# Gear Expo 2015 Product Preview

## A close look at the technology on display

### Carl Zeiss Industrial Metrology — Booth #1645

Carl Zeiss Industrial Metrology will feature the Zeiss DuraMax. With DuraMax, Zeiss offers a compact 3-D coordinate measuring machine. DuraMax Gear marks the evolution of DuraMax into a shopfloor gear wheel measuring machine.

"This enables us to fulfill the requests of many customers and introduce gear wheel measuring technology with small machines that can be used as close to production as possible," says Alexander Dollansky, product manager at Carl Zeiss Industrial Metrology, LLC.

The key features of DuraMax Gear are its suitability for a rough production environment, the high permissible temperature fluctuations, the proven and pioneering Zeiss measuring software and its small footprint.

DuraMax is designed for process control on the production floor, for quick in-between inspections of small workpieces and for testing volume parts directly in production. Because of its accuracy, DuraMax is also designed for many requirements in gear wheel measuring technology. DuraMax Gear comes with the required software and hardware, including stylus material for a broad range of applications. If the product being tested changes, standard inspection procedures often require new, expensive modifications. DuraMax Gear, however, is a CNC all-rounder that, when combined with CAD-based Calypso and Gear Pro involute measuring software, quickly, easily and reproducibly measures all changes. DuraMax Gear is available as a tabletop machine or with an optional base. Its design enables part loading from four sides.

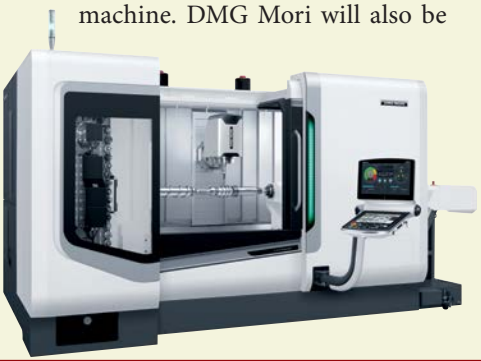
**For more information:**
Phone: (763) 744-2400
*www.zeiss.com/metrology*

### DMG Mori — Booth #1813

DMG Mori will demonstrate its gear milling portfolio with a focus on GearMILL software and various gear milling processes on multi-tasking machines. The solution's approach, which combines the machine, tooling, inspection and software, will be on display to demonstrate different ways of making gears.

"The demonstrations center around the flexibility of the machines, which leads to greater productivity," says Nitin Chaphalkar, product manager for the gear market for DMG Mori.

The booth will also have a display of their GearMILL software with latest machine cycle developments and part inspection capabilities. Machining of a variety of gears such as spiral bevels, spur, helical and internal gears will be demonstrated on this single machine. DMG Mori will also be presenting its solutions during presentations at the solutions center. The machine exhibited will be a NTX 2000 machine (a multi axis lathe) with second spindle and lower turret. This machine is capable of producing all types of gears using InvoMilling, flank milling (end mills), hobbing, gashing and power skiving processes. DMG Mori's gear expert team will be on site to discuss possible machining processes for your parts and recommend solutions.



**For more information:**
Phone: (855) 364-6674
*us.dmgmori.com*

### EMAG — Booth #1304

The new platform VT and VL Series for shafts and chucked components will be on display for visitors to experience the EMAG modular inverted vertical lathe design.

With the goal to develop a system of modular machines geared for use in the manufacturing of medium and large batch runs, EMAG offers flexible solutions on a standard platform. Single spline hobbing, for example, will be displayed on a VT vertical lathe for shafts. With the capability of offering gear cutting on a standard machine, EMAG modular machines offer increased flexibility. Machining is carried out in four axes at a maximum speed of 6,000 RPM. The process employs two turrets with twelve tool stations each, equipped with turning tools or driven tools. One common feature of all four VL machine sizes is the shared modular design. Their

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small footprint reduces floor space costs and increases flexibility in floor layout options. Every VL and VT machine features an integrated O-automation system for transporting workpieces.

When combined with the self-loading pick-up spindles, this automation concept ensures shorter cycle times and higher productivity. To accommodate machine operators, all the service units are easily within reach, with the various units (electrics, hydraulics, cooling system, cooling lubricant and central lubrication system) accessible at any time so that the machines can be maintained with ease. While the standard lathes are commonly used for gear blanks, a wide range of technologies can be incorporated into the machines, including turning, grinding, hobbing, chamfering, induction hardening and laser welding.

The technologies in the EMAG Group cover the entire spectrum of metalworking, including non-traditional processes. Laser welding is essential in lightweighting automotive components while electro-chemical machining (ECM) is a deburring option.

Introducing the latest addition to this technology portfolio, Eldec will display induction hardening systems with a modular induction (MIND) machine at the show. Featuring Simultaneous Dual Frequency (SDF) technology where two different frequencies are applied to the workpiece, MIND machines can apply mid-frequencies to penetrate deeper and heat the root of the gear tooth simultaneous to high frequencies to accurately heat the tip of the tooth. Eldec hardening systems compliment the workpieces machined by EMAG lathes to create more efficient, complete production lines. The flexible machine concepts and complete systems from EMAG offer modular and customized solutions for the production of workpieces in nearly every industry.

**For more information:**
Phone: (248) 477-7440
*www.emag.com*

## Emuge — Booth #1901

Emuge Corp. recently announced a comprehensive line of high-performance tools for threading demanding nickel/super alloy materials to 46 HRC. The new program includes tools ranging from taps with unique new geometry designs to solid carbide thread mills designed for challenging aerospace, powergen and oil industry applications. A full line of sizes from no. 4 to ¾" are available in UNC, UNF and Metric, 87 sku's in total.

Emuge's Nickel Alloy Program includes new DF-NI and C-NI taps. With Emuge's industry-first Variable Helix Correction (VHC) technology,

DF-NI taps feature a specially ground relief geometry in the primary cutting zone that is designed to generate a smaller and tightly rolled chip formation for enhanced chip control to prevent damage caused by chips jamming in the tap teeth. With a 10° right hand spiral flute, VHC taps are also available in STI thread sizes for jet engine components. New C-NI taps offer an advanced left hand helical flute form with rake and relief to optimize chip evacuation in the forward direction and add strength to the cutting teeth.

Both taps are designed with special relief geometry in the chamfer and thread section to help overcome the high hardness and elastic memory of precipitation hardened nickel alloys. Taps are manufactured with premium HSS-E and are TiCN coated for exceptional heat and wear resistance. Modified bottoming chamfer (2-3 threads on VHC taps) is designed to reduce torque and increase tool life. Taps are 3BX class of fit for internal UNJ threading applications. DIN length is available for improved chip clearance in hard-to-reach applications.

**For more information:**
Phone: (800) 323-3013
*www.emuge.com*

## Euro-Tech — Booth #1704

Mytec is introducing its new line of mechanical arbors and chucks with accuracy down to .0004" plus high expansion rates up to .010" or greater in a stainless steel construction.

Mechanical arbors and chucks are designed for workholding where high forces are incurred or auto load applications where high clearance is required. A closed expansion system, which is impervious to dirt and chips, combined with high wear resistance, offers increased service life. If space permits, Hydra expansion elements from Mytec-Hydraclamp are generally equipped with an adjustment piston. This makes it possible to set expansion for fine clamping, particularly in the case of thin-walled workpieces, so deformation can be avoided.

Also on display will be Frenco's INO system spline gages, an internal standard for the external dimensional measurement of spline gages based on national and international standards suited to even the most sensitive and complex components and systems. This product line provides a quick method of inspecting involute splines, serration splines and straight sided splines to ensure interchangeability of parts even between different manufacturers. Frenco spline gages are constructed of HX, a wear-resistant, high alloy, powder steel. This wear-resistant material allows for an improved extension in inspection intervals.

**For more information:**
Phone: (262) 781-6777
*www.eurotechcorp.com*

## Erwin Junker Machinery — Booth #1026


The Junker Group will present its product diversity in gear manufacturing: Grinding machines from Junker and Zema in addition to air filters from LTA.

Junker's portfolio has recently been expanded to include non-cylindrical grinding of camshafts for low to medium lot sizes. By using up to two high-performance grinding spindles, bearings journals and cam lobes can be rough and finish ground in a single clamping set-up. High powered grinding spindles, in combination with proven CBN grinding technology, guarantee the highest removal rates and performance.

The Lean Selection cam is capable of grinding all cam lobe profiles and geometries at high-speed – from concave to elliptical – and is suitable for manufacturing everything from prototypes to large production runs.



Zema will be demonstrating how its Numerika G-800 accomplishes the precision grinding of gear shafts. This durable, cylindrical grinding machine with its hydrostatic × and Z axes and hydrostatic grinding spindle reaches the tightest tolerances reliably and is suited for an unlimited array of work pieces. In addition, Zema also offers machines for ID/OD grinding and large shafts with diameters of up to 1 meter (40 inch) and up to 4 meters (157 inch) in length. The conversational control systems (Fanuc Based) offered by Zema are operator friendly, simple and convenient to use.

LTA Lufttechnik GmbH is extending its portfolio to include a filter which has been kept deliberately simple and will be launched in the market under the name Basic Line. LTA has developed the new entry level model to allow customers from the metalworking industry to benefit from a simple yet fully functional oil and emulsion mist filter.

The electrostatic filter is available in two versions: The smaller of the two has a single-stage filter, the larger comes with two filters in series. The filters are configured for coolant pressures of up to 40 / 80 bar internal cooling and a machine room of up to 6 $m^3$. Despite the suction capacity of 1,200 $m^3/h$, the blower uses minimal energy, as LTA exclusively installs fans in accordance with the ERP directive. The filter elements used also contribute towards simple handling: They are optically monitored and fully washable. Their compact design allows the BASIC Line filters to be mounted on all machine tools.

**For more information:**
Phone: (847) 488-0406
*www.junker-group.com*

## Exsys Tool — Booth #1731

Exsys Tool, Inc. will showcase its new line of high-quality Eppinger gearboxes and custom gear-making services for a wide variety of industries. Exsys just recently expanded its offerings of productivity enhancing systems into the gear sector.

Expo attendees will find spiral bevel, planetary, planetary bevel, hypoid, and cycloid-type gearboxes at Exsys's booth, many of which are produced by Eppinger. They will also learn how to acquire specialty custom-made gears produced to their specifications.

Eppinger offers BT (bevel torque) and BM (bevel maximum torque) compact spiral bevel gears designed to bring high torque and maximum efficiency to gear applications that require a high degree of reliability and variability. Each of these bevel gearbox types offer minimized tooth clearance and optimal transmission properties via precision axes and bearing seats combined with Gleason bevel gears built to withstand high loads.

The single-component steel housings for these bevel gearboxes have mounting threads on all sides to ensure stable attachment in a variety of installation positions. The heavy-duty bevel gears inside these housings offer high-transmission precision and reduced stress on the bearings. A friction-locked, zero backlash connection of the crown gears on the drive shaft reduces the mass of the gearing component. Eppinger also offers PE (planetary eco) and PP (planetary precision) gearboxes designed for applications that require low backlash, high efficiency, shock resistance and a high torque-to-weight ratio. They have a modular design that combines ground gears and precision gear components.

The present range of planetary gearboxes comprises five sizes, with each size offered as a single, dual, or triple stage design. Each gearbox variant is also available as a precision design with reduced backlash. The wide range of sizes and designs allows users to achieve overall transmission ratios from i = 3:1 to i = 512:1 in a variety of applications.

Eppinger's BP (bevel planetary) gearboxes combine features of the company's BT series gearboxes with the pre-stages of its PE gearboxes, creating an innovative solution for various applications. The stable housing design and hardened, super-finished gear components of these gearboxes help ensure smooth running and constant backlash control.

These planetary bevel gearboxes achieve high-output torque and transmission ratios up to i = 320. Currently offered in eight sizes, the planetary bevel gearboxes easily mount to a wide range of motors.

**For more information:**
Phone: (800) 397-9748
*www.exsys-tool.com/en*

## Gleason — Booth #1017

The Gleason Corporation will be showcasing a selection of its grinding and inspection machinery.

The Genesis 200GX threaded wheel grinding machine is Gleason's latest addition to the Genesis series and offers many features. The two spindle concept combines increased productivity with minimized idle and set up times. Fast, easy software-guided setup of the machine allows you to set up machines from one workpiece to another in just 20 minutes using only one tool. Fully automatic workflow after setup until grinding the first workpieces and the ability to interface with Gleason GMS machines via QR codes increases productivity. Easily accessible machine components make maintenance simpler and more efficient while standard dimension grinding wheels and dressing tools allow you to use your existing tools. All of this in an energy efficient small footprint machine designed to meet the needs of customers in high-productivity, high-quality environments.

The Gleason 300GMSP analytical gear inspection system is designed to operate in production environments while yielding reliable measurement results. A patent-pending base design includes an active leveling system to attenuate a broad spectrum of normal production environment vibrations, yielding measurement values in parallel with those achieved in controlled calibration laboratories, but without the delay of having to move to the lab location.

Thermal fluctuations normally associated with shop floor environments are proactively compensated for as well, allowing for the best possible and most reliable inspection results. The system identifies and applies a compensation for factory floor influences in real time. The 300GMSP is designed and tested to perform as a turn-key gear inspection system in the manufacturing environment.

Visitors to Gleason — Booth #1017 will also be introduced to a number of other products, technologies and services, including: Gleason's complete line of gear cutting tool solutions and advanced workholding solutions.

For cylindrical gear production, visitors will find a full array of hobs, form relieved milling cutters, solid carbide hobs, shaper cutters, chamfering and deburring tools, shaving cutters, honing tools, coated diamond and CBN grinding wheels, diamond dressing wheels and diamond dressing rolls. Visitors will have the opportunity to learn more about recent advancements in gear hobbing technology including G90, a tooling material which closes the performance gap between HSS materials and tungsten carbide. Visitors will also find an assortment of power skiving tools and learn how Gleason is the total source for supporting this process.

Gleason's bevel cutting tool display will feature new bevel gear cutting tools for cutting and grinding straight, spiral and hypoid bevel gears. Of particular note is the PentacPlus –RT, which can be built faster and more precisely than stick blade cutter systems of the past. With blade seating stiffness equal to the high stiffness of the PentacPlus, this new system offers increased surface finish, tool life and cycle time.

Gleason designs and produces a complete range of quick-change, tool-less workholding equipment for bevel gear, cylindrical gear and non-Gleason production machines. These systems reduce set-up and change-over times for gearing applications up to 600 mm in diameter. Quik-Flex Plus, Gleason's next generation of modular, quick-change workholding systems which requires a single tool, less time and minimal operator experience will be on display for the first time at Gear Expo.

Also on display will be Gleason's line of hydraulic workholding solutions. The holding force, increased accuracy and contamination free design are designed for dry gear processing applications. In addition, the stir-able modular workholding designs allow off-spindle assembly and truing to reduce changeover time as well as the amount of total run-out in the fixture.

Gleason will also have offerings from Gleason Global Services, Gleason Plastic Gears and Distech Systems.

Gleason customers can rely on factory trained service professionals located throughout the Americas, Europe, and Asia, working around the clock to deliver the full range of aftermarket service and support capabilities including service programs for preventive maintenance, machine inspection, troubleshooting and repair and machine relocations. Learn about Gleason's complete range of machine rebuilding and re-controls now offered for all types of Gleason machines. In many instances this work can be completed right in the customer's factory in less than two weeks. Gleason is a leading source of education for gear technology and it will be promoting its customer training classes which offer a full range of courses and education forums ranging from the beginner to the most advanced user covering all aspects of gear design, production and inspection.


Offering plastic gear design and injection molded plastic gears including helical gears, spur gears, planetary gears and internal gears, Gleason Plastic Gears provides customers with the benefit of a plastic gear with no weld-line for a stronger, more accurate, and economical drive train, eliminating the additional expense of secondary machining. Gleason will display some of its most recent innovations and have experts available to answer any plastic gear related question.

Distech Systems specializes in the design and manufacture of factory automation systems serving a variety of customers in the automotive and other industries. Combining customized automation technology with Gleason products for gear (and non-gear) production allows for more complete product for Gleason customers.

**For more information:**
Phone: (585) 256-6776
*www.gleason.com*

## Index — Booth #1653


Index recently developed a "bevel gear hobbing" package, which consists of a specially designed control cycle and four Index cutter heads with module-dependent inserts. Equipped with these features, the Index R200 and Index R300 turn-mill centers become gear cutting machines on which spiral bevel gears can be produced – from bar stock, with front and rear end machining, complete in one setup or as a pure two-spindle gear cutting machine.

By hobbing using a continuous indexing method – which corresponds to the Klingelnberg Cyclo-Palloid method 1) – spiral bevel gears can be produced with constant tooth height in a module range of 0.6 to 4 mm.

Compared to the conventional process chain with classic gear cutting machines, users can achieve shorter cycle times and better geometry and position tolerances.

"The starting point of the development by Index lies in its own manufacturing governed by the principle: quality-determining components are made in-house," says Dr. Volker Sellmeier, Index-Werke head of technology development. "When the tool holder production was reorganized several years ago, the decision was made to produce the required bevel gears ourselves."

Bevel gear cutting requires a machine with high rigidity and a B-axis as the basis. Due to their increased static, dynamic and thermal properties, the turn-mill centers of the Index R-series are designed to gear-cutting, provided they are equipped with the "bevel gear hobbing" technology package. The R machines' axis configuration with two milling spindles on Y-B-axes running in hydrostatic bearings makes it possible to machine on the main and counter spindle simultaneously in five axes.

The ability of the turn-mills to accomplish complete gear-part machining on the front and rear ends simultaneously results in shorter total cycle times and lower cost per piece.

"When we machine typical bevel gears with module 1.15 mm and approximately 25 teeth for our tool holders completely from bar stock, we achieve a cycle time of less than 3 min. The share of gear cutting amounts to about 30 seconds," Dr. Sellmeier says.

In a classical gear process chain, the workpiece has to be set up on several individual machines for turning, drilling, and milling, gear cutting and deburring. Index's approach is to run all operations on the turn-mill center. Bevel gears are turned, drilled, milled and finally cut on a single machine. Even brushes for deburring can be set up. The soft machining process is thus completely autonomous, according to Index with a process-reliable gear quality of IT5. This

is then followed by hardening. A final finishing process is usually required only for the mounting distance and the polygonal shaft/hub connection.

The Index solution works for both contract manufacturers, which need to produce small lot sizes with high flexibility, and mass producers, which want to produce bevel gears in large quantities at minimal cost. The investment is relatively low compared with specialized machines. Also the consumption costs are kept within manageable limits, since the cutter heads are equipped with interchangeable inserts.

Flexibility is high: In addition to bar stock machining, which is best primarily for small quantities, for series production the R machine can be used as a pure gear cutting machine, working on the main and counter spindles simultaneously.

"This requires the use of an automated workpiece-loading and unloading system that loads the blanks and removes the finished parts gently," said Dr. Sellmeier. "We offer a quadruple gripper with two stations on the main and counter spindle that picks up the finished parts, rotates and then loads new blanks. This way we use the machine as a kind of double-spindle machine, cutting the time per piece in half."

Two cutter heads are required per bevel gear. They differ slightly in their cutting circle radius in order to produce the longitudinal crowning. Index offers the cutter heads in four different sizes that can be fitted with up to six carbide inserts and feature internal cooling.

In contrast to the typical Cyclo-Palloid method with an interlocking cutter head, the Index method uses two separate cutter heads per bevel gear.

A control cycle developed by Index is another essential part of the technology package. The user enters there the same parameters as on a conventional gear cutting machine. These include, for example, machine distance, eccentricity and auxiliary angle. The cycle translates these values into the movements of each axis so that at the end the same relative movements are effected as on a conventional gear cutting machine.

**For more information:**
Phone: (317) 770-6392
*www.index-usa.com*

## Kapp Group — Booth #2222

Kapp Niles will be showcasing its ZE 800 profile gear grinder while R&P Metrology GmbH will present its PM 750/1250 portable gear inspection system.

The ZE 800 offers a compact yet highly productive solution for a range of applications. The machine is capable for 25 module (1 DP) external gears and is prepared for internal grinding using either CBN or dressable wheels. It will be shown with new software features including hob and worm grinding.


R&P's PM 750/1250 is the first portable gear checker/CMM with dual functionality for use in the lab or on the production floor. Its flexibility enables the measuring of larger gears on production machines that may not have onboard inspection. The design makes it moveable within the plant. The optional "docking station" with granite base and rotary table allows the PM 750/1250 to become a stand-alone, fully featured four axis generative gear inspection machine when not required for portable measurement.

Kapp CBN tools for direct grinding, and DIA dressers for grinding and honing are also featured at the booth, along with grinding experts, on hand to answer questions.

**For more information:**
Phone: (303) 447-1130
*www.kapp-niles.com*

## KISSsoft — Booth #1830

KISSsoft is a modular calculation system for the design, optimization and analysis of machine elements and complete gearboxes.

The scope of the software ranges from a single machine element up to the automatic sizing of complete gearboxes. KISSsys is KISSsoft's system add-on that enables the modeling of complete gear units and drive trains and is valuable for multi-stages gear transmissions or shifted transmissions. KISSsys also provides the calculations for efficiency and losses, static analysis with housing stiffness and modal analysis.

The software includes internationally recognized calculation standards and a large variety of design and optimization options, based on the experience of KISSsoft's customers and development engineers, ensuring that the software is always at the forefront of technology.

At the Gear Expo, KISSsoft will be presenting the latest version of the software. KISSsoft 03/2015 is being released with a number of innovations that have been implemented.

KISSsoft will be at booth 1830. Dr. Kissling and Dr. Beermann, founders of KISSsoft, will be on hand to answer questions. A free trial version of the KISSsoft Release 03/2015 is available at *www.kisssoft.com*.

**For more information:**
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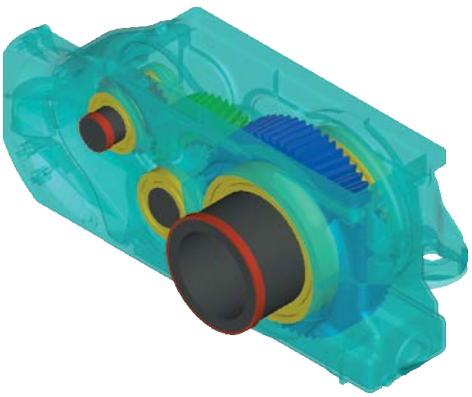
*www.kisssoft.com*



## Liebherr Gear Technology — Booth #1809

For Platform 2 (LSE/LFS 200 to 500) and Platform 3 (LSE/LSF 600 to 1600) machines, Liebherr Gear Technology is introducing a smaller shaping head option which facilitates electronically controlled machining of spur and helical gear teeth.

"The smaller SKE 120 shaping head enables users to machine a considerably wider range of components on our Platform 2 and Platform 3 gear-shaping machines," says Dr. Hansjörg Geiser, manager development and design gear cutting machines at Liebherr-Verzahntechnik GmbH. "We are thus better able to meet contract manufacturers' gear-cutting requirements."

The new SKE 120 shaping head with highly dynamic rotary drive and moveable shaping head slide occupies less space at a stroke length of 120 mm. The design engineers used the space gained to enlarge the stroke position travel range on Platform 2 machines. The

SKE 120's stroke position travel range, at 650 mm on Platform 2 machines, is more than twice as large as that of the SKE 240, which is 300 mm. The same applies to Platform 3 machines where the difference is 350 mm. Even 900 mm are feasible if raised column slides are used. The shaping spindle is hydrostatically mounted and channeled.

Some workpieces require a longer stroke length (for wider teeth), while others require a wider stroke position travel range (longer workpieces with correspondingly higher gear teeth). The optionally available NC swivel column slide, which lets you produce conical gear teeth at a shaping spindle angle of between -1° and +12°, has been optimized to achieve a higher degree of rigidity. If NC swivel column slides are not used, the shaping spindle angle can be adjusted by up to ±0.45° using a cam.

The direct-drive electronic lead guide provides users with latitude and flexibility. They only need enter a helix angle of between 0° and 45° and the control system calculates the rest. The new SKE 120 shaping head differs primarily from the larger shaping head with electronic lead guide, SKE 240, by a smaller stroke length. The crank drive features automatic mass counterbalance, which ensures optimum concentricity. The spindle itself has a somewhat narrower design than the SKE 240, which has a positive impact on interference conditions.

SKE 120 and SKE 240 shaping heads featuring the electronic lead guide provide contract manufacturers with a range of new opportunities. For example, frequent workpiece changeovers are easier.

To be able to machine different helix angles on gears, the motion of the shaping head must replicate the gear´s helix angle. This can be performed by a mechanical lead guide. Set-up times are shortened because where an electronic lead guide is used only the shaping tool needs to be changed, if at all.

An added benefit is that customers do not have to invest in multiple lead guides. They are not dependent on the control's processing time, which makes them even more flexible. Added opportunities are provided in combination

with the stroke position adjustment detail.

A further requirement was the ability to manufacture efficiently and to optimum quality, in addition to the flexible range of workpieces. The process itself is highly productive, given the high number of strokes at 1,200 double strokes per minute. This figure is based on a dynamic drive mechanism combined with effective control technology at optimum rigidity.

Liebherr developed its Type LSE range of machines based on its proven LFS machines. Besides the option of using electronic lead guides, these machines also enable you to correct helix angles. Tooth flank angular deviation (fh) can be corrected simply and precisely when setting up the shaping machine.

It is possible to retain the helix angle for subsequent tempering. For even better quality, µm corrections can be undertaken: the machine achieves tooth flank quality grade 4 as per DIN3962-2.

Along with increased quality and flexibility requirements, materials have also changed. For example the tensile strength of workpieces to be shaped has increased substantially. The LFS/LSE machines have been designed to shape high-strength materials.

Liebherr has already applied the results of internal tests in this segment using appropriately configured and coated replaceable cutting inserts to industrial applications and put these in practice. The choice of high-alloy substrates with correspondingly efficient coatings demonstrates that machining performance and tool service lives can be enhanced.

**For more information:**
Phone: (734) 429-7225
*www.liebherr.com*

## Koepfer America — Booth #1822

Koepfer America will showcase a selection of gear hobbing machines.

First is the "Repowered" Koepfer Model 160 gear hobbing machine. This K160 Repowered machine is part of the K-Repowered services offered by Koepfer America. This service offers a complete CNC re-control package for existing Koepfer models 160 and 200 gear hobbing machines. This re-control


renews the reliability of customers' existing Koepfer hobbing machines.

The Koepfer Model 200 horizontal gear hobbing machine offers increased flexibility, automation, and quality for the hobbing of fine- to medium-pitch gears. German engineering has developed this model for over 20 years, leading to a machine designed for manufacturing facilities across the globe. Koepfer America will feature a Koepfer Model 200, highlighting its easy setup, quick changeover, flexible automation, and rigid construction.

From Helios Gear Products, Koepfer America will also display the first Ra-Cut fine-pitch carbide hobs, which feature up to double the number of cutting faces on an otherwise like design. Ra-Cut hobs can achieve higher-quality finish cut gears and increased productivity using re-hobbing or skiving processes.

**For more information:**
Phone: (847) 931-4121
*www.koepferamerica.com*

## Klingelnberg — Booth #1410

Klingelnberg will be exhibiting its capabilities with a presentation of cutting-edge technology "made in Germany" in the form of the G 30 bevel gear grinding machine and the P 26 precision measuring center.

Klingelnberg, utilizes this platform for an intense professional exchange on equal footing. Not only will visitors encounter a team of Klingelnberg experts who are available for professional dialogue, but Klingelnberg will also unveil its "home-made" technology from two different business units with its G 30 bevel gear grinding machine and P 26 precision measuring center.

The Oerlikon G 30 bevel gear grinding machine continuously advances the vertical concept for grinding technology. All bevel gear machines in this series are equipped with a heat-stable, vibration-damping machine bed. An optimized axis arrangement ensures reduced approach paths and less load on the drive components – and a stiffer design of the overall system. The G 30 can be optionally equipped with a side loading door, allowing for easier loading in automatic mode using a machine integrated loading shuttle or handling robot. For series production, the machine also offers a range of process monitoring functions.

Klingelnberg has also continued to develop the P 40 measuring center. A height adjustable electric control console and the vibration isolation that can be integrated, now provide even better prerequisites for shop-floor use in the new P 40.

The fully automatic CNC-controlled precision measuring center is designed as a compact unit for the workpiece diameter range up to 400 mm. At the heart of the P 40 is an accurate, durable rotary table. Configured as a measuring axis (C axis), it provides concentric seating of the workpieces to be tested. In combination with the three linear measuring axes, tangential (X axis), radial (Y axis) and vertical (Z axis),

the precision measuring centers trace and inspect the functional surfaces of gearings and general drive components in generator mode.

Measuring centers are equipped with heavy-duty, stable beds and guide bodies made of cast iron. At the same time, all bearings and guides are backlash-free at the measuring axes. These form the basis for the measuring centers' high basic mechanical accuracy. The integrated 3-D measurement system enables both discrete-point probing and scanning, continuous measured value logging. The powerful GINA software makes it possible to evaluate the results quickly and easily.

**For more information:**
Phone: (734) 470-6278
*www.klingelnberg.com*

## Marposs Corp. — Booth #2039

Marposs Corp. will demonstrate its Artis process monitoring system for gear cutting applications at Gear Expo 2015. The Artis CTM V6 system will be installed on a Kashifuji KE 201 CNC hobbing machine powered by a Fanuc Oi-CNC control, which will be demonstrated in the Involute Gear & Machine Co. booth #1029.

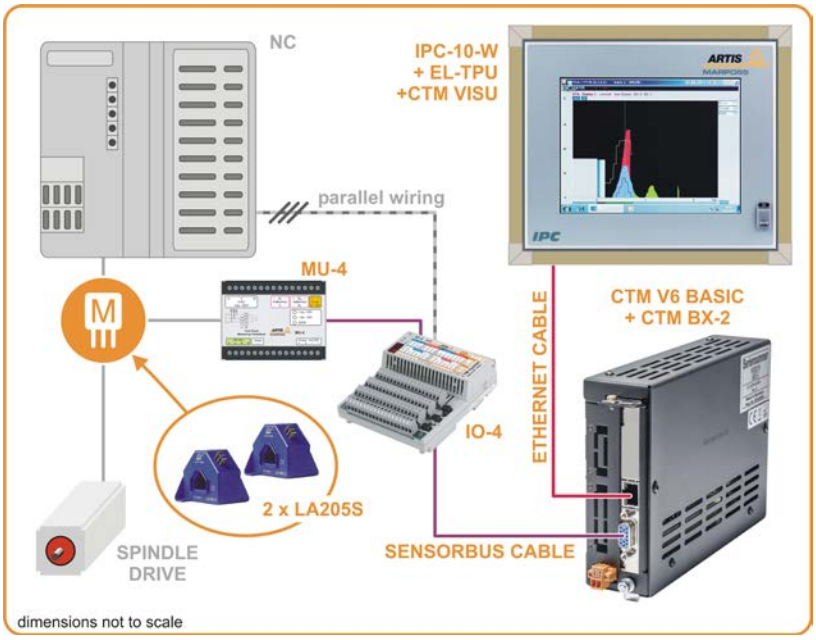
The Artis system for gear cutting has the ability to detect and track tool wear, provide a real and graphical tool life count and trending according to the cutting conditions, and instantly stop the process lights-out in case of chip welding, damaged or broken teeth or other conditions such as peeling coatings.

The Artis system utilizes an algorithm representing the life cycle of a hobbing tool that can be used to identify the optimum time to take the tool out of service for re-sharpening based on its actual condition. Additionally, a system of machine mounted sensors monitors process parameters including spindle torque, spindle vibration, true power consumption and a number of others depending on the specific application. Using these inputs, the system then captures the signature of each operation in the process and automatically generates a "good" tolerance band for the process based on that signature.

While the concept of monitoring process inputs is not unique, the Artis system couples it with powerful software specifically designed to detect the exact kinds of anomalies produced by worn and/or damaged hobs from conditions such as chips weld, peeling coatings or broken teeth. The Artis software can identify and quantify each of these signatures to generate either an approaching end-of-life warning for normal wear, or an automatic machine stop in case of actual tool damage.

In the case of normal wear, the Artis system notifies with ample time to schedule the downtime required to minimize the impact on production.

**For more information:**
Phone: (616) 891-1091
*www.marposs.com*



## Mazak — Booth #1322

At Gear Expo 2015 in booth 1322, Mazak will use its Integrex i-100ST, equipped with the latest Mazatrol SmoothX CNC, to demonstrate how advanced multitasking machines can effectively perform today's gear-making processes, from hobbing to skiving to gashing.

Mazak multitasking machines, including the Integrex i-100ST and over 90 other model configurations, when paired with the right software and CAD/CAM system, can serve as adaptive gear machining solutions that produce precision gears of all shapes and sizes. Unlike dedicated gear cutting equipment, these machines have the flexibility to perform a variety of operations in a single setup.

Shops with occasional gear work, for example, can use a Mazak multitasking machine to turn a part's I.D. and O.D., process its mating features, and power skive its gear tooth pattern. Performing all of these functions on one machine improves overall accuracy because every part feature runs true to the gear teeth. And, when the machine is not busy with gear work, it can continue to earn its keep by processing a range of complex, non-gear components.

One of the most compact models in the Mazak multitasking machine family, the Integrex i-100ST, processes small complex workpieces in single setups. It employs two 15-hp, 6,000-rpm turning spindles, a nine-tool lower turret and a 10-hp, 12,000-rpm milling spindle. Each turning spindle features a 6" chuck with a 2.4" bore size that can accommodate bar stock of up to 2" in diameter. The machine's 36-tool magazine accommodates tools up to 5.1" in diameter when neighboring stations are empty and up to 3.5" in diameter when stations are occupied.

Gear Expo attendees will be among the first to see the Integrex i-100ST equipped with the new Smooth Technology process-performance platform, which has transformed the way the company's multi-axis machines perform. According to Mazak, new CNC technology, progressive machine design and unequaled engineering resources set the foundation for the platform and, together, provide users with unsurpassed ease of operation and unmatched productivity.

The Mazatrol SmoothX CNC, a key element of Smooth Technology, operates four times faster than Mazak's previous-generation controls. Gear makers, especially, will benefit from faster rotary axis speeds, which allow the machine tool to quickly perform gear hobbing and skiving operations.

Gear Expo attendees can also inquire about the company's other gear production options while in booth 1322. The company's larger multitasking machines with full 5-axis capabilities are known for being able to produce low-volume spiral-bevel gear sets. The Integrex e-1550V/10, for example, can machine a spiral-bevel gear set with a 29-tooth, 22"-diameter pinion gear and a 114-tooth, 6'-diameter gear ring in a matter of days as opposed to months.

**For more information:**
Phone: (859) 342-1700
*www.mazakusa.com*

## Machine Tools Builders — Booth #1804

At Gear Expo 2015, MTB will display a P900 gear hobbing machine rebuilt with all mechanical linkages, gearing and other driving mechanisms replaced with new, modern servo drives and electronic controls via CNC. All guide ways have been refinished, seals and bearings replaced, hydraulics completely replaced, lubrication systems replaced, and a new electrical system installed. During the course of the rebuild, the machine was converted to CNC control for the × (radial), Y (tangential), Z (axial), C (worktable), and A (hob head swivel) axis, along with the B (cutter) spindle. Overall features will include a hob head swivel converted to CNC, enclosure with manually operated door and access panels for maintenance and a new magnetic style chip conveyor.

MTB is also showcasing a Challenger muscle car, which has been retrofitted and customized.

At MTB, classic machine design challenges are overcome by shortening the drive (gear) train for efficiency and accuracy, and by converting them to servo-driven ballscrews. Motors are designed with the proper torque and speed to move the axes at the required accelerations and speeds, which is very similar to the dynamics of supercharging an engine. MTB finds the processes of rebuilding cars and gearing equipment to be very similar. The remanufacturing or rebuilding of a machine includes a rebuild, a recontrol and modifications to reduce or eliminate as much as possible the mechanical linkages, gearing and other driving mechanisms. Generally these are then replaced with new modern servo drives, and electronic control via CNC or PLC motion cards. The reduction in the number of bearings, seals, shafts and other mechanical elements translates to less mechanical wear areas, and a more reliable and accurate machine tool. As a result, it's a modern machine tool.

Several members will be available for questions. Christoph Donner (from Donner+Pfister AG) will be visiting from Switzerland to answer questions and provide insight on gear checking and measurement systems, along with upgrades to MAAG gear grinding machines. Rick Claeyssen, heat treatment 30 plus year veteran, will be available to answer questions and provide insight on atmosphere equipment. Ken Flowers (MTB co-owner and engineer) will be available for answering gear related questions.

**For more information:**
Phone: (815) 636-7502
*www.machinetoolbuilders.com*


## Reishauer — Booth #2242

Reishauer AG will be demonstrating the RZ 160. The concept is based on the RZ 150 series. The RZ 160 has been increased in size and all relevant components have been adapted to handle higher loads and forces which occur when grinding larger gears. The RZ 160 can grind gears with an outside diameter of 160 mm and modules up to 4 mm.

The RZ160's design focuses on adaptability to the different production requirements of numerous customers. The machine can be fitted with one or two work spindles. The version with two work spindles is used to minimize the loading times. When grinding gears with space limitations, one can use the changeable Profile Grinding Spindle, enabling the use of a small plated or dressable wheel to grind gears using the discontinuous profile method. Both versions of the RZ 160 can be equipped with a fixed or CNC-controlled axis for swiveling the dressing tool. This option can increase the flexibility of the dressing tools since the same tool can be used for a range of gears as compared to the fixed dresser where the tools are normally workpiece specific.

Felsomat, a member of the Reishauer Group, has developed an automation system that is designed to match to the specific requirements of the RZ 160. In combination with the Felsomat FRC600 robot cell, the machine is suited for small to medium lot sizes. Available options include composite checking, de-oiling, SPC and NOK drawers.

Reishauer will be demonstrating polish grinding on a helical gear used in a truck transmission. The grinding wheel has two different sectors and compositions. One area is used to grind and remove the heat treat distortion while the other is for polishing the tooth surface.

The geometry of the grinding wheel is produced by using conventional dressing systems. Grinding various workpieces requires a variable shift jump to reach the polish grinding sector. The shift feed rate and the shift jump can be optimized for polish grinding depending on the dressing frequency.

This process achieves a surface finish of Ra .10 µm. In addition to the improved surface, the polish ground process rounds out the edges at the transition of the workpiece flank and face. The topography of the flanks remains unchanged.

Many of Reishauer's common features are present in the RZ 160, including the Reishauer Generating Module for gear quality, Reishauer LNS Low Noise Shifting technology for low gear noise emissions, Polish and Fine Grinding for surface roughness reduction, Reishauer Twist Control grinding technology to create defined values for flank twist and the Reishauer HMI for fast change over and set-up times.

Reishauer will be at booth 2242 at Gear Expo.

**For more information:**
Phone: (847) 888-3828
*www.reishauer.com*

## Riten — Booth #2201

Riten Industries will display its Raptor series of live centers, specially engineered for gear hobbing and gear grinding.

Unlike the prevailing foreign import, these centers are made and serviced in the U.S., and are available for immediate delivery. Other featured products are the Adjusta-Point live center that corrects for off-center workpiece center holes, and the C4T live center with permanent bearing protection. Also on display are face drivers and a sampling of the world's largest selection of live and dead centers.

**For more information:**
Phone: (800) 338-0027
*www.riten.com*



## Star SU — Booth #2109

Star SU will be showcasing its Bourn & Koch 25H Horizontal Hobbing CNC Machine. The machine hobs shafts, gears, and special parts up to 25 mm in diameter. It is designed without hydraulics reducing wear parts and heat.

Also on display will be a variety of gear cutting tool solutions, including: gear hobs, milling cutters, gear shaper cutters, shaving tools, chamfer and deburring tools, master gears, ring and plug gauges, and broaches. The company also offers precision tool re-sharpening services and advanced coatings, including Oerlikon Balzers Altensa and Alcrona Pro, which can extend the life of your tools and lower your costs.

Star SU partners Profilator/GMTA and Sandvik Coromant will also be

present in the booth during this year's show. Star SU has formed an alliance with Profilator to manufacture Scudding tools for the global market. Scudding can complement shaping, broaching and other gear cutting processes to produce gear and spline teeth for both cycle time and tool cost.

See the latest in indexable gear milling solutions from sandvik coromant. As national sales channel partner for Sandvik Coromant's line of indexable gear milling solutions, Star SU presents several new solutions and products enabling optimal production of small to large batch sizes, both in dedicated machines as well as multi-task machines.

**For more information:**
Phone: (847) 649-1450
*www.star-su.com*

**Gear Expo 2015**
**October 20–22,**
**Cobo Center, Detroit, MI**
***www.gearexpo.com***

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