincident that 'safety' comes first on this list of attributes. To ensure the highest safety standards we oversee a rigorous company-wide quality regime. In addition to employing skilled quality personnel, we invest in the best available inspection equipment.

ACCRETECH machine with Hill Helicopter fabrications in background

"The latest addition to our impressive list of inspection aids is our advanced SURFCOM NEX 240 DX-13. After searching for a high-precision, rapid-acting surface and contour measuring instrument we concluded that the advanced ACCRETECH machine best met our demanding accuracy and efficiency standards. In addition to the performance of the instrument, ACCRETECH's reputation for producing high-quality machines, and for providing excellent levels of customer service, were major factors in our decision.

"During the development and testing of our components our new ACCRETECH machine will be used by our skilled machinists and our production and quality engineers. Then, when we move into full production, we plan to purchase further SURFCOM NEX machines for use on our shopfloor. Given the SURFCOM NEX's ability to provide high-precision surface and contour measuring results within production environments, it will be ideal for inspecting components throughout our production runs and for generating and archiving First Article Inspection Reports (FAIRs).

"As each of our helicopters have 38 different high-precision bearings, our SURFCOM NEX machines will be used to inspect the critical surface and contour specifications of all of our manufactured bearings. In addition, they will be used on all other relevant in-house produced components. The impressive operational speed and ease of use of our first SURFCOM NEX and that of our planned additional models means that they will be able to keep pace with our high-precision surface and contour inspection needs as our production volumes continue to grow."

Building on the global success of the company's previous SURFCOM product, the recently launched ACCRETECH SURFCOM NEX range is currently exceeding all anticipated sales projections. Rather than invest in two expensive, dedicated machines, cutting-edge SURFCOM NEX models allows users to achieve high-precision surface and contour measurements by the use of a single, cost-effective instrument. Moreover, as well as occupying much less space than two separate machines, the highly efficient new range delivers up to 60 percent faster measurement processes.

Given the growing trend for component inspection to take place close to the point of

manufacture, in addition to being ideal for use within pristine, temperature-controlled cleanrooms, due to their ability to deliver accurate results across a range of temperatures, the robust SURFCOM NEX range can also be employed within serial production environments.

The new range's innovations include the use of a flexible hybrid detector that enables simultaneous contour and surface measurements to be made. Rather than use a traditional ball-screw assembly SURFCOM NEX machines employs a progressive linear drive system that ensures rapid, low-oscillation measurements with no disruptive noises and vibrations.

Much of the success of the new range is based on the machines' flexible modular platform. Rather than settle for a surface and contour measuring instrument that represents a near match for their requirements, potential customers are now able to specify a system that exactly meets their own specific needs. For example, the Hill Helicopters' SURFCOM NEX 240 DX-13 machine was supplied with two separate detectors. In addition to an advanced hybrid detector that allows simultaneous high-precision contour and roughness measurements to be made in single pass, the DX-13 variant also boasts a high-resolution contour detector that provides an upwards and downwards measuring bias.

Hill Helicopter component under inspection on ACCRETECH machine

Tim Wood, ACCRETECH SBS regional director for North Europe concludes: "ACCRETECH products enable the high-precision tactile and non-contact measurement of component's surface roughness and profiles. Features able to be inspected include the measurement of roundness, flatness, levelness, concentricity, coaxiality, axial run-out, radial run-out, perpendicularity, cylindricity, parallelism and straightness.

"Thanks to their modular construction, our advanced test equipment can be adapted to meet individual clients' specific requirements. As Hill Helicopters had several alternative suppliers to choose from, we were delighted to receive an order for a generous capacity SURFCOM NEX 240 DX-13 machine. This option has a 700 mm x 450 mm granite bed and a column with 450 mm of travel. To further aid precision, the Hill Helicopters 240 DX-13 model was also supplied with an integrated anti-vibration table."

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Vibration analysis and surface measurement technology as a service

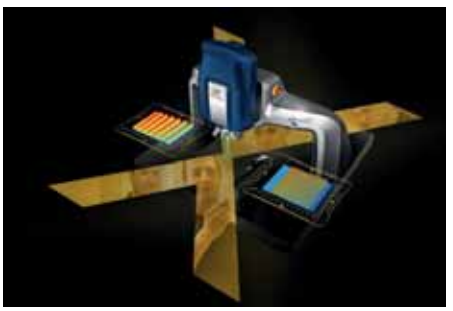
Polytec offers vibration and structural analysis, modal testing and non-contact surface metrology

If production does not require 100 percent control and measurement tasks tend to occur sporadically or at short notice, contract measurements often offer an economically attractive alternative. Polytec therefore also offers vibration and structure analyses, modal tests and non-contact surface measurement technology as a service, either on the test benches in the application centres in Waldbronn, in Japan and in the USA, or with transportable devices directly on site, for example if the test objects are difficult to transport permit.

The fully equipped measurement laboratory houses a powerful system for fully automatic vibration measurement. Robots that can be moved on linear axes are each equipped with a 3D scanning vibrometer.

Outsourcing measurement tasks can have many advantages: When developing new products, precise measurement data are quickly available so that basic properties and functions can be better assessed. The service provider always works with up-to-date systems that are suitable for the measurement task. This guarantees high data quality and leads to meaningful results, especially since the entire expert knowledge is available for the evaluation. Employees specially trained on the measuring devices in your own company are not necessary. Anyone planning to purchase measurement systems can also try out potential solutions in advance as part of a feasibility study with their specific task in the real operating environment and get advice from the experts.

Since its foundation in 1967, Polytec has grown into an international high-tech company. Its headquarters are located in Baden-Württemberg, Germany. In addition, it maintains subsidiaries in the USA, England, France, Japan, Singapore and China. Furthermore, its customers purchase their Polytec products through a worldwide network of reliable sales partners.



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Contributing to a safe working environment with BOFA's innovative technology

Many industrial processes produce airborne contaminants which can create a risk to human health, as well as the potential to impact production and product quality.

In a growing number of countries around the world, Workplace Exposure Limits (WELS) are in place covering emissions resulting from industrial processes. These are designed to help ensure that workplace environments are safe for people and transgression can be costly both in terms of penalties and corporate reputation.

BOFA's continuous development of fume and dust extraction technology can be a key contributor to workplace occupational health and safety strategies, helping manufacturers stay compliant with local regulations by maintaining a clean working environment.

BOFA's portable technology is proven to filter airborne contaminates down to 0.3 µm in size emitted. It achieves this through the advanced collection and filtration of fume and dust, thanks to multi-stage filtration that includes a patented DeepPleat DUO pre-filter, a main High-Efficiency Particulate Air (HEPA) filter and a layer of activated carbon to remove vapours, gases and odours. The exact configuration, airflow rates and filtration media will depend upon each application and the industrial process involved.

BOFA systems have really proven their worth in recent times by delivering reliable performance and automated monitoring when workplace restrictions have sometimes meant fewer eyes on the shop floor. Customer feedback has reported that the availability of reliable control functionality and continuous filter condition monitoring and remote diagnostics has enabled a timely exchange of filters, which not only helps safeguard operatives but helps keep equipment clear of contaminants, which helps avoid unplanned downtime.

BOFA systems are designed to deal with process-specific emissions, including laser coding, marking, cutting and engraving, ink printing, electronics soldering and 3D printing.

In additive manufacturing, BOFA's technology helps to filter nanoparticles and Volatile Organic Compounds (VOCs) which can be emitted during these processes. Each solution takes account of the processes, substrates and chemical interaction to help ensure optimal protection for the workforce and avoid unnecessary downtime that can be caused by equipment contamination.

When supplying a new customer with fume and dust filtration technology, BOFA ensures that the system design meets the specific needs of each application. In some higher temperature instances, this includes taking account of a risk of a thermal event and introducing mitigating technology. This could include BOFA's Spark Arrestor 2 and FireBOX products, which will filter hot embers before they reach the fume extraction unit, which itself is thermal cut-out protected.

So, with this combination of system monitoring, smart airflow management, extended filter life and bespoke design, BOFA technology can play an important role in keeping manufacturing environments safe for employees. BOFA units are also portable, meaning that they can easily be manoeuvred to support an agile manufacturing environment; a benefit that is becoming increasingly important as companies seek to flex opportunities in new markets and respond quickly to customer demand.

BOFA launched in 1987 as a small family business and has developed into a global technology leader.

BOFA's head office and Centre of Excellence is in the UK and is home to its R&D facility, as well as corporate functions, including customer service, marketing, technical support, accounts, HR, training and product developments. It also has expanding offices in the USA and Germany offering sales and technical support, customer services and warehousing.

It continues to lead the way in the development of innovative fume extraction systems, winning multiple awards for its technology, including the Queen's Award for Innovation and now serves sectors as diverse as laser, electronics, mechanical engineering, printing, 3D printing, medical, pharmaceutical, dental and beauty in over 120 countries. The BOFA team shares a common purpose: to make air quality in the working environment as safe as possible while improving productivity. Its people are the heartbeat of its business.

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Using a downdraught bench for fabrication processes

Downdraft systems

Anyone who has welding experience knows that welding fumes and dust can be a serious health hazard. Exposure can lead to the risk of illnesses such as asthma, lung ulcers, or even cancer. Extraction of these contaminants are vital in any workshop, which is why Flextraction offers downdraught benches, suitable for a variety of welding and fabrication processes.

Downdraught benches are a multipurpose solution for welding, grinding and/or sanding. They are most suited for dealing with heavy dust and fume build-up coming from a variety of processes where a bespoke extraction arm may not filter each application to its best ability.

A downdraught bench becomes the work surface, constantly working to filter the air without requiring adjustment. The downdraught top extracts hazardous fumes and dusts downwards away from the operator before it has a chance to spread through the room, protecting the worker and keeping equipment inside the workshop clean.

Many of our downdraught benches include cartridge filters to clear even the finest of particles up to 99 percent efficiency. We can provide a mobile solution via the Coral Smokart, a sturdy bench with all the capability of a larger bench but perfect for repositioning in any location. It is ideal for small to medium sized workshops.

Smokart

Benches can also be attached to existing extract systems to be fully integrated into the production process, maintaining your fume and dust control across the board. Downdraught benches do not interrupt the production process and can be constantly working to filter the air around the work environment, returning fresh air back into the room.

For ATEX applications, a downdraught bench can still be used as means of extraction. The Poliex eliminates any spark ignition and further supports the removal of hazardous material with a special extract outlet designed to remove any residual powder.

Poliex Coral brochure

Fabrication processes are dangerous for health by nature, but with the help of a downdraught bench the process can be made safe for the working environment. To find out more on the various benches we have to offer, click here or alternatively get in touch with our friendly sales team who will gladly help you choose the right product for you.

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Cleaning up in hazardous areas with new KEVA Premium vacuums

Clean air specialist Filtermist has introduced an exciting new range of Kerstar KEVA Premium industrial vacuum cleaners that include patented filter cleaning technology for the safe and efficient collection of hazardous dust, debris and workplace particles that pose a health and safety risk to employees. Regarded as the perfect all-rounder for your manufacturing facility, the new modular KEVA Premium series is ATEX certified, making it ideal for applications as diverse as powder coating, pharmaceutical, food processing, additive manufacturing, woodworking and much more.

What sets the impressive KEVA Premium Type H cleaner apart from its rivals is the ability to safely and effectively collect hazardous dust particles using a 3-stage filtration system that resides on the negative side of the powerful 230V 50Hz, 1,150 W Max/1,000 W Mean, electronically commutated brushless motor. From a health and safety perspective, the KEVA Premium vacuums are classed as Category 3 equipment. This makes them suitable for applications in Dust Zone 22, an atmosphere where air and flammable dust can be explosive. With three stages of filtration that includes two conical M class filters at the first stage, an oversized, metal cased H14 Grade HEPA absolute filter at the second stage and a conductive fabric filter assembly at the third stage, the new vacuum series can achieve a filtration efficiency of 99.995 percent. Safety is further assured by the robust stainless-steel construction and conductive rollers that eliminate any hazard potential in safety-critical areas, with additional 2 m earthing clamp for added protection.

With two models in the new Premium range, the KEVA Premium CBS (Continuous Bagging System) and the Keva Premium 50L, 50 litre drop down collection container, a key advantage is the new conical filtration system. The M and H14 Dust Class filter units incorporate a new mechanical cleaning system that simply requires a pull on an external lever to undertake fast and efficient filter cleaning. The patented mechanical control enables a reliable, reverse pulsation cleaning action on the first stage filtration system, helping the filters retain maximum efficiency. Contrary to a common 'shaker' mechanism for filters, this unique cleaning method prevents undesired wear issues caused by shaking. Cleaning the filter in seconds, the patented system on the new KEVA Premium series eliminates the need for dismantling the vacuum and manually cleaning the filters. This not only saves valuable time but, in instances where hazardous dust is collected, it helps to protect the health and well-being of staff. Furthermore, the ability to frequently, quickly and safely clean the filter prolongs the life of the HEPA filter by up to 50 percent, reducing operational costs with fewer changeovers. This ease of filter cleaning also ensures that the maximum suction volume of 210 m^3/h is maintained for extended periods.

The KEVA Premium CBS has been developed with an ingenious bagging system at the base of the unit. This enables users in pharmaceutical and other particularly hazardous environments to safely collect, bag and remove contaminants without ever risking contact with the particulate. Perfect for environments that demand the highest levels of hygiene, safety and staff protection from potentially carcinogenic or harmful waste, the KEVA Premium CBS minimises exposure to any contaminant while the quick-change bag system maximises vacuum running hours. Alongside the KEVA Premium CBS is the 50L unit. With a fully enclosed stainless steel collection drum, the KEVA Premium 50L is the perfect unit for a wide variety of industry applications.

Both KEVA Premium vacuums incorporate the renowned Kerstar 230V 50Hz, 1,150W Max/1,000W Mean, electronically commutated brushless motor. They also include a stainless-steel roller carriage, 2 m earthing clamp, cyclone separator, a 10 m connection cable, a flashing LED blockage warning indicator and vacuum pressure gauge that notifies the operator of any potential filter blockages. For customers working in particularly challenging environments, Filtermist can provide a host of optional equipment such as anti-static suction hoses, floor nozzle box, anti-static accessories, carbon fibre high reach pole sets and more. For further details, visit *www.kerstar.com*

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New downflow booth

AirBench announces the release of its new VertEx DFB downflow booth models

DFB is designed for use in high-end manufacturing environments, including food and pharmaceutical manufacturing but can also be applied in wider industry settings. Manufactured as standard in polished T304 stainless steel, the DFB is also available in T316 stainless, or as a powder coated mild steel unit.

Developed in response to a customer request for a UK manufactured downflow booth direct from the manufacturer, DFB is now available to order.

Downflow booths function by providing a flow of clean, filtered air downwards from the roof of the enclosure and over the operator. This ensures the operator remains in a clean air zone at all times. Air is drawn in at the base of the unit, through primary and secondary filters, before being recirculated back through the final stage H13 HEPAs to the operator. A percentage of air is exhausted back to the workspace, ensuring the booth remains in negative pressure at all times.

AirBench offers a full installation and commissioning service for the DFB range. Visit airbench.com/dfb for more information, or contact AirBench Ltd.

AirBench is one of the UK's leading manufacturers of dust, fume, and mist extraction equipment.

All of its own dust and fume extraction systems and filtration products are built to order in its factory located in the East of England. All products are assembled from stock components allowing it to maintain short lead times. It also imports the AOF range of oil mist filters from its trusted partners in the Netherlands.

AirBench specialises in high air volume, low velocity extraction systems, providing a demonstrable working extraction solution to a wide range of dust and fume problems.

It demonstrates its extraction systems on site prior to purchase where possible, to ensure both buyers and operators are confident that the products are the correct solution and are usable in day-to-day operation for their businesses.

It provides dust and fume extraction solutions to specific workplace problems using standard modular components and filtersets allowing rapid delivery.

Airbench has supplied over 10,000 AirBench downdraught benches into the UK and to worldwide customers.

In 2014, it purchased the OMF range from Air Cleaning Systems of Cardiff following their entrance into liquidation, in order to broaden its coolant mist filtration product range and provide ongoing support to Oil Mist Filters (OMF) customers.

The company also distributes the AOF range of mist filtration units, which are manufactured for its Netherlands-based partners Dormatec.

Its extraction systems are generally self-contained. AirBench downdraught benches usually require no installation. The VertEx range of cross draught booths can be installed quickly in-house, while OMF products can usually be fitted in less than one day by the trained teams.

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Reflecting on a ten-year partnership

From the smallest of details to the highest pursuits, Collins Aerospace is dedicated to redefining aerospace. It prides itself on tackling the toughest challenges in the industry and believes in the power of intelligence and partnership to guide its customers into the future.

Having spent over ten years working with the company providing them with degreasing and cleaning solutions for its manufacture, we sat down with Philip Bucknall, senior manufacturing engineer to reflect on how the business relationship came about and why it chose to work with Simon Graham, now of Turbex.

How did the relationship begin with Simon Graham?

As part of the initial manufacturing process, we have to clean components and, given the processes that our components go through, we have to ensure a very high standard of cleanliness.

Our story with Simon started over ten years ago when we used trichloroethane to clean our components. While we were happy with using this, we knew that it was due to be phased out by a combination of internal group policy, and legislation coming into force further down the line and we needed an alternative solution.

Water/detergent-based solutions were initially investigated as they would be the most environmentally-friendly solution. However this wasn't effective at removing the contaminants involved and the large surface areas involved proved difficult to dry.

Which solvents did you try?

We trialled lots of different types of solvents, for example, we tried N-Propyl bromide (nPB), which did remove the contaminants involved, but had a detrimental effect on the equipment seals, leading to leakage of the solvent into operational areas. Subsequently, the solvent was also designated to be harmful to operator health.

We then tried a fluorinated solvent, which worked well and the cycle was ok, but the machines we used were open-topped, meaning operators were still exposed, although the solvent was not harmful. We were also using a vast amount of the solvent, which was very expensive and evaporated at an alarming rate. The solvent also contained a small amount of transchloroethane, for which we needed a waiver from UTC (now RTX). We used this for a few years but eventually, the waiver was withdrawn and we had to switch to a completely Chlorine free solution.

At this point, we were introduced to DOWCLENE™* 1601, a Modified Alcohol. This was being marketed by Safechem, who could ensure safe transit and came with excellent environmental credentials. To use this type of solvent we needed to source new equipment that would be suitable for this type of solvent.

How did you decide which equipment to invest in?

At this point we had not heard of either Simon or his company Kumi Solutions, nor the equipment Simon was suggesting, a Pero V4 solvent degreasing unit, so we were understandably cautious about taking a risk on both a new supplier and new equipment, and a previously unused solvent.

After meeting Simon a couple of times, we found his knowledge of the equipment he was selling and his experience of the operation, maintenance and components were vastly superior to that of other sales reps we had encountered. That combined with his experience as a service engineer meant we knew we could rely on him to guide us through any issues we may come across. He came across as enthusiastic, honest, and trustworthy and an engineer first not a salesman.

Did the equipment perform as expected?

When we bought the machine all those years ago the cleanliness was so much better and the cycle time so much faster, we wished we had done it years before.

The improvement in the quality of cleanliness had a knock-on effect further

down the line as the product moved through production, there were fewer failures in the brazed joints, and fewer repairs required too, increasing the efficiency of our manufacturing.

The time saved at the point of cleaning too was huge, instead of a cycle time of 30 minutes we were now looking at 12 to 13 minutes per cycle, an improvement of over half the time it had taken previously.

After using the machine for some time, with it being an enclosed process rather than the open-top equipment we had previously used, we found it was a year before we had to top up any solvent at all, as it wasn't evaporating. This saved us a huge amount in solvent costs, enabling us to justify our spending far more quickly than anticipated.

Following the success of our first purchase, we went on to buy a further two Pero R2D solvent degreasers ourselves and partner sites in Poland and Mexico also bought machines off the back of our recommendation.

Where are you now?

The original machine, although generally reliable, is now ten years old and parts are consistently wearing out. We have also found that the configuration and manufacturing methods used for the main chamber are less robust than we first thought and this has led to many reliability issues and many hours of downtime. We have now found ourselves in the position of needing to source new equipment.

We got in touch with the usual suspects and, of course with Simon, to research the options available.

Again, Simon recommended another machine we were not aware of, this time from Karl Roll, sold in the UK through Turbex. Having trusted him all those years ago, we included this in our research and visited our shortlisted options in Germany.

Initially, we were favouring a competitor's machine and, when we visited them, while the machines were undoubtedly a high standard, we were concerned that there were no service engineers in the UK should anything go wrong. We can't afford to wait for three days while an engineer is sent from Germany and we were wary of the advice that almost all problems could be addressed remotely.

Other suppliers also had good machines, but we were a little concerned in respect to part supply which could present a potential risk if there was an issue in the supply chain, particularly in light of the current invasion of Ukraine.

When we visited Karl Roll we found they were much bigger than we'd expected, the quality was robust, much better than our previous machines, and, like Simon, technically they were very knowledgeable.

You could see they had thought about what could be problematic for a customer and what they could do to make things easier.

For example, for simple things like replacing door seals, they had designed the machine so you can move the door to one side and replace the seal, rather than dismantling the whole machine, all ensuring we would save time.

We've chosen once again to go with Simon's suggestion and placed an order, through Turbex, for a Karl Roll RCKS-115 solvent degreasing system using the same Dowclene 1601 solvent, which was delivered in the first quarter of 2023.

Why did you choose Turbex?

When you're sourcing machinery and equipment for a precision industry like aerospace, your decision is not only about the equipment and infrastructure, you need people with engineering experience behind them.

We like to work with both businesses and people that we can call on quickly. We want to make informed decisions and have partners we can rely on to support us should anything go wrong. We know we can call Simon and he'll turn up and help straight away, he'll use his knowledge and experience to diagnose issues and help us get things moving.

It was a big risk to choose Kumi ten years ago, but I'm pleased we did. The first machine proved that the modified alcohol process was the right process for us as a business like I said we wish we'd done it years before and it also began a relationship that we've trusted ever since.

Turbex is the sole representative for sales & service of Karl Roll products in the UK and Ireland. To discover the value of a Karl Roll machine, get in touch with Turbex today.

Who is Turbex?

Turbex has delivered the right cleaning solution for hundreds of UK businesses for nearly 40 years. Customer satisfaction is everything; we'll only ever employ and train the best people, and work with partners whose goals are closely aligned to our own.

From our spacious and well-equipped facilities in Alton, Hampshire, we offer a nationwide service that provides our customers with innovative cleaning solutions and comprehensive support from our team of highly-trained professionals.

How we can help

With an expanded portfolio that now includes fully automated, anodising, chemical cleaning and chemical etching lines, we can help you with your surface treatment requirements – from concept design through to installation and commissioning.

We offer free demonstrations and cleaning trials on an extensive range of ultrasonic and water-based cleaning machines – backed by expert advice to make sure you get the right machine for the job.

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ActOn Finishing launches new smarter way to clean components

ActOn Finishing is pleased to announce the launch of a new ultrasonic cleaning series. It is designed to clean, descale and strip a large range of components, for industries such as automotive, aerospace, energy, electronics, food, graphics, jewellery, manufacturing, marine, mould cleaning, medical, optical and more.

ActOn ultrasonic cleaning technology

The ActOn offering includes a Standard Series, a Laboratory Series, the ultrasonic machines built for the automotive industry and customised ultrasonic systems.

The ultrasonic cleaning is a finishing process, which works on the principle of ultrasound waves, 28 to 40 KHz, created in a liquid, usually water or/and chemical, to clean the parts. Components are placed in the ActOn ultrasonic tank, in a mix of water and/or chemical. A generator and ultrasound emitter agitate the liquid mix and create the waves, resulting in small bubbles. This action penetrates the particles from the component, such as dirt, rust, grease, oils or any other materials and removes them.

The main benefits of using the ActOn ultrasonic cleaning systems include: These machines come in a wide range of sizes to suit your components.

- Cleans even areas which are difficult to reach
- Offers a fast process and 80 percent reduction of cleaning time
- Energy cost reduction
- Environmental-friendly process
- Repeatable high-quality results

TT Standard Ultrasonic Series

The Ultrasonic Standard Series has been designed to clean, descale and pickling a wide range of components. These machines come in different sizes, from 30 litres to 7,998 litres capacity and can be built with a lifting platform for loading and unloading the parts.

LT-PRO Laboratory Ultrasonic Series

The LT-PRO series includes a range of small sized ultrasonic machines, designed for cleaning dental implants, small electrical parts, jewellery, watches, laboratory equipment, medical and surgical instruments and glasses. These systems are particularly useful as a previous step to sterilisation in the medical and optical industries.

MOT Automotive Ultrasonic Series

The Ultrasonic MOT range includes machines with a capacity between 30 and 8,000 litres and are built to clean oils, grease and carbon build-ups from automotive components such as turbocharger structures, carburetors, gearboxes, engine blocks, crankshafts, camshafts, conrods, pistons and more.

This equipment uses a working frequency of 40 kHz, sweep system +2 percent, to efficiently process soft materials such as aluminium, brass or magnesium, without damaging the components.

Tailored solutions

ActOn Finishing offers a range of ultrasonic systems custom made for the automotive, aerospace, food, electronics, electroplating, graphics, machining and turning, maintenance, marine, mould, nuclear and medical and pharmaceutical industries. These ultrasonic machines are offered in a wide range of sizes and include three types of systems:

One-tank special equipment: These machines are offered with a capacity ranging from 75 litres to approx. 2,000 litres. All models are custom made for industrial cleaning and specific processes:

Special equipment manual multistage: Designed for finishing processes which require different stages, such as rinsing, drying or different treatments in addition to cleaning. Depending on the component's cleaning requirements these machines can be built with a number of tanks, with a wide range of capacities.

Multistage automatic smart line: Fully automated systems with a load capacity ranging from 20 to 100 Kg. This equipment is designed to meet the highest requirements for industrial cleaning.

Sid Gulati, managing director at ActOn Finishing, says the ActOn Ultrasonic Cleaning series fits perfectly with the firm's existing range of surface finishing products: "We are continuously developing and adding new products to our range of finishing solutions and are certainly excited with our new range of ultrasonic technology. ActOn are here to offer you a complete solution."

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MC marks 20-year MecWash partnership with new order

MecWash Systems of Tewkesbury, Gloucestershire has been selected by its longstanding partner, SMC UK, to build a powerful and bespoke MWX400 parts washing machine to meet their stringent precision cleaning standards. SMC UK has been working with MecWash for over two decades, purchasing their original machine parts washing system in 2001. Paul Jarratt, sales manager at MecWash, says: "We were delighted SMC UK recognise the value in the results and service that MecWash had provided over the years."

The initial machine that SMC UK bought was the MIDI 400, specifically designed to clean the complex and intricate parts manufactured by SMC UK. The processes included flood and spray wash, flood and spray rinse, hot air drying and the final stage of vacuum drying. The team at SMC UK used a separate ultrasonic system to unsettle the contamination on the components. The MIDI was recommended to the team at SMC UK because of its reliability and effectiveness at cleaning hydraulic and pneumatic systems, designed to clean complex shapes of fixtures and parts.

Stuart Knox, production engineering manager at SMC UK, adds: "The Midi system was very effective over a long period and the service and maintenance from the team at MecWash had been consistently excellent. Speaking with Paul, the MWX was the most appropriate choice.

"An important aspect of the purchase was the ultrasonic options of the MWX400. The incorporated double ultrasonics process vastly improved the speed and cleanliness in key areas," says Stuart Knox.

The double ultrasonics work at frequencies of 40 khz and 25 khz. The latter is the most common frequency used in industrial applications and the most powerful. The lower frequencies create bigger bubbles with a bigger bang on implosion. Higher frequencies, including 40 kHz, are more effective for targeting the smaller particles. Together, these frequencies combine to achieve high cleanliness by loosening the most tenacious of contaminations within the components.

SMC UK also added the Aqua-Save option to the MWX400 to reduce water consumption. Aqua-Save is a wash water recycling system that helps to maintain pristine washing, rinse quality and reduce the need for water changes and effluent disposal, making the cycle more efficient, cost effective and environmentally sound.

The ultrasonics and Aqua-Save features of the MWX400 parts washer has helped to drive efficiency at SMC UK.

MecWash machines are some of the most advanced, connected parts washing systems in the world. The connectivity within the MWX400 facilitates remote servicing, condition monitoring, fault diagnosis, maintenance and management. This offered SMC UK new ability to programme and monitor the washing process.

Stuart Knox continues: "The Human-Machine Interface (HMI) process has hugely improved our ability to programme the modification of the washing cycles. Now, we have the options of having 25 programme slots instead of five, as well as a maintenance I/O override."

John Pattison, managing director at MecWash, comments: "Since the original purchase by SMC UK, the technological capabilities of our systems have greatly progressed. The connectivity system is built around a host of sensors covering pressures, temperature, flow, energy usage, proximity and vibration that provide the ability to monitor the condition of the machine including fault diagnosis and are capable of being remotely serviced.

John Pattison concludes: "The pneumatics we buy from SMC are critical for our machines and to have SMC return to MecWash to buy another machine is fantastic news. Repeat business, especially over the course of decades, shows a MecWash customer is one for life. This is a key aspect of the MecWash approach that we are very proud of."

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Perfect deflashing and dedusting of duroplast and thermoplast components

Less weight, compact design and improved sustainability; a producer of injection moulded components has proven that these goals can be achieved economically with high-performance plastic materials. The company is increasingly producing workpieces from duroplast and thermoplast materials that were previously made from metal. Therefore, the capacity for deflashing these components had to be increased. For this purpose, the customer chose a shot blasting solution from Rösler. The wire mesh belt machine RSAB 470 ensures fast and efficient processing in continuous flow. The swing satellite table machine RWS 1200 is utilised for high-quality, consistent deflashing of single workpieces. The special dual chamber design of this machine practically eliminates any unproductive idle equipment times.

Ever since ROS GmbH & Co KG was founded in 1926, the processing of plastic materials was always at the centre of the company's activities. Initially named Press plant ROS, the company now has a nearly 100 years old tradition in this field. Today the private business, managed by third generation family members, is a high-end partner for technically demanding injection moulded components made from duroplast and thermoplast materials including polyphenylene sulfide (PPS). Product development, tool making and production take place at the company's headquarters in Coburg, Germany. An additional manufacturing plant is located in Ummerstadt in the German state of Thuringia. For removing the flashes on the components created by the manufacturing process, the company has been working with Rösler shot blast equipment since 2006.

Jürgen Bär, responsible for planning in the industrial engineering department at ROS in Coburg explains: "The demand for plastic components substituting metal parts, for example in thermo management systems for the automobile industry, has been rapidly growing. In 2021 this forced us to increase our shot blasting capacity at both our manufacturing locations. The plastic components reduce the overall weight of the cars and, therefore, help to reduce CO_2 emissions. In addition, we received large orders for duroplast pre-formed components, among others from a leading manufacturer of garden tools."

After discussions with four suppliers of shot blast equipment, the customer chose the wire mesh belt machine RSAB 470 and the swing satellite table machine RWS 1200 from Rösler. Jürgen Bär continues: "Deciding factors for choosing Rösler were our good experience with the shot blast machines we have been using for a long time, the compact, space-saving and sturdy equipment design and Rösler's comprehensive knowledge in the field of plastic deflashing. Moreover, we needed the continuous flow shot blast machine quickly. Rösler generously supplied a machine from their customer experience centre within a few days."

The flexible high-capacity shot blast machine RSAB 470 at the Coburg location is used for deflashing of components made from duroplast and the high-performance thermoplast PPS-GF materials. After deflashing the components undergo a tempering treatment. For this purpose, the components are placed on special frames.

Normally the workpieces are placed individually on the wire mesh belt. To streamline the material handling operation and eliminate this time-consuming step, Rösler adapted the standard work piece transport system of the shot blast machine to the workflow at ROS. This re-design now allows placing the raw components on the tempering frames immediately after the injection moulding process. The workpieces on the frames are then passing through the shot blast machine for the deflashing operation and can, thus, be directly transferred to the tempering station. Four turbines, specially designed for plastic deflashing and placed above and below the wire mesh belt, ensure consistent shot blasting results. This turbine arrangement allows throwing the media consisting of polyamide grains with a diameter of 1 mm onto the workpieces from above and below.

Compared to the normally utilised suction air blast systems the turbines, equipped with electric drives, are considerably more energy efficient. Jürgen Bär adds: "Not only our certification per DIN EN 50001 demands a reduction of our energy consumption, but energy savings are also necessary to save costs and for reasons of sustainability."

A blast media flow control with automatic media replenishment ensures that there is always sufficient blast media available in optimal quality. The shot blast machine is

equipped with numerous technical features such as the anti-static compound dosing system with automatic compound replenishment, the efficient air extraction from the blast chamber, the dual step parts cleaning system in the outlet zone and the effective blast media cleaning system with screen and air wash separator. All these features guarantee that the components coming out of the shot blast machine are perfectly deflashed and absolutely clean. Since the plastic materials used at ROS and the polyamide blast media can cause explosive dust, the shot blast machines were equipped with special ATEX-compliant filter systems.

The swing satellite table machine RWS 1200 was installed to increase the shot blasting capacity at the plant in Ummerstadt. It is used for deflashing components made from PPS-GF and outer dimensions of up to 163 mm. In line with the production cycle of the injection moulding machine up to four workpieces are de-flashed simultaneously within a processing time of 40 seconds. The RWS 1200 has two chambers, equipped with four rotary satellite stations per chamber and each satellite holding one workpiece. This clever design allows to unload/load workpieces in one chamber, while the workpieces in the other chamber are processed. Unproductive idle times are, therefore, minimised. One energy-efficient blast turbine throws the media onto the workpieces placed on the rotary satellite stations arranged in the shape of a diamond. The satellites are not only rotating but, depending on the workpiece geometry, can also be stopped at a certain angle.

Workpiece areas that cannot be reached by the media thrown by the turbine, are cleaned with special air blast nozzles. This suction

air blast system is equipped with pressure control and a vertically moveable nozzle holder ensuring precise deflashing. In addition to the vertical movement a linear positioning system allows to place the nozzles precisely in front of the workpieces. The nozzles are working in either oscillating or static mode. "To minimise the usage of compressed air, we are working with workpiece specific PLC processing programs," concludes Jürgen Bär.

The RWS 1200 is also equipped with automatic replenishment devices for the blast media and the anti-static compound, an air extraction unit for the blast chamber and a blast media cleaning system.

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