

# A Shifting Status Quo

## What's New and What's Next at Motion + Power Technology Expo?

Matthew Jaster, Senior Editor

**Manufacturing is getting a makeover.** This might be why you've signed up for the Motion + Power Technology Expo. The gear shop is evolving right before our eyes. New material, software and additive technologies are in the headlines while machine tools get smarter, faster, and more energy efficient.

Forecasts are buzzing with news on automation, IIoT, robotics and augmented reality. In order to meet the stringent demands in aerospace or e-Mobility, you'll need the appropriate grinding wheels, hobbing machines, closed loop solutions or skiving technologies to stay competitive.

It's all here in St Louis — hints of the future gear shop. Markets are picking up, power transmission is moving in the right direction and commercial and industrial growth may provide real opportunity post-pandemic. It's time to roll up the sleeves and focus on the future.

### Bourn & Koch Touts Hobbing and Remanufacture Packages

While Bourn & Koch is well known in the gear manufacturing industry for their expert support of Barber-Colman and Fellows machine tools, the machines they are bringing to M+PT will showcase the solutions they can provide for new and remanufactured gear manufacturing machine tools.

Bourn & Koch will feature their flagship horizontal gear hobbing machine, the 400H. Capable of producing large diameter, high quality gears in a compact footprint, the 400H allows for a highly efficient way to hob long spline shafts and gears on large shafts for a variety of industries, including aerospace, agriculture, heavy equipment, and defense. The 400H's predecessor is the Barber-Colman 16-16, a machine still used to this day by many gear manufacturers. The Bourn & Koch 400H provides a way to upgrade your Barber-Colman to today's technology with standard single and multiple cut cycles, a Fanuc 0i-F CNC control with easy to learn conversational programming, a power-programmable CNC hob swivel, automatic hob shift, along

with crown and taper hobbing cycles. Additionally, the machine will feature an integrated probe arm assembly, designed to be used in carbide re-hobbing applications to measure tooth to tooth spacing and for automatically detecting profile length.

Also, on display in Bourn & Koch's booth, is their new Fellows 10-4 CNC remanufacture package. While remanufactured gear shapers have been provided by Bourn & Koch for decades, this new package provides a direct drive work-spindle and infeed axis along with numerous mechanical improvements over a typical retrofit. Bourn & Koch has long provided quality OEM remanufactures of Fellows 10-4 gear shapers, but this new package, featuring a Fanuc 35i, provides an economical CNC gear shaping machine with the quality and support that Bourn & Koch is known for. Loyd Koch, co-founder of Bourn & Koch, was integral in bringing this "new product" to market with the engineering team, so its pedigree is based in a practical approach to providing a quality machine for job shops and large manufacturers alike.

**Bourn & Koch, Inc. – Booth #3721**  
[www.bourn-koch.com](http://www.bourn-koch.com)

### Euro-Tech Offers Frenco and Mytec Hydraclamp Workholding Solutions

Euro-Tech Corporation offers workholding solutions for gear industry challenges with the Frenco and Mytec Hydraclamp product lines. Today's solutions for efficiency and power density are often a combination of mechanical, fluid power, electric, and hybrid technologies. Today's gears and splines are precision items produced through special tools with very tight tolerances. When you need to inspect manufactured workpieces you need even more accurate measuring and inspection equipment. For over 40 years, Frenco has committed itself to the challenge of providing customized solutions for individual gear and spline inspection requirements. MyTec Hydraclamp expansion elements provide the optimal connecting link between workpiece and machine. Mytec recently added a line of mechanical arbors

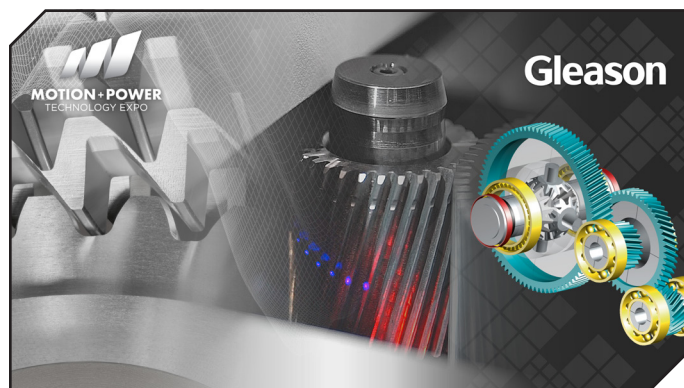


and chucks with repeat accuracies of  $\leq 0.005$  mm ( $\leq 0.0002$ "). These are excellent for workholding where high forces are incurred or auto load applications where high clearance is required.

**Euro-Tech Corporation – Booth #2312**  
[www.eurotechcorp.com](http://www.eurotechcorp.com)

### Gleason Showcases Latest in Closed Loop Manufacturing and In-Process Quality Control

Gleason Corporation will showcase the latest technologies in design, manufacturing and inspection of cylindrical and bevel gears. Special focus will be given to the new KISSsoft Gear and Transmission Design Capabilities, 100%-In-Process Control, Gear Noise Analysis and live manufacturing demonstrations from Gleason operations around the globe.



### KISSsoft: Intuitive Gear and Transmission Design at System Level

KISSsoft will demonstrate its *KISSsoft 2021* release with numerous new features, including: *KISSsys*, the intuitive concept design software at system level; the new interface with SKF bearing technology to simplify transmission development; the interface with Gleason's GEMS to exchange gear and system information for bevel gear manufacture; the Closed Loop system to exchange data with metrology and production machines, and much more.

### Up to 100% In-Process Quality Control with Integrated Gear Noise Analysis Tool

The new GRSL Gear Rolling System with laser technology revolutionizes in-process gear inspection and sets a new standard for high-speed, high-volume quality control. This compact gear inspection unit combines double flank roll testing with index and involute measurement as well as lead measurement on all teeth for full analytical and functional in-process gear inspection. Measurement data and process trend analysis are displayed in real time throughout the production run, with automatic Closed Loop corrections. In addition, Gleason's Advanced Waviness Analysis allows the detection of potentially conspicuous gears in real time regarding noise problems.

### Live Product Demos and Complementary Virtual Show

Gleason will present several new products with live webcasts directly from its global operations including a world

## All The Gear Cutting Tools You Will Ever Need Are Right Here

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premiere, the 280HCD Genesis Gear Hobbing Machine with integrated Chamfer Hobbing, Threaded Wheel Gear Grinding, Power Skiving, and the new Phoenix 500C Bevel Gear Cutting Machine with Pentac Ecoblade Cutter System for mid-size bevel gears. Experts will be available to answer questions and demonstrate specific features of products. For customers not able to participate in MPT2021, Gleason's "emotions" virtual showrooms will be available to experience all exhibits remotely. For more details, please refer to Gleason's website and social media channels.

**Gleason Corporation – Booth #2607**  
[www.gleason.com/mpt2021](http://www.gleason.com/mpt2021)

## GMTA Presents Machine Tools and Metal Fabricating Equipment

German Machine Tools of America (GMTA) in Ann Arbor, Michigan, will showcase several of its machine tools and metal fabricating equipment at the Motion + Power Technology Expo. The show will take place September 14-16, 2021 in St. Louis, Missouri and is produced by AGMA. It connects top manufacturers, suppliers, buyers and experts in the mechanical and gear power, electric power and fluid industries.

The company represents several high quality, high performance lines including Arnold, BvL, K+G, Profilator, Rasoma, Samag and its latest addition, Stiefelmayer. Arnold laser technology provides a complete line of laser welding machines for the automotive, aerospace and other markets. BvL offers parts washing systems, equally suited as a one-off station for large castings/forged products or as a continuous washing and drying line. K+G are high-tech machine tools for internal or external grooving, turning and milling.

Profilator is a world-renowned brand of machines for gear pointing, cutting, rounding, deburring, polygon slot facing and the Scudding process. Rasoma is a builder of vertical turning centers and inverted spindle turning machines for milling, drill-



ing and special machining. Samag machining centers and deep hole drilling machines are used in the automotive, off-highway and moldmaking industries. Stiefelmayer lasers cut products such as motor laminations, as well as laser hardening, fiber and diode types. Lastly, GMTA offers its own line of baskets, trolleys

and lift tables.

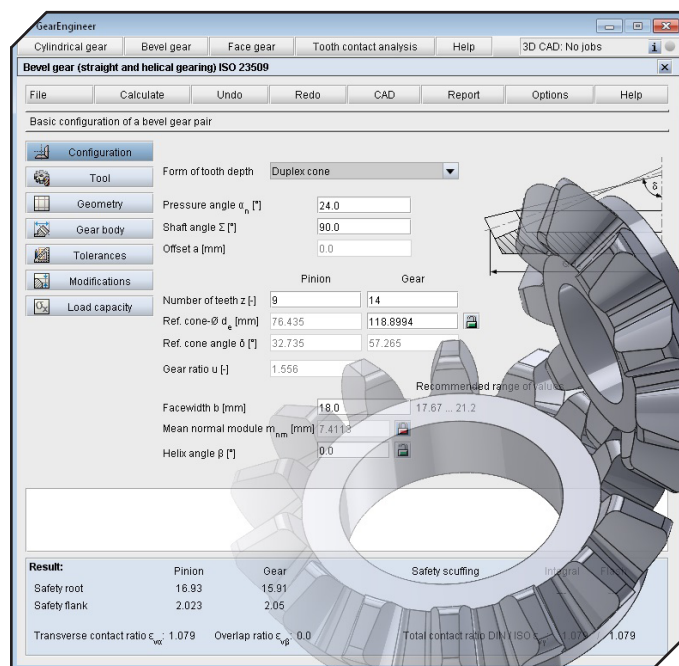
**German Machine Tools of America (GMTA) – Booth #3513**  
[www.gmtamerica.com](http://www.gmtamerica.com)

## GWJ Technology Offers GearEngineer Software for 5-Axis Milling

GearEngineer is a special gear software that calculates the exact and real 3D tooth form geometries of cylindrical and bevel gears. The 3D tooth forms are generated using mathematical simulations of the manufacturing process. Micro geometries, i.e. profile and flank modifications, are also taken into account when generating the 3D data. This makes GearEngineer the ideal starting point for 5-axis milling of gears.

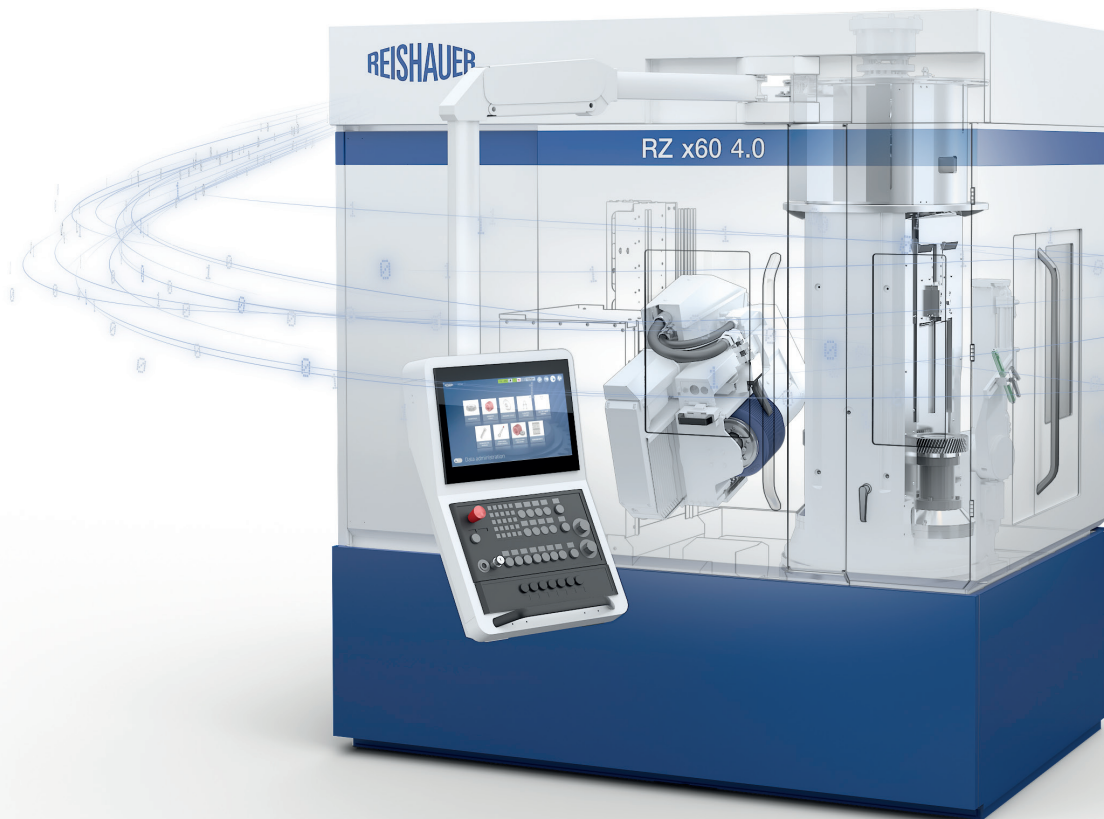
With the new version, the GearEngineer is now 64bit and adapted for WIN 10. At the same time, the internal CAD core has been updated and, in addition to the surface and curve output, provides even more stable 3D solid models for special functionalities such as the circumferential chamfer for cylindrical gears. The definition of the tool basic rack tooth profile for hobs has been supplemented by the new tip form "Full radius" in addition to the tip form "Radius with straight line". This means that cylindrical gears with a full root fillet can be calculated and manufactured.

For cylindrical gears, the VDI 2736 standard for plastic gears was added to the load capacity methods according to DIN 3990, ISO 6336 and ANSI/AGMA 2001. In addition, plastics have also been included in the material database. Another new feature is the possibility to calculate with a "wrong" center distance for cylindrical gear pairs. A corresponding function has been



integrated for this purpose when designing the profile shift coefficients.

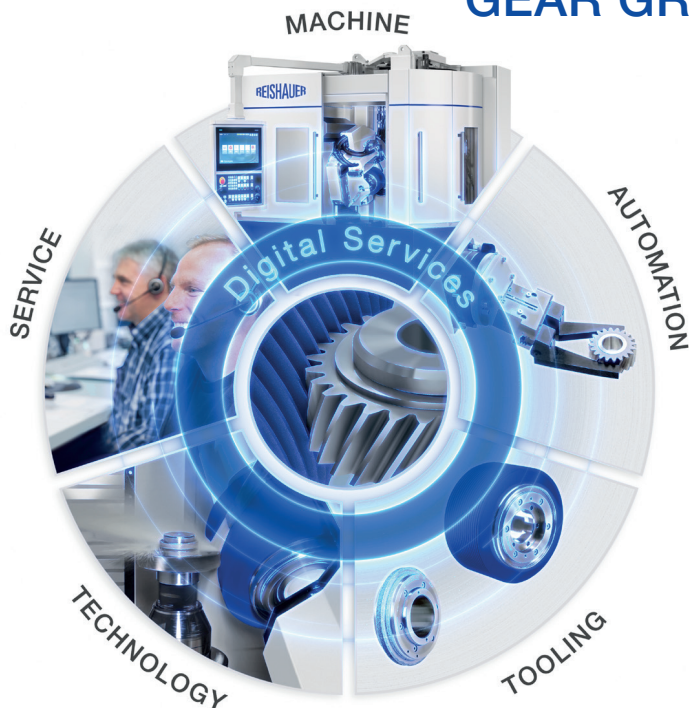
Furthermore, the module for straight and helical bevel gears has been extended by profile modifications in addition to the already existing flank modifications. Thus, profile crowning and tip relief as well as pressure angle modifications are now



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available for each flank.

The new “duplex” bevel shape is now supported, which results in a constant tooth root along the facewidth. This enhancement, together with the profile modifications, was added in response to user requests from the differential bevel gear forging sector.

In addition to the output options of CAD data in STEP and IGES format, so-called nominal measurement data, are also possible. An updated version of the Klingelnberg’s KIMoS software format has been integrated here, which allows the measurement of the flank topography on corresponding gear measuring centers or 3D coordinate measuring machines.

**GWJ Technology – Booth #2810**  
**www.gwj.de**



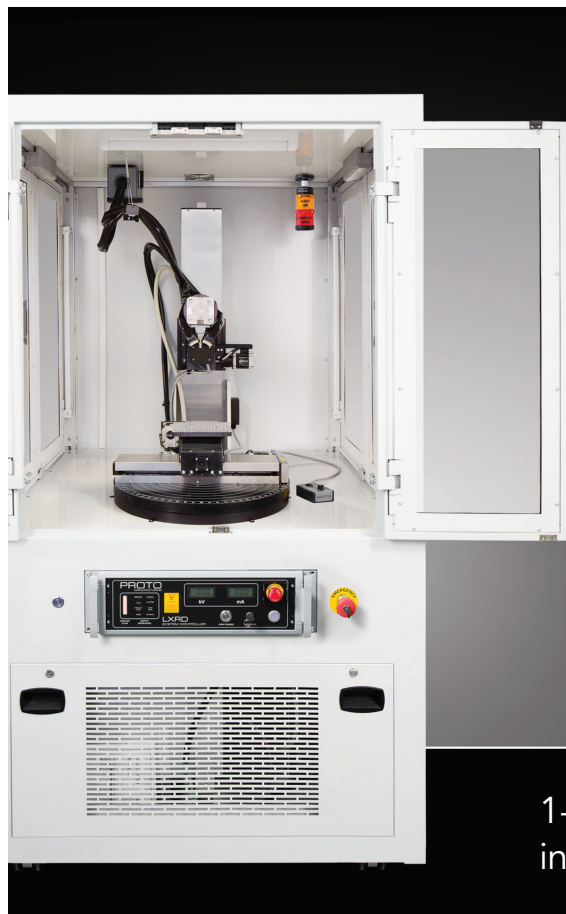
### Hainbuch Presents Maxxos T211

A mandrel with hexagonal pyramid shape instead of a round taper, designed with stringent manufacturing requirements and process reliability in mind. Hainbuch has acted in response to demand from specific areas that has been growing year by year. Users are requesting mandrels that deliver higher performance as well as process reliability. The result is called Maxxos. The segmented clamping bushing with hexagon inside shape fits perfectly onto the clamping pyramid and enables maximum cutting performance. The lubrication, combined with its tightness ensures a very constant production flow and as a result, achieves maximum reliability. Customers that value process reliability and maximum torque transmission will be delighted

with the Maxxos T211.

#### The best for heavy I.D. clamping

Thanks to the hexagonal pyramid clamp, maximum torque transmission can be achieved. Up to 155 percent more transmissible torque and up to 57 percent higher bending stiffness compared to the classic Mando T211 mandrel. This makes it possible to achieve higher process parameters and consequently improve the yield of finished parts. Greater process reliability is facilitated by the spacious layout between the clamping bushing and the clamping pyramid. Even during the clamping process, this design prevents virtually any dirt getting onto the surfaces.



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This significantly cuts down the frequency of maintenance times for cleaning and lubrication. Overall, the mandrel has a clamping diameter range of 18 to 100 mm. The clamping areas of each size are designed to overlap. This has the advantage that users can choose from up to three mandrel sizes depending on the clamping diameter. The larger the mandrel is, the greater its stability and rigidity. Smaller mandrels may be able to handle more of the customers smaller workpieces. The aligned, segmented clamping bushings have a minimum concentricity of 0.01 mm and can even be supplied in a high precision version.

Advantages include I.D. clamping mandrel for clamping diameters of 18 to 100 mm, ideal for stringent manufacturing demands and process reliability, unique rigidity due to spacious layout of the clamping segments, high transmissible torque and holding forces, contamination resistant due to hexagonal pyramid shape, and concentricity <0.01 mm also available in high precision version.

**Hainbuch America – Booth #3425**  
**[www.hainbuch.com](http://www.hainbuch.com)**

### **Helios Features Latest Hobbing, Shaping, Skiving and Grinding Technologies**

In the Helios show booth, manufacturers will see a Hera 90 CNC gear hobbing and thread (worm) milling machine with unified gantry automation. This machine offers a single platform for automatically hobbing and milling parts up to approximately 3.5" outside diameter. With its 6,000 rpm cutter spindle, the machine productively handles small parts with small hobs by maximizing surface speeds. This high-speed spindle also enables productive milling of worms. Moreover, this machine will demonstrate its versatile, easy-to-set-up automation system to prove its place as the industry-leading workhorse at an unbeatable price for fine-pitch gear manufacturing.

Also in the Hera series of hobbing machines, show attendees will learn about the model 350, which empowers manufacturers as a robust vertical hobbing platform for parts up to approximately 15" outside diameter. As with other Hera hobbers, the 350 is surprisingly affordable and offers several options for an optimized solution, such as 2- or 4-station ring loaders, re-hobbing abilities, automation systems, and more. Similarly, Helios offers the Hera models 500 and 750 for parts up to approximately 30" outside diameter. Additionally, manufacturers of fine- and ultra-fine-pitch gears will want to learn about the Hera 30, which features dual direct-drive work spindles, and a 10,000 rpm hob spindle for productive hobbing of parts up to approximately 1.6" outside diameter.

For productive manufacturing of internal gears, Helios will feature the Neo Power Skiving ("NEOPS") line. This series of machines, which includes the models 100, 200, and 400, produces internal or external gears for parts up to approximately 16.5" outside diameter. Compared to traditional shaping, a NEOPS can produce precision gears in a fraction of the time.

"Show attendees will really want to stop by and learn about the Neo power skiving machine, which offers this cutting-edge technology at a fraction of the price compared to competitors in the market," said David Harroun, Helios vice-president.



Helios will also feature the 2021 CNC upgrades to its line of Tecnomacchine ("TM") gear deburring machines. The TM series now offers manufacturers complete CNC programming of the chamfer-deburring process. This includes tool position (radial, axial, tangential, and inclination), tool pressure, tool rotation speed, tool rotation direction, workpiece rotation direction, and workpiece rotation speed. This allows manufacturers to store a complete application to later be recalled by the CNC with just a few software steps. Consequently, changeover time reduces to a few minutes rather than the traditional 30-45 minutes. Moreover, it significantly lowers the bar for personnel training, altogether making the machine investment more flexible and productive for high-mix gear manufacturing.

Helios also offers manufacturers cutting and abrasive tools, including hobs, milling cutters, shaper cutters, continuous generating grinding wheels, form (single-profile) grinding wheels, bevel gear grinding cups, diamond dressing gears, and more. Manufacturers will want to establish their communication channel with Helios engineers at the show to empower their manufacturing teams with valuable guidance on tool specifications and machining parameters. These in-person connections will pay dividends well into the future.

Manufacturers who attend the Motion + Power Technology Expo will discover the latest solutions for hobbing, deburring, inspection, and grinding by seeing demonstrated CNC equipment and a variety of cutting and abrasive tools at the Helios Gear Products booth. Show attendees can ask questions and learn from Helios experts on-the-spot while viewing machines and tools that enable globally competitive production of gears.

**Helios Gear Products – Booth #3521**  
**[Heliosgearproducts.com](http://Heliosgearproducts.com)**

## KAPP NILES

KAPP NILES will be displaying the latest technology in gear finishing and metrology solutions at this year's Motion Power Technology Show. At Booth #3303, gear manufacturing professionals will be able to see the proven ZE 400 gear profile grinding machine - a versatile, highly flexible solution with unparalleled KAPP NILES quality. Precision grinding requires even more precise measuring where the newly launched X series



analytical inspection machines from KAPP NILES Metrology are necessitated. The KNM 2X and KNM 5X will be on display featuring granite measuring columns, air bearings, and linear motors. The Penta Gear Metrology division will showcase new DFT and DOB gauging to support in process and final inspection requirements.

**KAPP NILES – Booth #3303**  
[www.kapp-niles.com](http://www.kapp-niles.com)

## Klingelnberg Looks at Optical Measuring Technology and Bevel Gear Grinding

Reducing measurement times in series measurement thanks to hybrid solution

Klingelnberg precision measuring centers can be optionally equipped or retrofitted with an optical solution. Klingelnberg has worked very intensively on the entire signal chain of optical measuring technology and, together with several development partners, has developed a measuring system specially tailored to the requirements of gear measurement.

In serial measurement of a cylindrical gear, the profile and lead are typically measured on three or four teeth, and pitch measurement is performed on all teeth. This tactile pitch measurement necessarily involves inserting the stylus into each tooth space. With optical measurement, by contrast, nothing is inserted into the tooth spaces. Accordingly, pitch measurement offers the greatest potential for reducing the measurement time. Through optical measurement of the pitch using one

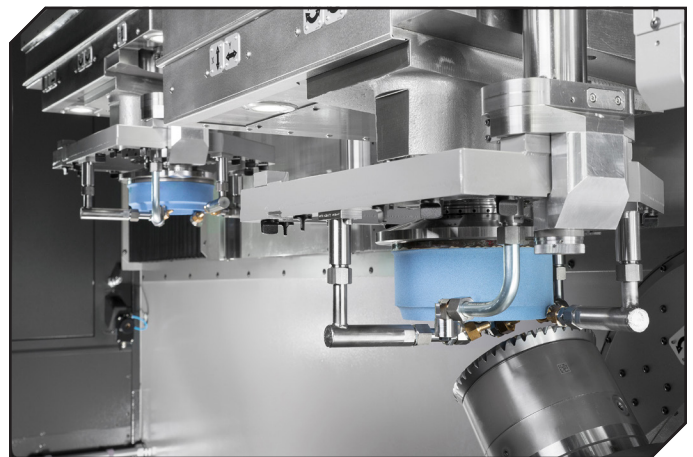


continuous, uninterrupted rotation of the component, the measurement time advantage increases with large numbers of teeth to up to 80 percent. It is not necessary to scan a large area of the gear with multiple revolutions.

This optical pitch measurement is combined with the tactile measurement of Precision Measuring Centers the profile and lead. Overall, the total measurement time decreases by up to 40 percent. Thus, in cases where there is a high utilization rate of the measuring machine, the costs for the optical metrology option are quickly recovered.

## G 35 – Optimal and maximum productivity in the aviation industry

Just as innovative and inspiring is another innovation from Klingelnberg: with the Oerlikon Bevel Gear Grinding Machine G 35, the gearing specialist has implemented a new machine design for the 5-cut method. As a result, the manufacture of aviation gearing as regards efficiency is really taking off. To achieve this, the system provider has combined proven technology with new ideas. Background: bevel gears manufactured using the 5-cut method with a fixed setting are used in the avia-



tion industry. This entails the consecutive machining of convex and concave pinion flanks, with different tools and different machine settings. Due to complex certification procedures for aerospace applications, changing to another gearing is not an option. However, the newly developed Oerlikon Bevel Gear Grinding Machine G 35 makes the production of aerospace gears much more efficient thanks to its technology: with



its two vertically arranged grinding spindles, it is specially tailored to these requirements. In contrast to older dual-spindle concepts with fixed grinding spindles, the G 35 is equipped with two grinding heads that are positionable independently of each other, thus enabling maximum flexibility. The high rigidity and thermal stability ensure optimum machining results and, thanks to the advanced vertical concept, grinding sludge deposits in the working chamber can be avoided. Its name, “Clean Cabin”, is thereby justified. The machine’s operating concept is based on the forward-looking KOP-G software interface, which is operated intuitively via a high-resolution touch screen. Function keys on the control panel thus provide direct access to frequently used setup functions.

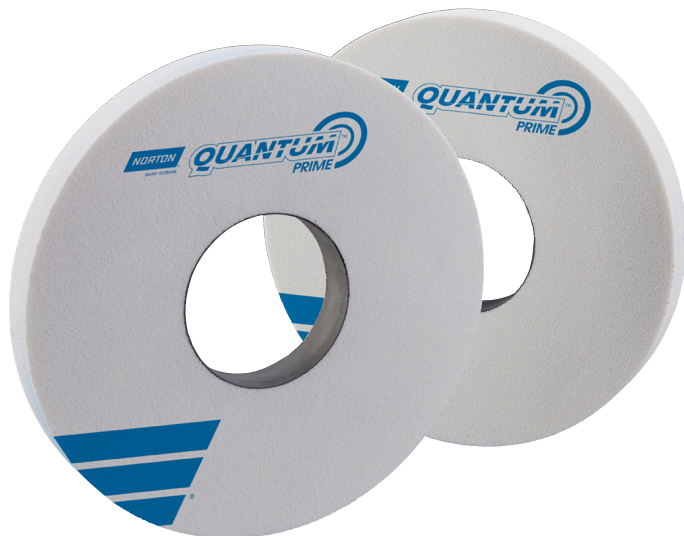
**Klingelnberg GmbH – Booth #3629**  
**[www.klingelnberg.com](http://www.klingelnberg.com)**

### **Norton | Saint-Gobain Abrasives Focus on Grinding Efficiency**

Saint-Gobain Abrasives has announced it will be featuring new Norton Quantum Prime Grinding Wheels. The new wheels have 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.

**Norton | Saint-Gobain Abrasives – Booth #2307**  
**[www.nortonabrasives.com/en-us/newsroom/news/revolutionary-new-norton-quantum-prime-grain](http://www.nortonabrasives.com/en-us/newsroom/news/revolutionary-new-norton-quantum-prime-grain)**

### **Reishauer Offers a Variety of Advancements to Gear Generation Skiving**

Every automatic transmission features several planetary gear sets with internal gearing that could be hard-finished if an adequate process were available. For this reason, Reishauer designed a very stiff generating skiving machine and concurrently developed cutting tools that feature superhard material for their cutting edges. This combination enables the generating skiving process to be economical and successful for the hard-finishing of internal gear components.



### **Reishauer Software Platform (RSP)**

The scarcity of skilled operators demanded a rethinking of the machine’s operating design. Hence, the key design criteria of the new RZControl was its user-friendliness. Easily understandable icons guide the user through the set-up process. These visual aids apply both to generating skiving and generating grinding. The Reishauer Software Platform RSP simplifies



operation and process design considerably, reduces potential errors, and increases efficiency with modern database technologies encompassing tooling, workpieces, and processes. During data input, the control automatically generates machining proposals based on sophisticated calculation models.

### RZx60 4.0

Over 1000 RZx60 machines in the market have proven themselves as a successful concept. Building on this experience, the machine concept has been revised and adapted to the requirements of Industry 4.0 applications. The 4.0 series still features all the proven technologies including the double spindle feature. However, this has been complemented with the latest control technology and modern interfaces for Industry 4.0 applications.

### ARGUS Monitoring System

The ARGUS process monitoring system controls the dressing and grinding intensities by applying real-time data processing and tested algorithms. "Grinding and dressing intensities" are process-based force models to calibrate the grinding and dressing forces to interpret and control the process. The force models encompass the characteristics of the cutting zone, the cutting kinematics over the changing grinding wheel diameter, the variation of the wheel's RPM, and the variable lever ratios depending on the wheel's position to the axial location of the bearing.

**Reishauer – Booth #2526**  
[www.reishauer.com](http://www.reishauer.com)

## Star SU Offers Full Line of Machine and Cutting Tool Solutions

At the Motion + Power Technology Expo, STAR SU will be showcasing its full offering of machine tool and cutting tool solutions for producing gears and other fluid power components. Star SU's comprehensive line of products and services enables the company to customize each cutting and tool grinding operation from cutting speeds and feeds to automation and tool coatings. The company will be presenting interactive demonstrations and displays of the following:



### Machine Tools for a variety of processes including:

Vertical Gear Hobbing for workpieces from 80mm to 2300mm diameter; FFG Werke GmbH Modul H80 – H2300 machines

Chamfer, Deburr and Rolling of straight or helical gears or shafts up to 250mm diameter, FFG Werke GmbH Modul CD250, CDA250 and CDX machines

Vertical Spindle Scudding of gears up to 500mm diameter; Profilator Scudding® machines, models S240 – S500

Tool and Cutter Grinding for sharpening straight and spiral gash hobs up to 8" diameter; Star Cutter NXT 5-axis tool and cutter grinder



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### Cutting Tools

Star SU will also be showcasing its wide variety of gear cutting tools including solutions for chamfer and deburring, hobbing, and milling, as well as scudding cutters manufactured to produce gear and spline teeth for reduced cycle times and tool costs.

Also Star SU's multi-diameter cavity machining tools that allow cuts form either a solid or cast core casting condition will be featured. These multi-step tools often enable a cavity machining in a single pass or shot.

The company will also display select H. B. Carbide preforms suited for gear cutting applications.

**Star SU – Booth #3513**  
**[www.star-su.com](http://www.star-su.com)**

### Wenzel America Stands for High Precision

WENZEL stands for the highest precision and accuracy in metrology. As the premier supplier of flexible gear inspection systems, we invite you to visit our booth #2214 where we will

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be offering live demonstrations of the most modern software in the market. Our gear experts are excited to share our tips and tricks with you to meet the challenges of modern gear manufacturing and achieve higher productivity.

**Wenzel America Ltd. – Booth #2214**  
**[wenzelamerica.com](http://wenzelamerica.com)**

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## Heat Treat 21 Co-Located with Motion + Power Technology Expo

Heat Treat is the premier conference and expo for heat treating professionals, attracting global innovators, researchers, influencers and decision makers from around the world. This year's conference and expo will feature: two and a half days of face-to-face networking opportunities with approximately 200 heat treat exhibitors/companies; the latest research and industry insights offered during more than 100 technical presentations; a VIP guided industry tour; student/emerging professionals initiatives, including free college student registration, Fluxtrol Student Research Competition and the new ASM Heat Treating Society Strong Bar Student Competition.

### Education Highlight: Materials Selection and Heat Treatment of Gears

New developments in gear technology, particularly from the materials and heat treatment perspectives, have improved gear performance. This course, development jointly by the ASM Heat Treating Society and AGMA, will provide an overview of materials selection and heat treatment of gears. The course takes place Thursday September 16 from 8:00 am – 5:00 pm.

#### Don't Miss These Events:

"Opportunities in the Electric Vehicle World," joint keynote address with IMAT takes place Tuesday, September 14<sup>th</sup> from 2:30 to 4:00 pm.

Keynote Speaker: Kathy L. Hayrynen, Ph.D., FASM, Applied Process Inc., takes place Wednesday, September 15<sup>th</sup>, from 8:00 – 8:45 am.

Heat Treat Session Chair Briefing takes place Thursday, September 16<sup>th</sup>, from 7:00 – 8:00 am.

#### What's New in 2021?

Access to additional materials-related exhibitors in the co-located exhibit hall; access to an additional 375 technical presentations and workshops, featuring special crossover keynotes and sessions with Heat Treat; joint networking events; access to comprehensive student/emerging professionals programming and events; joint Heat Treat/IMAT programming in the Solutions Center on the show floor.

**[www.asminternational.org/web/heat-treat/home](http://www.asminternational.org/web/heat-treat/home)**



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