

Star SU Uses Virtual Inspection and Cut Simulation

Recent changes in automotive technology include a move away from hydraulic to electric steering systems. For Star SU, that means much tighter tolerances in the manufacture of rack milling cutters at their Tawas, Michigan plant.

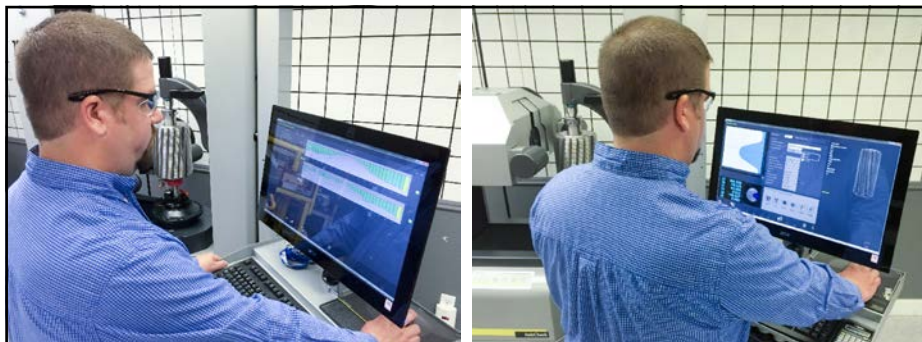


Generated tooth contour with simulated wire.

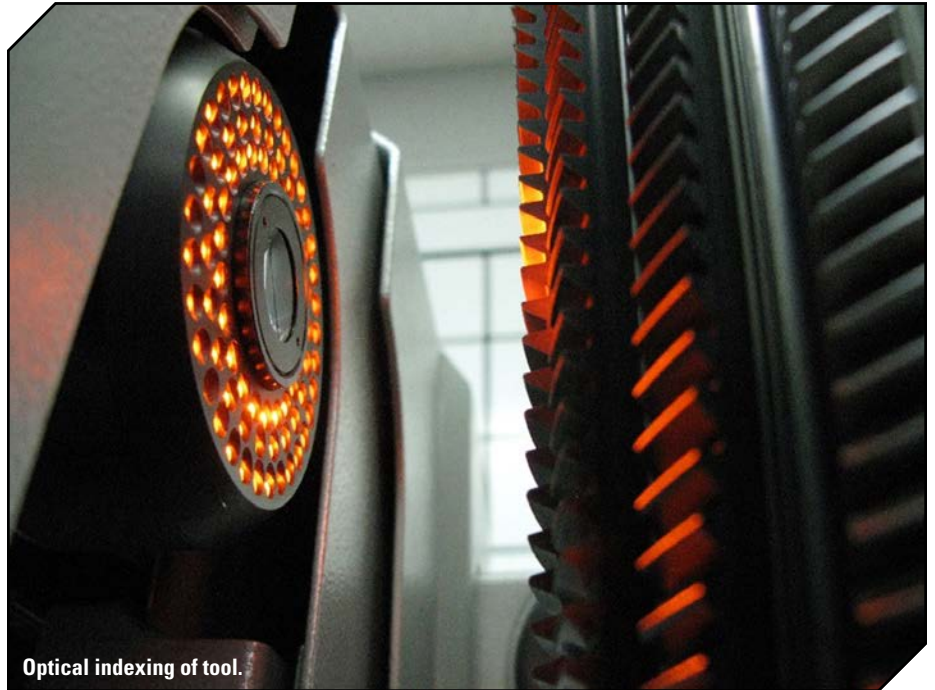
The Challenge

Today's steering systems contain highly engineered rack and pinion components. The complexity and precision of these components require cutting tool measurement techniques not found on standard inspection equipment.

Recently, Andy Kobs, Star SU cutting tool designer, met Werner Lueken, Zoller inspection product manager, at a



Andy Kobs, Star SU cutting tool designer. Setup of measuring program and reviewing measuring results.



Optical indexing of tool.

meeting of AGMA. They discussed the need for a special application to measure and inspect the rack milling cutters Star SU manufactures. Lueken offered a new solution in the form of measuring and inspecting the milling cutters visually, and to the micron, using the Zoller hobCheck system.

These milling cutters may have teeth in alternating patterns and asymmetrical forms, making elemental inspection difficult. To solve this, Zoller simulates the cut and develops a virtual rack template. The hobCheck allows Star SU to simulate the test on the rack before the tool leaves their plant.

Implementing the Solution

To satisfy the need for micron-level measurements, Zoller developed software for the hobCheck based on Star SU's specific requirements for measuring and inspecting rack milling cutters. With the hobCheck, Star SU can measure and inspect a cutter in about 20 minutes with extreme accuracy.

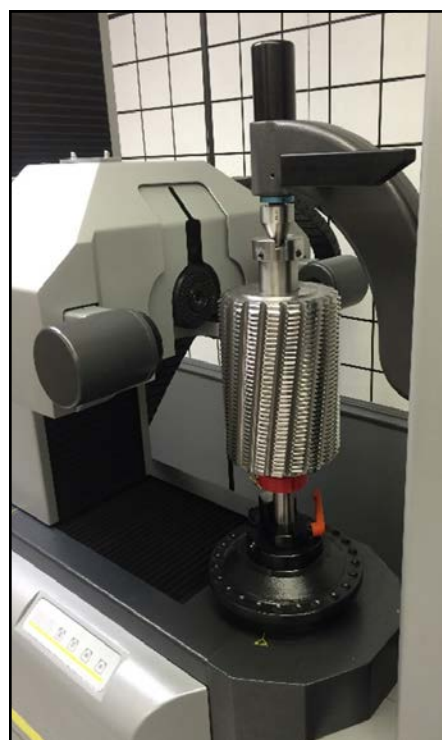
"It has allowed us to work in significantly greater detail — to the micron. We can do things we couldn't do before. Prior to getting the hobCheck, we used standard and specialized probing machines to measure rack milling cutters. Although very accurate, they did not output a composite of what the tool will produce. Now we have that capability," Kobs said.

The Future

Star SU is interested in adding more Zoller 3-D capabilities. Thomas Ware, product manager of Gear Tools said, "We also like the way Zoller uses graphics and other visuals that make using the machine easy and quick. Operators expect ease-of-use in equipment — more now than ever.

“Another application we are looking at is measuring and inspecting saw blade milling cutters that put the teeth in band saw blades. Those cutters aren’t easily manually checked. The cutter elements can be checked more accurately with the hobCheck,” Ware added.

Star SU offers RFID chips with their hobs and is working with Zoller to capture the tool information required by the customer. For example, after reconditioning, the dimensional changes in the tool can be downloaded directly to the customer’s machine via the RFID chip.



hobCheck with tool between centers.

Star SU’s manufacturing facility in Tawas, Michigan offers a full range of gear cutting and inspection tools to a broad range of gear tooth manufacturers. One application primarily serving the automotive industry is the steering rack milling cutters that cut racks for rack and pinion steering mechanisms.

The Zoller product portfolio encompasses tool presetters, measuring and inspection machines, and tool management software, which are demonstrated in our showrooms and on-site around the world.

The Zoller hobCheck universal measuring machine opens unprecedented opportunities for fully automated and economical complete measurement of

carbide or HSS hob cutters. All parameters are measured automatically through the intelligent combination of image processing technology. CNC axes and touch probes benefit from improved tool quality, shorter setup times during re-sharpening and complete documentation.

For more information:

Star SU
5200 Prairie Stone Parkway, Suite 100
Hoffman Estates, IL 60192 USA
Tel: 847-649-1450
Fax: 847-649-0112
sales@star-su.com
www.star-su.com

Zoller Inc. (USA)
3753 Plaza Drive, Suite #1
Ann Arbor, MI 48108
(734) 332-4851
Fax: (734) 332-4852
sales@zoller-usa.com
www.zoller-usa.com

For more information on the Zoller hobCheck universal measuring machine, follow this link: http://zoller.info/en/products/inspection_measuring/universal_measuring_machines/hobcheck

EXCEL-LENCE AT WORK

LARGE GEAR GRINDING? WE'RE FASTER!

Time is money. With our new high speed, high accuracy continuous generating grinding capability using multi-thread wheels, we’re grinding gears as large as 1200 mm in diameter and module 12 much faster and more efficiently than form grinding.

We’re more flexible too, with the same new platform offering rough and finish profile grinding and on-board dressing and inspection.

We also excel at grinding gears as small as 2.00" in diameter.

**Ready to Excel?
Contact:**



815.623.3414 / www.excelgear.com

Vacuum Heat Treating



...because quality is critical

- » Over 60 vacuum furnaces – lab-sized to 48' long
- » Argon, nitrogen and helium quenching up to 20 bar
- » Operating range of -320°F to +3,600°F
- » On-site metallurgical testing lab
- » 24/7 responsive service
- » Four convenient locations – Philadelphia, Pittsburgh, Los Angeles, South Carolina

ISO9001:2008 | AS9100C

Nadcap Accredited

MedAccred Accredited

ITAR Certified

☎ 1-855-WE-HEAT-IT
 🌐 solaratm.com



MedAccred accredited for Heat Treating at our Souderton, PA facility only.
 Nadcap Accredited for Nondestructive Testing at our Hermitage, PA facility only.

VACUUM PROCESSING

- Heat Treating • Brazing
- Carburizing • Nitriding

Sandvik's Coromill 174 Gashing Tool

OFFERS FLEXIBILITY IN LARGE GEAR CUTTING

The new Coromill 174 flexible gear cutting disc from Sandvik Coromant is designed for roughing or finishing small to medium batches of spur or helical gears. Its primary advantage is increased flexibility, as one cutter body can handle a range of modules or DPs.

“The same disc can be used for a range of DPs/modules and a range of tooth counts both for internal and external gears,” says Gear Milling Americas Manager, Nicklas Bylund. In fact, Bylund says, it takes only three bodies to handle the entire range from 2.5 DP to 0.5 DP.

In addition, variation of pressure angle is also possible from 20 to 25 degrees.

The tool uses inserts that are ground to form, with a minimum order of 25 inserts. The tools are capable of producing gear quality up to DIN 7/AGMA 10 (according to AGMA 2000-A88) on tooth forms module 16 and larger using good machines, with DIN 8/AGMA 9 being typical results.

There are some limitations to the cutters when it comes to lower tooth counts (less than Z=25, for example). In those

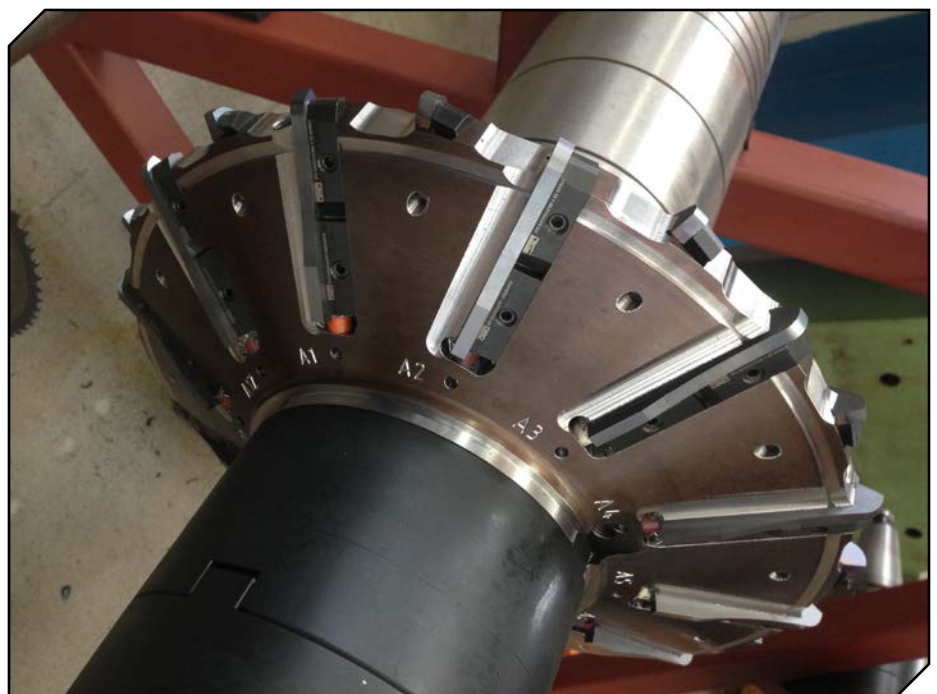
cases, Sandvik recommends a separate Coromill 174 disc for pinions.

“The time and cost savings using an inserted disc compared to a HSS hob are substantial for big teeth, both for roughing and finishing,” Bylund says. “An inserted disc is several times faster than an HSS hob, and the cost of using ground-to-form finishing inserts, compared to several regrinds on a big hob, is often lower.”

In addition, Bylund says, “CoroMill 174 is ideal for the customer making spare parts or small series since the investment in the tool body can be spread over several parts, and one single batch of inserts can be ordered for each particular gear.”

For more information:

Sandvik Coromant US
 1665 N. Penny Lane
 Schaumburg, IL 60173
 (800) 726-3845
 Fax: (847) 348-5630
nicklas.bylund@sandvik.com



Affolter Technologies

DEVELOPS WORM POWER SKIVING MACHINE

Affolter Technologies SA, a technology and market leader in micro gear hobbing machines for the aerospace, medical and micromechanical industries, is introducing an innovative new technology: worm high-speed power skiving.

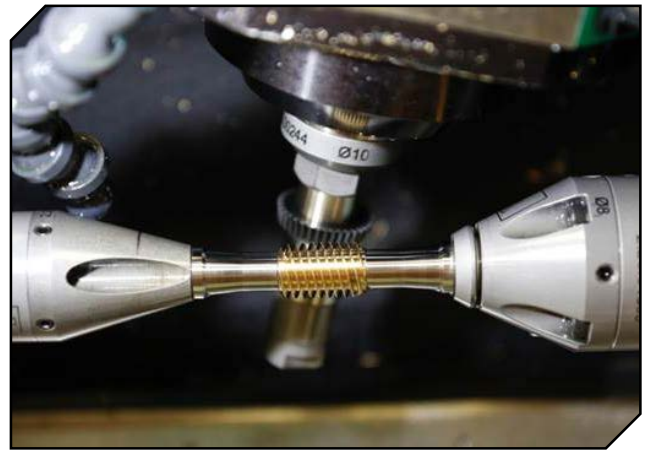
“This new development will increase the productivity and efficiency of manufacturers in the automotive and aircraft industries considerably,” said Managing Director Vincent Affolter. “With this technology, we can finish a high-precision worm in about six seconds, about four times faster than with the previous methods. Reducing cycle time by such a large step will help any worm-shaft manufacturer.”

This new technology will help manufacturers of high volume precision worms significantly. Speed and accuracy are the main focus for small worms with a module of 0.3 to 1. “We recently saw a big demand in the automotive industry. Such worms are used in car seats or trunks, but also in other sectors,” Affolter added.

Unlike conventional worm hobbing, where the hob turns much faster than the workpiece, the Affolter engineers inverted the process. The workpiece turns extremely fast, with up to 12,000 rpm, while the new cutter (similar to a special lathe bit) turns much slower and rotates into the part. This process is only possible with a machine that can reach such speeds while providing the necessary rigidity and stiffness like the Affolter AF100 and AF110.

The integration of such high speed spindles into the existing Affolter Gear Line machines was the first step of the process. Currently, the Affolter R&D team is focusing on an optimized machine base including peripheral support devices. The new skiving process produces an increased amount of chips, that will be addressed with a new “chip disposal device.” In addition, efficient and ideal coolant supply is of high importance and is being examined by the Affolter team. It is important to keep the kinematics of the machine the same. Affolter is represented in the United States and Canada by Rotec Tools Ltd.

For more information:
Rotec Tools Ltd. (Affolter Technologies)
Phone: (845) 621-9100
www.rotectools.com



TURNING UP

THE HEAT

Now offering complete heat treat capabilities for our seamless rolled ring forgings up to 144" diameter with the same speed and quality you've come to expect.

Turn up the heat with excellent customer service and the fastest delivery times in the industry.

Speed. Quality. McInnes Rolled Rings.

1.800.569.1420

sales@mcrings.com

www.McInnesRolledRings.com

Heat Treating Capabilities:

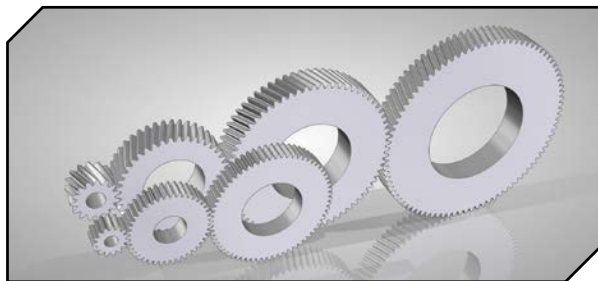
- Normalize
- Normalize & Temper
- Solution Treat & Age
- Anneal
- Solution Anneal
- Spheroidize Anneal
- Quench (Polymer, Water & Air)
- Temper
- Stress Relieve

GWJ Technology GmbH

OFFERS NEW CALCULATION MODULES FOR CYLINDRICAL GEARS

GWJ Technology GmbH, a manufacturer of calculation software for machine elements and gearboxes, has upgraded its web-based calculation software *eAssistant*—the engineering assistant—with two new modules for cylindrical gears. Brand-new modules are the modules for three- and four-gear train systems. These modules allow a fast and easy calculation of geartrain systems with three or four spur or helical gears.

The new modules have all typical functions of the *eAssistant* cylindrical gear pair module to determine the geometry. To cal-



culate the load capacity, the standards DIN 3990 and ISO 6336 are available. Alternating stress of the tooth root is automatically taken into account for the intermediate gears. Furthermore, there are new versions of the popular *eAssistant* 3D CAD plugins for *Solidworks*, *Solid Edge* and *Autodesk Inventor*.

The plugins enable the user to open all *eAssistant* calculation modules directly through the CAD menu. At the push of a button, the part, including the accurate gear tooth form, can be created as a 3D part on the basis of the previously calculated data. With just one click, the design table with all manufacturing details of the gear can be placed on the manufacturing drawing. The appearance and size of that table is individually configurable. In addition, *eAssistant* supports the output format DXF.

The *eAssistant* software allows calculation, design and optimization of machine elements, including shafts, bearings, gears, bevel gears, shaft-hub connections, bolted joints, timing belts and springs.

The software is available in a variety of pricing plans, including pay-as-you-go plans that allow the purchase of blocks of time on the system. Interested individuals can apply online for a free test account, which allows up to five hours of credit to try it out. Visit www.eassistant.eu for more information.

For more information:
 GWJ Technology GmbH
 Phone: +49 (0) 531-129 399-0
www.gwj.de



RAVE GEARS AND MACHINING



**AS9100 QUALITY
 FROM START TO FINISH**

Rave Gears promises to deliver the highest quality gears and machined parts, on-time, at a fair price.

Our Specialty: Spiral Bevel, Hypoid, Helical and Spur Gears

Current customers include Bell Helicopter, SpaceX, United Technologies, GE, Baker Hughes, Multiple Nascar Racing Teams.



Klingenberg P65 Gear Analyzer

Klingenberg G60 Gear Grinder

Mori Seki NT 5400

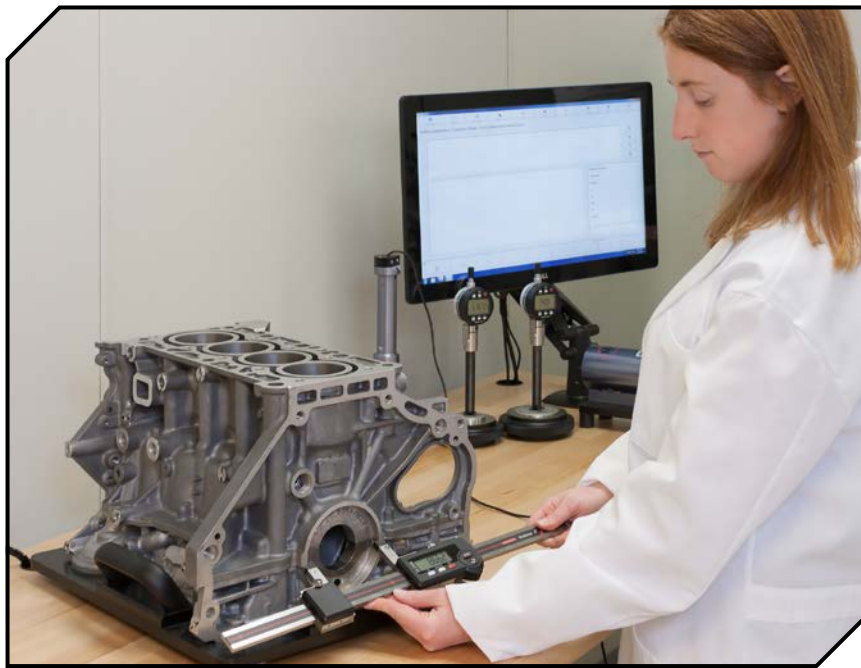
425 Stempel St. Seguin, TX USA 78155
 (855) **RAV GEAR** | 855-728-4327 | 830-421-3295
sales@ravegears.com

Mahr Federal Digital Universal Caliper

OFFERS NEW MEASURING RANGE AND ACCESSORIES

With its broad range of measurement accessories, the new Multimar 25 EWR Digital Universal Caliper from Mahr Federal is a versatile and configurable caliper for ID and OD measurement requirements. Available in four capacities with outside measuring ranges up to 1,250 mm (50 in.), the 25 EWR can measure outside and inside dimensions, narrow collars, external and internal tapers, dovetails, grooves, distances between hole centers, for centering shoulders, scribing workpieces and more.

by the user. Anvils and tips are available in a wide variety of shapes and configurations, including threads, flat and spherical shoulders, blades and round faces. Depth stops can be set to the exact measuring depth in the horizontal measuring position to provide precise support on the reference plane surface. This improves repetitive accuracy when conducting comparison measurements in the second axis, and when used with a rectangular gage block, can provide accurate depth measurement on cones.



Unlike standard calipers, both measuring arms of the 25 EWR can be moved along the beam, thus functioning like a beam-gage, and providing well-balanced weight distribution even with small dimensions. The application range can be easily extended by reversing the interchangeable measuring arms. Plus, the digital display is always in the operator's line of vision due to the patented mounting fixture of the measuring arms and attachments provided.

But what makes the Multimar 25 EWR so versatile is the wide range of measuring arms, anvils, mounting attachments and depth stops, which can be configured

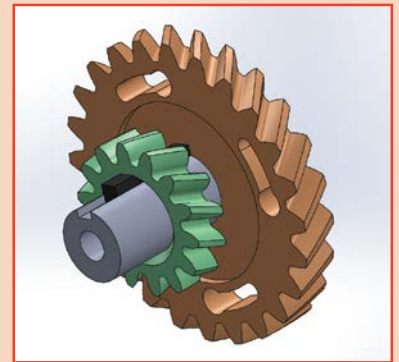
Data output is via USB, Digimatic, Opto RS232C, or wireless, and battery life is about three years. The Multimar 25 EWR Universal Caliper provides IP 65 protection for all workshop conditions, and is supplied with battery, instruction manual, hardwood mounting and resting blocks and a finely crafted wooden case.

For more information:
Mahr Federal Inc.
Phone: (800) 343-2050
www.mahr.com

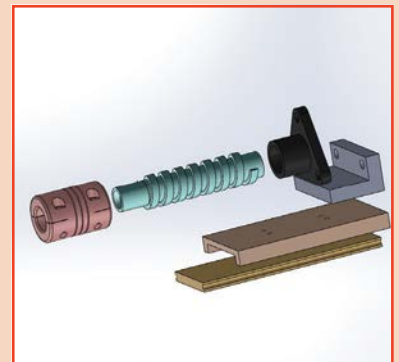
Quality Solutions Since
1960



STANDARD COMPONENTS,
MADE TO PRINT PARTS
AND ASSEMBLIES



- Mechanical Components and Assemblies
- Made to Print Parts
- Design & Engineering



Nordex.com

sales@nordex.com
eng@nordex.com

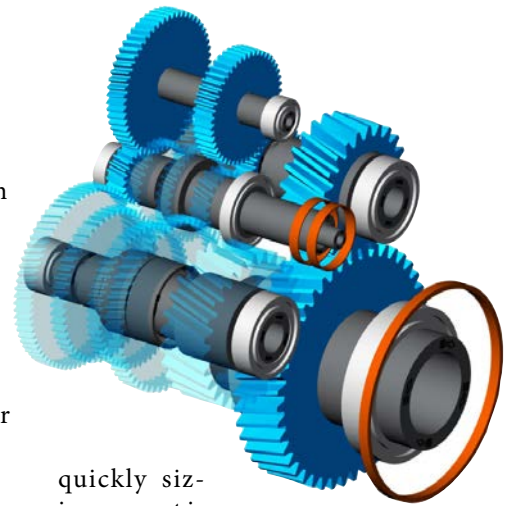
Phone: (800) 243-0986
or Call: (203) 775-4877

KISSsoft

INTRODUCES RAPID 3D MODELING IN KISSSYS

Modeling in *KISSsys* has been radically simplified in the latest *KISSsoft Release 03/2016*. Now, for example, when elements are added, the part geometries are prefilled with default values. At the same time, the shafts are positioned intelligently, to suit the gearing types involved, such as a cylindrical gear pair, a bevel

gear or a planetary stage. The user can now see the modeling progress immediately in the 3D view. Another new feature is the option of adding assemblies (such as planetary stages) to a model, and also adding shafts, if required. Would you like to find out more about *KISSsys* functionalities for



quickly sizing entire drivetrains? Training courses (held in English) e.g. Basic Training, which runs from August 30 to September 1, and Planetary Stage Gearboxes, which runs from December 6-7, are the ideal opportunities to attend and learn from KISSsoft software experts.

For more information:

KISSsoft USA LLC.
Phone: (815) 363-8823
www.kisssoft.com

Gearing your past to power your future.

Breakdown Services

We understand the urgency of meeting critical deadlines. We offer our customers expedited services without sacrificing quality.

Heat Treatment

Our in-house heat treat facility performs a full range of services that include annealing, carburizing, and thru hardening.



B&R Machine and Gear Corporation is a full service gear manufacturing facility driven to power your equipment with reliable and durable gears that are built to perform and last. Find the perfect mesh. No matter the gear, we've got you covered.

VISIT OUR WEBSITE BRGEAR.COM FOR MORE INFORMATION

Riten Industries Disk Driver

DESIGNED TO HOLD DIAMETERS TWO INCHES OR LESS

Riten has introduced a modified face driver specifically designed to hold workpieces with diameters of two inches or less. In lieu of individual drive pins, the unit features a multi-toothed drive disk that securely penetrates the face of the part. It is ideal for gear hobbing and other aggressive machining operations.

The disks are available in a choice of diameters, similar to the driving diameters on standard face drivers. The teeth configuration is designed to allow the disk to be bi-directional — for both clockwise and counter-clockwise rotation. This also compensates for the backlash common to gear hobs. The driver features three stirring screws which move the disk and center point radially to compensate for misdrilled center holes and other concentricity issues in the workpiece or machine.

Walter Surface Technologies

OFFERS IMPROVED TOPCUT DISC FOR FINISHING OPERATIONS

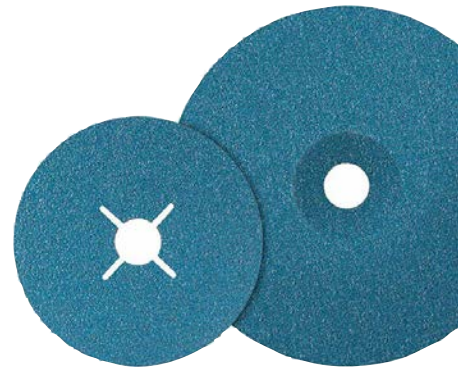
Walter Surface Technologies has introduced the new and improved Topcut sanding disc, one of the latest additions to the company's finishing solutions. The Topcut sanding disc now features a new formulation of blue zirconium grain blend to remove more material, faster. The new blend contains a higher concentration of Zirconium, according to Jonathan Douville, product manager, Surfox, E-Weld and finishing solutions at Walter Surface Technologies. "The new and improved discs remove material 50 percent faster than the previous model, and also have a longer lifespan," Douville said.

The new grain blend is designed for finishing applications on steel and stainless steel and offers maximized stock removal on any given surface. The disc also guarantees cooler sanding so that the metal will not overheat. "The cooler sanding helps to preserve metals, especially the heat-sensitive material, and

will result in a beautiful, finished product," continues Douville.

Topcut comes in Walter's exclusive 50-pack protective packaging designed with humidity control to preserve the wheel's physical properties until ready for use. Discs are also available in the standard pack of 25.

For more information:
Walter Surface Technologies
Phone: (514) 630-2800
www.walter.com



The Riten Disk Driver is available in standard straight shanks and Morse tapers. Special tapers are available on request.

For more information:
Riten Industries, Inc.
Phone: (740) 335-5353
www.riten.com



**PRECISION.
PERFORMANCE.
PERFECTION.
FIRST TIME.
EVERY TIME.**

Manufacturers of:

Broaches

- Spline Broaches
- Fine Pitch Gear Broaches
- Form Broaches
- Serration Broaches
- Bearing Cage Broaches

Shaper Cutters

- Disk Shapers
- Shank Shapers
- Hex and Square Cutters
- Special Form Cutters

Inspection

- Master Gears
- Go-No Go Gages
- Posiloc Arbors
- "Quick Spline" Software



The Broach Masters
and Universal Gear Company

1605 Industrial Drive
Auburn, CA 95603
Phone: (530) 885-1939
Fax: (530) 885-8157

Call 530-885-1939 or visit
www.broachmasters.com

**DO YOU
KNOW HOW
YOUR BEVEL
GEAR BLADE
WAS MADE?**

WE DO.



**NOT ALL CARBIDE
IS CREATED EQUALLY.**



MITSUBISHI
MITSUBISHI MATERIALS

Hard Materials Division | (800)-322-6382 | hardmaterials@mms.com

Mitutoyo America Corporation

RELEASES ELECTRONIC GAGING PROBES AND DISPLAYS

Mitutoyo America Corporation introduces the 519 Series of high-accuracy Mu-Checker probes and displays. These electronic gaging systems are suitable for a range of applications from the inspection room to production-line integration.

High-resolution lever-head probes allow multi-point measurements of small parts, flatness and straightness measurement on X/Y table, as well as runout measurement of shafts. The cartridge-head type is easily built into equipment due to its slim and compact shape, making it optimal for an automatic measuring machine. Probes are offered with a stan-

dard measuring force of 0.2 N, or a low measuring force of 0.02 N. The low-force style enables soft workpieces to be measured without significant deformation. Optional styli, extension rods and brackets are available.

Both digital and analog display models offer zero setting with the touch of a button. Additional models allow for multi-probe measuring systems.

For more information:
Mitutoyo America Corporation
Phone: (630) 820-9666
www.mitutoyo.com



Siemens Industry Inc.

OFFERS SMART OPERATION FOR FLEXIBLE AND EFFICIENT MANUFACTURING

Siemens presents a new concept for efficient work processes surrounding the Sinumerik 840D sl CNC in the form of Smart Operation. Shop floors will benefit from the use of Smart Operation, as it allows work at the machine tool to be performed with greater flexibility and speed and helps boost productivity. The new concept encompasses aspects such as job preparation, IT networking, improved usability with touch operation and the use of mobile devices to perform monitoring and control functions. In short, Smart Operation simplifies the

integration of machines into the production process. Smart Operation does not require support by IT specialists and can be simply implemented independently by machine operators — meaning that companies can implement the individual functions using minimal financial and organizational resources.

Smart Operation encompasses four areas: Smart Prepare, Smart Operate, Smart IT and Smart Mobile. Smart Prepare is concerned with job preparation and the generation of CNC programs at the PC. Siemens offers high-

performance software for this purpose in the form of *Sinutrain*. Known as control-identical training software, *Sinutrain* is used as an offline programming workstation. Users will benefit from programming and simulating the next job ahead of time offline at the PC and shop floors can make significant gains in terms of productivity at the machine.

Smart Mobile is a solution designed to enable the use of mobile devices in the machine tool environment. Using a secured webserver, users can deploy monitoring and control functions using a notebook, smartphone or tablet. This allows up-to-the-minute information such as the current job status or component supply situation to be accessed remotely or service information to be displayed. These functions can benefit machine tool builders from the early development stage of new machine concepts, allowing mobile access to be included as a standard feature from the start.



For more information:

Siemens Industry Inc.
Phone: (800) 879-8079
www.usa.siemens.com



HANS-JÜRGEN GEIGER

Maschinen-Vertrieb GmbH

Metzingen/Stuttgart



High quality used machine tools from Germany since 1968.

Please visit our showrooms:
7000 sqm display area with more than 600 machines in best condition.

HANS-JÜRGEN GEIGER
Maschinen-Vertrieb GmbH
James-Watt-Straße 12
D-72555 Metzingen (Germany)
Phone +49 (0) 7123 / 18040
Fax +49 (0) 7123 / 18384
E-Mail: geiger@geiger-germany.com

- MIKRON
- DMG | DISKUS
- TBT | HELLER
- ELB | NAGEL
- SCHAUDT
- KEHREN
- KARSTENS
- MIKROSA
- INDEX | ZEISS
- BOEHRINGER
- GILDEMEISTER
- SCHÜTTE
- AGIE | SCHULER

Gear cutting machines:

- LORENZ | HURTH
- PFAUTER | KAPP
- KOEPFER | NILES
- LIEBHERR
- REISHAUER
- LINDNER
- KLINGELBERG
- GLEASON
- WMW



www.geiger-germany.com

b-werk.de