

Norton Quantum Prime Grain

OPTIMIZES GRINDING WHEEL PERFORMANCE

Saint-Gobain Abrasives has announced the introduction of Norton Quantum Prime Grinding Wheels featuring new, proprietary nano-crystalline ceramic grain which offers unprecedented productivity gains across a wide range of applications. The new Quantum Prime grain delivers exceptionally high grinding efficiency and part quality, as well as significantly longer wheel life than traditional ceramic grains.

"We are excited to offer our customers with a superior grinding solution which is producing substantial productivity increases," said Rama Vedantham, director of product management, bonded and superabrasives, Norton | Saint-Gobain Abrasives. "In an Outer Diameter (OD) Bearing Grinding application, the Quantum Prime Wheel resulted in 150% more parts per dress than a previous generation ceramic wheel, and also resulted in 300% faster rough/ finish infeed for a plunge face



grinding application compared with a competitive ceramic OD wheel."

Norton Quantum Prime Wheels have several important advantages including a new micro-fracturing grain that has unparalleled sharpness and cutting efficiency which reduces power draw and cycle times, while increasing material removal rates. The unique grain is free cutting, which combined with advanced bond technologies such as Norton Vitrium3, allows Quantum Prime to wear more consistently, improving part quality, geometry and finish even at high material removal rates. Also, Quantum Prime has a more friable self-sharpening grain technology so grinding wheels stay sharper longer, reducing dress requirements and drastically improving wheel life.

Applications for new Norton Quantum Prime are diverse including OD, Centerless, Internal Diameter (ID), Gear, Toolroom, Disc, Surface, Flute and Creepfeed Grinding and Mounted Wheels. Also, newly introduced Norton IDEal-Prime ID Wheels for precision applications feature Quantum Prime grain embedded in an optimized matrix of Norton Vitrium3 bond. The combination of the micro-fracture properties of the new ceramic grain and the retention capability of the bond, ensures long wheel life, excellent grinding efficiency and consistent part quality which results in substantial cost savings.

Key industries for Norton Quantum Prime include automotive, aerospace, energy, primary steel, gear, bearing, cutting tools, and metalworking/engineering. Quantum Prime Grinding Wheels are made-to-order to meet customer requirements. The grain blends are available in all standard grain combinations, and bonds are organic or Vitrium3 vitrified.

nortonsga.us/QuantumPrime

Danobat

INTRODUCES NEW CYLINDRICAL GRINDING MACHINE

The new CG generation is the perfect combination of productivity, versatility and compact design. With its new core technology and the process know-how of experts, users will get finished parts in less time, thanks in part to Danobat's ability to use conventional grinding wheels at 80 m/s (16,000 sfpm) without affecting the quality of the workpiece. With a long life cycle, customers will enjoy decades of optimum performance from this machine. In addition, it incorporates heavy duty precision assemblies that deliver extraordinary stiffness, making it the ideal choice for the most demanding 24/7 production environments. Discover the smart machine and benefit from connectivity in a virtual presentation that took place May 18. If you missed the recent live event, you can watch it by registering using the following link:

danobatgroup.microsoftcrmportals.com/newCG-eventregistration-EN/





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Big Kaiser

INTRODUCES NEW ROUGH BORING TOOL

Big Kaiser Precision Tooling has introduced the Series 319 SW rough boring head with the BIG CAPTO connection. The new SW BIG CAPTO Rough Boring Head makes it possible to perform rough and finish boring processes seamlessly with the finishing heads it has offered for years. Big Kaiser currently offers the widest range of rotating BIG CAPTO tooling of any provider.

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Heidenhain Touch Probe

OFFERS BENEFITS TO GRINDERS AND LATHES

Heidenhain's new TS 750 high-precision touch probe is now available for in-process workpiece measurement in grinding machines and lathes. This extremely durable new probe offers the ability to state the reproducibility of its jobs at increased probing speeds better than its competitors. And the low probing force inherent in the new TS 750 is an important benefit when working with soft or delicate workpieces.

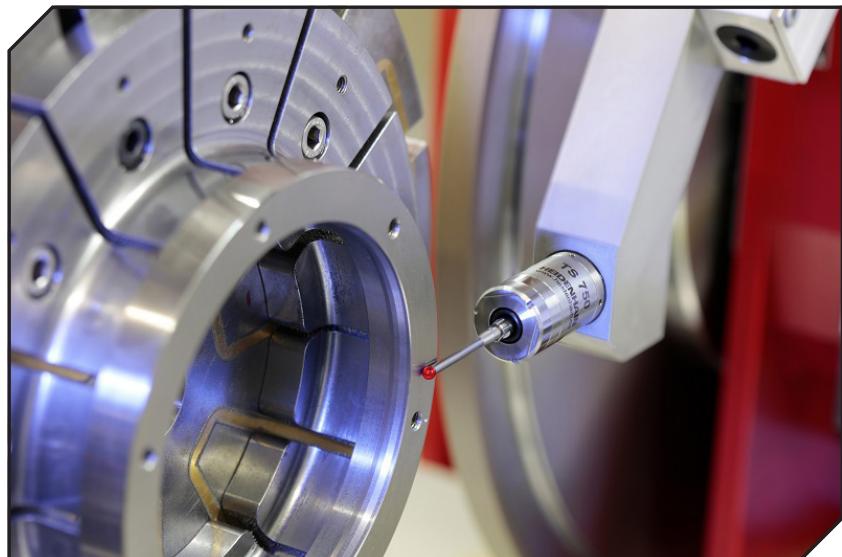
The TS 750 operates with high-precision pressure sensors, with force analysis for generating the trigger pulse. The forces that arise during probing are processed electronically. This method delivers extremely homogeneous, 360° probing accuracy. It offers high probing speed of up to 1 m/min and does not require a minimum speed.

Also, due to its very low probing forces of approximately 1.5 N (axial) and 0.2 N (radial), the TS 750 can attain high probing accuracy ($\pm 1 \mu\text{m}$) and repeatability with almost no effect on the measured object. Only on further deflection do the forces of the springs take effect until the machine stops.

Delivering reliable measurements after prolonged use — even after five million probing

cycles — this TS 750 touch probe is still highly accurate: with a probing repeatability of down to $2 \sigma \leq 0.25 \mu\text{m}$ at its high probing speed. This is highly unusual in the industry.

www.heidenhain.com/products/touch-probes/workpiece-measurement/ts-150-750

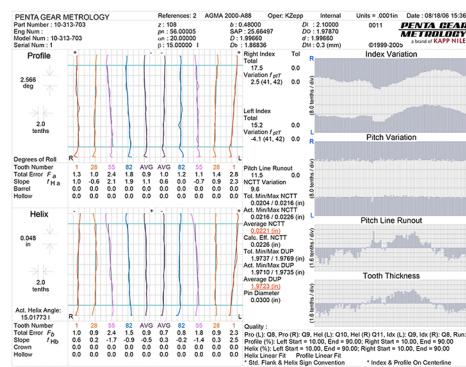


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Schunk ADHESO Gripper

OFFERS BIONICALLY INSPIRED ADHESION TECHNOLOGY

The bionically inspired gripper technology ADHESO, based on the principle of adhesion, uses the intermolecularly acting Van der Waals forces for handling components. Made of special polymers, the patented surface architecture is optimized by numerical simulation, creating a structure of extremely finely structured legs that adhere to different materials and objects.

Glass fibers as light as feathers; the smallest SMD components or micro-mechanical parts; sensitive battery components; plastic films; paper and glass - all can be handled by the ADHESO gripper. Gripping of automotive or mechanical engineering components of a weight of 33 pounds and more is also possible. Automated separation of breathable components is also feasible. With the ADHESO gripper, solutions can be tailored to each customer's individual needs, creating opportunities that are as diverse as the applications themselves.

Using Van der Waals forces, the face of the gripper is gently pressed onto the workpiece during the gripping process, increasing the contact surface and locking the grip into place. This effect can be reversed by applying a slight pressure/rotary movement so that the gripper can be loosened from the object without leaving a residue or any marking. The alternative use of a wiper ensures that the object is gently put down.

The respective adhesive forces and removal of ADHESO depend on the type of material, surface roughness or flatness,

and miniaturization, and can be customized to the different requirements of the relevant environment. Therefore, the adhesive structures can be adapted to the required size and the loading condition (horizontal/vertical) of the application, and can be designed transparent, translucent, or opaque. This high degree of individualization ensures that components with dimensions of a few hundred micrometers can be handled as reliably as those measuring several meters.

Installation costs and commissioning efforts are minimal. The adhesive technology is gentle on components, low-noise, and doesn't require compressed air, vacuum, or current. An external energy supply is not necessary for gripping or for maintaining the gripping force. In case of a power failure in the handling system, the holding forces of the gripper are reliably maintained. Schunk ADHESO allows gripping times of < 100 ms: It can be used in conventional industrial environments, but also in cleanrooms and vacuum environments. In the field of micro handling, repetitive positioning accuracies of < 0.01 mm can be achieved with this technology and it can be also used in collaborative applications. The ADHESO gripper has a bayonet lock and therefore the grippers can be exchanged in just a few simple steps.

Schunk.com



SMW Autoblok BP Chuck

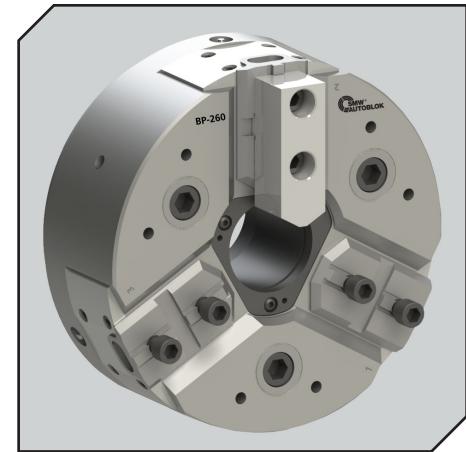
PROVIDES FLEXIBILITY AND EFFICIENCY IN WORKHOLDING

SMW Autoblok presents the BP chuck, the only standard fully sealed power chuck on the market with large through hole for maximum lifespan, throughput and durability.

Ideal for lathe applications, BP's large through hole provides tremendous flexibility for virtually any application where a standard chuck is used including: O.D.

and I.D. clamping, bar stock clamping and shaft clamping. Easily convert BP to a collet chuck using collet pads for small diameter parts.

A true workhorse, BP maintains high efficiency even in harsh environments of dry machining, abrasive powders, high pressure or corrosive coolants, and more. Constant grease lubrication provides



clamping force consistency and reduced wear, greatly reducing downtime and loss of productivity. With BP, daily maintenance intervals become a thing of the past and only requires maintenance checks every 2,000 hours.

Being fully proofline sealed from outside contaminants allows BP to maintain a consistent grip force for excellent repeatability at high speed, versus non-sealed chucks which can lose more than 50 percent grip force if not maintained properly. Other advantages include a case-hardened body and internal parts for high resistance and longer life.

Available in 210, 260, and 320 mm, BP series chucks accept all industry top jaws. The BP-D utilizes master jaws with inch serration while the BP-M operates with metric serration (suitable for Japanese jaws). The American standard, tongue and groove master jaws, are available on the BP-C.

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WFL Millturn Technologies

INTRODUCES WFL iCONTROL PROCESS MONITORING SYSTEM

Thanks to the fundamental redevelopment of its in-house process monitoring system, WFL has significantly expanded its range of functions. With the new WFL iControl system, process signals can be registered, evaluated and recorded in the CNC-kernel of the control with the maximum sampling rate. The introduction of new monitoring strategies, such as so-called "yellow limits," results in considerable advantages in tool breakage and tool wear monitoring. Another new feature is the option of integrating external sensors into process monitoring. The latter allows, for example, continuous monitoring and recording of performance data from coolant pumps or conclusions about the condition of spindle bearings.

With the new iControl process monitoring system, WFL gives the future machine operator a whole bundle of functions to ensure reliable and economical production, particularly in series production. On the one hand, the machine and tools should be used with maximum productivity; on the other hand, the process should run as stably and reliably as possible. The software package that WFL provides for this is extremely diverse and offers a suitable monitoring tool for practically every processing situation. The up to 16 process signals to be monitored are configured by WFL at the factory according to



the machine equipment and displayed live on the control screen. Important process signals include the forces or torques of the NC axes and spindles, but also the signals from integrated sensors (vibration, pressure, flow, temperature, etc.). These are built into machine components or tools and can be used for a wide variety of applications such as process control, optimization or monitoring.

Process monitoring is typically divided into functions for protecting machines, workpieces and tools, and

functions for recording tool wear and ensuring constant productivity. Key new features for detecting tool wear and total breakage include the "wear limit" and the "tool missing limit." The goal was to develop a solution that would respond sensitively and reliably to all conceivable abnormalities in the machining process. This is complemented by a long-time data recording function for process data that WFL offers as an additional option under the name "iControl Data Recording," which is an important topic in the production of safety-relevant components in particular.

WFL is launching two design variants of the new iControl process monitoring system. The "iControl Basic" version monitors the designated maximum machine loads only and triggers a quick stop within ten milliseconds in the event that these are exceeded. The "iControl Advanced" variant also makes it possible to select an individually customisable monitoring strategy for each machining operation and systematically develop a machining process that provides maximum productivity. The software was designed by WFL to ensure that the optimal monitoring strategy could be selected easily and intuitively, and freely combined with other limits.





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For example, the energy consumption per operation can serve as a comparative value when this operation is repeated, making it possible to detect excessive tool wear or a total breakage at an early stage during drilling and avoid serious damage. However, brief and isolated load peaks in the process sequence probably would not have any bearing on this operation and even small partial breakages on the cutting edge would be acceptable. As a result, the process would not be interrupted provided that the event was not identified as a total failure of the tool. By contrast, when it comes to finish turning, even the tiniest partial breakage on the cutting edge could lead to an unacceptable surface quality, even though in principle the tool would still be functional. These types of events happen in a matter of a few milliseconds and are difficult or impossible for the operator to see during machining. With dynamic monitoring enabled, iControl would detect the inconsistency, interrupt the process immediately and inform the responsible staff member.

The maximum loads on the individual axes and spindles—known as “red limits”—can be freely selected anywhere up to the collision limit. This means that, for each operation, there is a pre-set percentage of the maximum permissible load for each axis or spindle. If no limit is selected, the collision limit set at the factory will apply automatically.

The process signal from a complete machining sequence can be recorded using a teach-in cut. The allocation of upper and lower process limits defines the tolerance band within which the process signal must remain during machining. If these limits are violated, the machine will stop. It is also possible to select a pre-warning limit, otherwise known as a “yellow limit.” If this limit is reached, the machine will not stop immediately. Instead, a message will be generated to enable the operator to respond in good time, i.e. before another limit is reached. This primarily serves to ensure uninterrupted operation and makes it possible to replace worn tools even if they have yet to reach the end of their (theoretical) tool life. Typically, the collision limits set at the factory will always automatically limit any process-related forces to a level that is safe for the machine.

Nevertheless, there are often applications where the stability of the workpieces, the clamping devices or the required tools simply does not permit large machining forces. The “red limit” can help in these cases in particular because the machine will stop immediately—even if the limit is exceeded for only the briefest of moments. However, the “red limit” also serves to detect tool breakage, chip jams or blanks that are too large and can always be activated in the background so to speak.

The “iControl” process monitoring system is typically characterized by its extremely high sensitivity and reliability. The signal value for process monitoring is derived directly from the drive torques of the NC axes and spindles. A special algorithm eliminates friction and acceleration forces, making it possible to analyze the process signals with particular precision. “iControl” provides essential services for automation and series production in particular. However, making the machining process fully transparent is also beneficial for complex internal machining tasks.

FANUC

EXPANDS SCARA ROBOT SERIES

FANUC America has expanded its line of high-performance SCARA ROBOTS, offering more reach and payload options to companies with assembly, packaging, pick and place, and inspection processes.

FANUC's family of 4-axis SCARA robots has grown to include the SR-3iA, SR-6iA, SR-12iA, and new SR-20iA models with 3kg, 6kg, 12 kg and 20 kg payload capacities, and a 400-1,100 mm reach, respectively.

The small SR-3iA and SR-6iA SCARAs have a compact footprint and space-saving design for maximum efficiency. In addition, the SR-3iA/H and SR-6iA/H are 3-axis variants that provide strong performance and an affordable alternative to small linear slide products. The higher-payload SR-12iA and SR-20iA provide flexibility with a large vertical stroke, and an environmental option for harsh conditions. All of FANUC's SCARA robots include superior robot motion, high-speed operation and ultimate precision.

"FANUC's SCARA robots provide great solutions when speed and repeatability are essential," said Eric Potter, director of FANUC's general industry and automotive engineering segments. "Our SCARA robots are designed to help customers increase productivity in a number of industries including consumer electronics, auto components, plastics, food & beverage, lab

automation, appliances and medical device manufacturing."

Powered by the R-30iB Compact Plus controller, FANUC's SCARA robots have the same intelligence and reliability that's available on all FANUC robots, including integrated iRVision, conveyor tracking (iRPickTool), and most other software options. FANUC's latest SCARA iRProgrammer user interface makes it easy to setup and program the robot on a Tablet or PC (Teach Pendant is optional).

"With over 715,000 robots installed globally, FANUC is a household name in manufacturing. Now, with our expansive line of SCARAs we're able to help more companies solve their manufacturing issues," added Potter.

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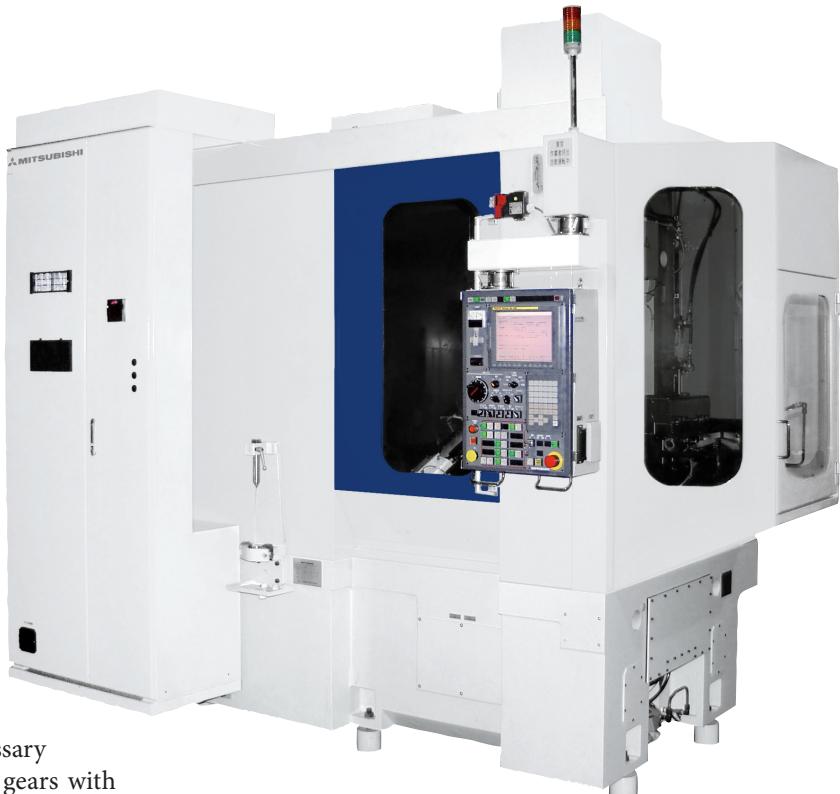
LAUNCHES TWO NEW HOBBLING MACHINES

Mitsubishi Heavy Industries Machine Tool Co., Ltd., a part of Mitsubishi Heavy Industries (MHI) Group, announces the June 2021 launch of the new GE15HS and GE25HS models of hobbing machines. Emphasizing high speed, precision and efficiency, the new machines produce gears for electric and hybrid cars amid the global trend toward reducing the carbon footprint.

The GE15HS model is for gears with a maximum diameter of 150 mm, widely used in automobiles and motorcycles. The high-speed, high-torque direct-drive motor for the main cutting spindle provides a maximum spindle speed of 6,000 rpm — three times faster than previous models. The high efficiency spindle holding the workpiece uses a special table that provides high rigidity and high-speed rotation to handle the necessary thrust load for high efficiency machining. Cutting gears with Mitsubishi's super-hard cutting tools yields a surface roughness, R_a , of less than 0.4; on par with gear grinding. The GE15HS provides process efficiency, eliminating the finishing process of shaving prior to heat treatment, improving productivity and reducing processing cost.

The GE25HS is for larger gears up to 250 mm in diameter, such as automobile differential gears. With its high-efficiency processing, this model utilizes a high-speed, high-power spindle eliminating the effects of temperatures variation during production. The high rigidity table has the backlash eliminator incorporated as standard equipment. In addition, the motor torque and maximum spindle rotation speed of the main spindle have been increased 1.5 times from previous models, providing a 42% reduction in processing time.

Used in combination with MHI Machine Tool's new materials and coatings for cutting tools, the GE25HS model provides

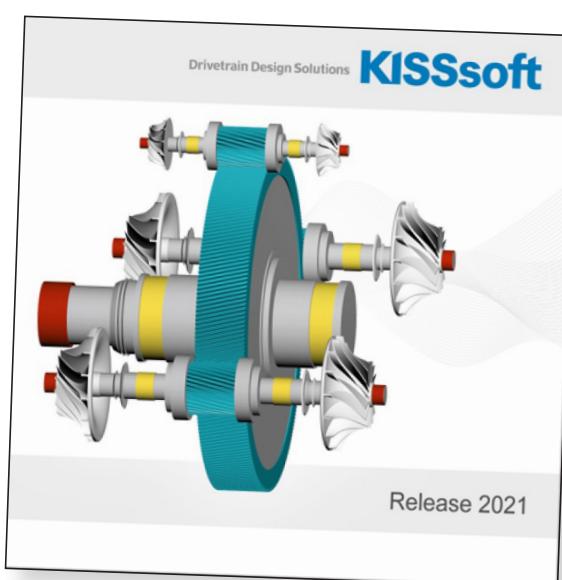


stable mass production with a cutting speed of more than 400 m/min.

MHI has delivered and installed more than 2,800 GE Series hobbing machines since the product launch in 2004.

Demand for mass production of high-precision gears is continuing to rise with the shift to electrification of vehicles. With the need for improvements in NVH and fuel efficiency, and the move toward low-cost manufacturing, MHI Machine Tool, with expertise in both gear machine tools and cutting tools, offers a full lineup of gear production machines, including these two new models. By delivering precision cutting tools and processing solutions to achieve high-precision, high-efficiency processing, MHI provides comprehensive support for manufacturing in a wide variety of industries.

www.mhi.com



KISSsoft

RELEASE 2021 NOW AVAILABLE

The new *KISSsoft Release 2021* contains numerous innovations; for example, the 7th edition of the FKM Guideline has been implemented.

The revised 7th edition of the FKM Guideline (2020) contains a number of innovations in the nominal stress concept for shaft calculations. The revision includes a protective layer factor for galvanized steels, a new material group "Austempered Ductile Iron (ADI)" and equations for a cross-section of the shaft with hub seat (aligned with DIN 743). All material properties have also been adapted. The FKM guideline is thus state of the art.

www.kisssoft.com

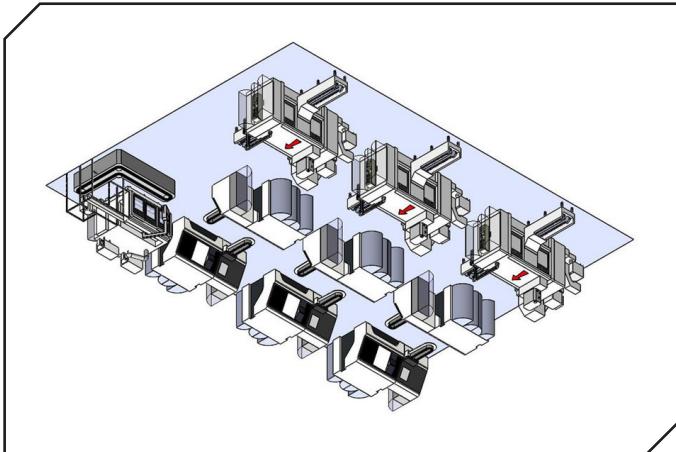
DVS

REPORTS RISE IN DRIVE SHAFT PRODUCTION

In order to meet the emissions targets, drive shaft production is being further expanded by automotive manufacturers. They will ultimately be used in modern hybrid or electric engines.

Two products are currently in series production in Krauthausen; for a Scandinavian and an American manufacturer.

The process begins with the procurement and delivery of the raw material. Subsequent turning operations, including gear manufacturing, are carried out on the WMZ H200 machine, while the hardening process is performed externally. Finally, grinding and hard machining are carried out on the DVS Universal Grinding machine UGrind. The subsequent gear honing is performed on the Präwema Synchrofine. With the final inspection, the products are finally checked and finally packed and shipped. The traceability concept is ensured by a DMC code applied to the shaft.



The challenge in the production of drive shafts lies in compliance with the specified tolerances and noise, vibration, hardness values. Due to the now high-quality requirements, the demands on production processes and machines have also increased. DVS Production maps these characteristics with its portfolio.

Previously, the customer manufactured the components in-house. However, DVS makes it possible to manufacture the drive shafts with up to a 50 percent time savings, which means that the advantage of cost-effectiveness clearly lies with the manufacturing company. The customer has no investment commitment when placing an order. This is for him, with fluctuating call-offs of the OEMs and Tier 1s, of great benefit.

technology.dvs-gruppe.com

Helios Gear

OFFERS ABRASIVES FOR GEAR MANUFACTURERS

Demand for ground gears continues to grow, especially in the automotive and truck power transmission industries. Consequently, manufacturers need improved solutions for abrasive tools. Helios Gear Products has supported manufacturers and this need for decades with world-leading tools for the hard finishing of gears. Today, Helios announces the latest line of abrasives backed with dedicated application engineers specifically for gear manufacturers. These tools cover all applications for gearing, including form grinding wheels, continuous generating grinding wheels, diamond dressing tools, honing rings, bevel grinding cups, and traditional solutions for OD and ID grinding. Moreover, gear manufacturers rely on the Helios team of dedicated application engineers to improve their gear grinding success.



Gear grinding means quality, so manufacturers require state-of-the-art abrasive tools. The Helios abrasives line includes such tools that use the latest technology for ceramic and aluminum oxide grains and bonds. For example, the Tyrolit Burka-Kosmos Mira Ice series of form (single-profile) grinding wheels use the latest grains combined with an innovative, high-strength bond system and increased porosity to achieve industry-leading “cool” grinding. Put simply, Mira Ice enables gear manufacturers to push the envelope on speeds and feeds. Said Tim Lee, technical sales manager — hard finishing from Helios, “It is not uncommon for gear manufacturers to decrease cycle times 20–30% by switching to an optimized grinding wheel technology, such as Helios’s Mira line. Additionally, manufacturers can extend tool life dramatically by optimizing their processes (engineering their applications) with the Helios team.”

Several solutions comprise the rest of the Helios abrasives line for gear manufacturers. These tools for generating grinding, tool dressing, honing (with the industry’s shortest lead times), and bevel gear grinding meet the Helios standard of globally competitive manufacturing solutions. Many of these tools are manufactured in technically cutting-edge European and U.S. factories, and they equip manufacturers to serve global markets.

Choosing a tool specification (“spec”) can be a daunting task. Some manufacturers make a conservative choice and use a traditional spec employed at relatively slow speeds and feeds. By leaning on the Helios team of application engineers, gear manufacturers can reap the benefits offered by contemporary wheel specs. After manufacturers establish an open communication channel, Helios engineers become a powerful tool for the gear manufacturer’s team. Consequently, Helios advises on optimal wheel specs to push the limits of an application’s cycle times, tool life, and part quality. “Successful manufacturers know that what comes in the box is not just a grinding tool but also the team of engineers to support it. By literally using the Helios team, manufacturers can stay at the top of their game,” said David Harroun, vice president from Helios.

Gear manufacturers rely on Helios abrasives for profitably productive grinding. By using Helios engineers for application support, manufacturers optimally use their resources: tool life, machining time, and tool costs. For future grinding jobs, gear manufacturers should contact Helios Gear Products and speak with an engineer.

Heliosgearproducts.com

Open Mind

INTRODUCES LATEST HYPERMILL SOFTWARE SUITE

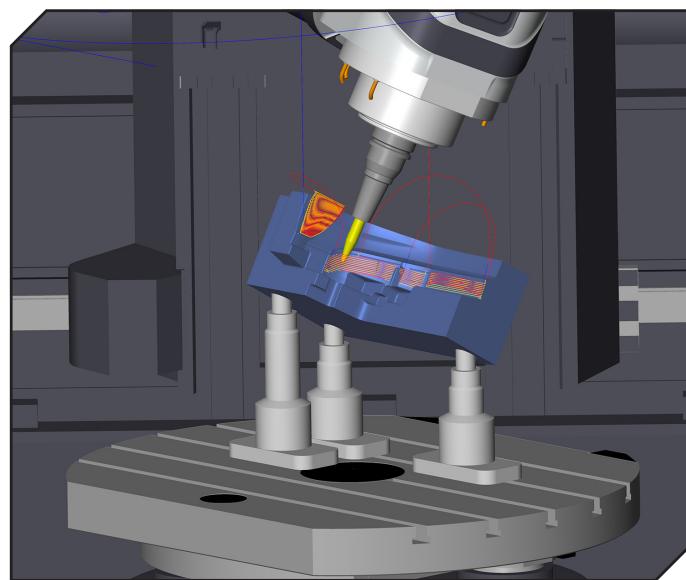
Open Mind Technologies AG has introduced its latest *hyperMILL* 2021.2 CAD/CAM software suite which offers users innovative and enhanced features for efficient, user friendly machining in applications ranging from 2.5D to 5-axis. “With our continued focus on providing a rich, simplified user experience, the latest version of *hyperMILL* offers enhanced machining strategies, increased options for data feedback, as well as more convenience,” said Alan Levine, managing director of Open Mind Technologies USA, Inc.

Resulting in simplified programming and increased process reliability, *hyperMILL* VIRTUAL Machining NC code-based machine simulation has also been enhanced. Within the VIRTUAL Machining Optimizer module which links individual part programs with smooth and safe connections, the cutter is able to remain close to the workpiece, violations of the axis limitations are now detected and movement sequences are optimized accordingly. There is also a new option in VIRTUAL Machining to apply a special approach and retract strategy to machines where the cutting tool can be retracted into a tunnel.

A forerunner in CAM Additive Manufacturing, Open Mind has introduced more capabilities in *hyperMILL* 2021.2 ADDITIVE Manufacturing including a Weave Mode. This new mode generates a toolpath in a wave-shaped or zigzag movement, to apply material to contours or to fill areas, allowing the application area to be widened and the thickness to be increased for the individual movement. This continuous application also improves the metallurgical properties of the applied material.

In the integrated hyperCAD-S CAD module, additional file formats for import and export have been added including SAT as standard ACIS text, and OBJ and 3MF for importing mesh data. Also, electrode creation has been improved via the optimized selection of the raw material. To support EDM machining, the hyperCAD-S Electrode Converter can now be used to create import files for several EDM machines such as Exeron, Zimmer & Kreim and OPS-INGERSOLL.

For increased quality and ease of use, enhancements to some CAM cycles are offered in *hyperMILL* 2021.2 such as 3D and 5-axis Equidistant Finishing capabilities that define the milling area by selecting bounding curves so that individual areas on a surface model can be targeted. With 3D ISO Machining, multiple bounding curves can now be used to allow different areas to be machined in one job. In addition, 3D Z-level Shape



Finishing includes several innovative features to improve machining quality, including optimized sorting of toolpath, smooth overlap at boundary, free tool geometry and trim toolpath to stock.

For improved clarity, *hyperMILL* 2021.2 also has new functions that provide better feedback during CAM programming. Automatic Stock Display displays stock automatically for any machining job. Also, there is a new Preview of Selected Entities feature that highlights entities such as curves, faces or points when a job is selected. And for component alignment at a touch of a button, a new BEST FIT feature aligns the NC program automatically to the component position, eliminating manual alignment and optimizing the options offered by VIRTUAL Machining.

www.openmind-tech.com

LK Metrology

HELPS CUT INSPECTION TIME IN HALF

At the U.S. transmission plant of a global automotive manufacturing group, component inspection times have been reduced by half or more following the decision to partner with LK Metrology Inc, which has upgraded all of the CNC coordinate measuring machines (CMMs) on site to use 5-axis scanning technology in addition to touch probing. The Brighton, Michigan-based metrology company is the U.S. subsidiary of British CMM manufacturer, LK Metrology, Ltd. which built 19 of the 26 CMMs in use at the US factory. Two are on the shop floor, while the others are installed in five different quality control (QC) rooms.

A spokesperson at the world class manufacturing center explained, "We have been using LK machines for controlling the quality of our machined components for more than two decades. They have proved to be a reliable supplier and their ceramic-bridge machines are very accurate."

"There are a couple of other makes of CMMs here as well and we also asked those suppliers if they would convert all our machines to the REVO 5-axis scanning system from Renishaw, which is another UK company. They did not offer us a solution, however."

The impetus for investing in the metrology upgrade, where four- and six-speed transmissions have historically been manufactured, was the addition of eight and nine-speed versions. Since then, electric hybrid transmissions have also entered production. It put the inspection team under pressure to cope with the increased throughput, so the company ordered extra LK machines and decided to award the site-wide, turnkey REVO upgrade and servicing contract to them.

The spokesperson added, "LK had been pro-actively offering the conversion, but we needed to satisfy ourselves that our other CMMs could be similarly modified. Our engineers proved it could be done on a small, non-LK machine at another one of our plants. The results showed how fast the REVO process is, while being just as precise as the touch probing method we have traditionally employed."

"Some machined features on our transmission components need to be held within ± 30 microns true position. To achieve this level of accuracy, it is essential for us to be able to hold single-figure micron tolerances on other dimensions, as tolerance build-up is inevitable. Obviously we need to measure those features and REVO on our CMMs allows us to do that quickly and accurately."

Jobs swapped between CMMs in minutes

About 1,500 steel and aluminum parts per day are inspected, some being the same item but at different stages of manufacture. Overall, 200,000 features are checked daily. The benefit of the present metrology set-up is that each of the five QC rooms houses identical technology and capability, with fixtures and probes freely interchangeable. As a result, any operator can flexibly transfer jobs between CMMs around the site within



minutes and it feels like he or she is using the same machine, a level of commonality that delivers highly consistent results. Previously this would not have happened, as the disparate measuring platforms within the facility meant that it would have taken hours or even days to move parts around for checking.

The benefits of scanning

The scanning system is Renishaw's REVO, a two-axis CNC head that moves in unison with the three CNC axes of the CMM under program control to provide full 5-axis inspection, collecting dimensional data accurately using a tactile stylus. It can measure discrete points on a component in a conventional manner but is also able to scan over some areas, where it is expedient, to collect data at much higher speeds without leaving the surface. It is this latter feature that has on average halved cycle times at the US transmissions manufacturer.

Controlled by Renishaw's MODUS software, the nimble head with its two rotary CNC axes minimizes the linear acceleration and deceleration of the CMM's large moving elements during a measuring routine, whether touch probing or scanning. It means that the three orthogonal axes move for the most part with constant velocity, allowing changes in component geometry to be followed without introducing dynamic errors. Programs are created either in teach mode using the same software or from a CAD model.

The spokesperson concluded, "The system works extremely well, so we get results faster. We are currently looking at the possibility of having LK retrofit the latest REVO-2 head to our CMMs, which would allow us to acquire information on the surface finish of components in the same CNC cycles. The need for dedicated test equipment to check surface roughness could then be reduced or even eliminated."

"The system would also enable a multi-sensor approach to our measurement, as it can incorporate non-contact inspection using a vision probe as well as tactile methodology, should we ever decide to go down that route."

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