



Pack your bags for a fun-filled week in Chicago at **IMTS 2004** with booth after booth of products and services for gear manufacturers, as well as a technical conference and a student summit.



This year's IMTS, to be held September 8–15, is probably the closest thing the manufacturing community has to summer camp.

This special section lists booths and showcases many of the newest and most interesting products at this year's IMTS.

Special features this year include filming for TLC's "Junkyard Wars."

McCormick Place, 2301 S. Lake Shore Dr., Chicago IL 60616

Registration fees: Free for international visitors!

\$50 for domestic visitors. After September 1, 2004, you can only register at the door.

Show Hours: Lakeside Center: 9 a.m.–5 p.m.

South Building and North Building Hall B: 10 a.m.–6 p.m.

Sunday, September 12: All buildings: 10 a.m.–4 p.m.

To register, contact The Association for Manufacturing Technology at:

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Abrasive Machining/Sawing/Finishing—North Building, Hall B

Controls & CAD/CAM—East Building, Hall D

EDM—East Building, Hall D

Emerging Technology—South Building, Ballroom S100

Fluid Power—Lakeside Center Building, Hall D

Gear Generation—North Building, Hall B

Machine Components/Cleaning/Environmental—East Building, Hall D

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## Sigma Pool Features New and Improved Machines

Two Sigma Pool partners will unveil a new spiral bevel gear generator and an upgraded gear measuring center at IMTS '04.

Oerlikon GearTec AG will unveil its C 27, a spiral bevel gear generator that cuts dry and uses direct-drive spindles for workpieces.

"Acceleration of the spindles to operating speed occurs in less than one second, so that non-productive times can be reduced to an absolute minimum," says Klaus Singler, vice president—sales for Sigma Pool partner Liebherr Gear Technology Co. "The maintenance-free drives, with their high positioning accuracy, guarantee high quality bevel gears during the entire lifetime of the machine."

Also, the drives have an integrated water-cooling system, largely eliminating machine variations from internal temperature changes.

The precision gear measuring center, the P 26, improves on earlier versions available to North America with a new operator interface called Gear Inspection Assistant (GINA). The center also has an extended range of applications, including non-gear related CMM-type capabilities. GINA is designed to simplify operation. The machine itself is designed for increased accuracy and faster cycle times, says Ted Klemm, a Liebherr regional sales manager.

The P 26 measures gears with outside diameters of up to 260 mm. The center can measure cylindrical gears with external and internal teeth, worms and worm gears, spiral bevel gears, rotors, camshafts, and other curved workpieces. Measuring programs are available for the most important gear cutting tools, such as hobs and shaper and shaving cutters.

Liebherr will feature its CNC generating and profile gear grinder, the LCS 300. The machine is designed to be flexible. For example, it can process a twin gear by generating grinding one gear with a dressable worm and profile grinding the other with a CBN wheel. Also, using an attachment, the machine can profile grind internal gears with diameters of 50–300 mm.

The LCS 300's optional features include intelligent software for tooth-end modifications and topological corrections and a dressing unit for sintered alumina tools.

Sigma Pool will also exhibit Liebherr's LP 200 gantry system, Lorenz tooling and CM-Digit systems.

The gantry system has an integrated drip pan that travels with the part gripper for the length of the gantry's working area. The tooling will consist of shaper and shaving cutters and master gears. Products from CM-Digit GmbH & Co. KG will include automated single/double flank and noise testing systems.

Since IMTS '02, Sigma Pool has improved its dry hobbing technology through increased use of direct drives for improved accuracy and reliability with reduced cycle times and through integrated tools for deburring, spinning and other peripheral operations.

According to Peter Kozma, Liebherr's president, Sigma Pool has much increased the reliability and maintainability of its machines, significantly reducing life cycle costs.

Liebherr Gear Technology Co. (Booth B-7016)

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## Keyseating Machines Use Fewer Fixtures for Large Parts

Mitts & Merrill L.P. will feature its L-series keyseating machines.

Unlike the K series, this series includes a post holder that's flush with the machine tabletop.

"This now allows large parts to sit directly on the table with less fixtures needed," says David G. Sabel, general manager of Mitts & Merrill, a Frömag Group company.

Also, making the post holder flush allowed the machine to use Mitts & Merrill tooling (except post) and Frömag tooling.

These electromechanical machines have two concentrically arranged ball screws for stroke movement and a PLC control unit.

According to Sabel, the L-series design offers improved tool life, reduced floor space and energy savings compared to hydraulically driven machines and older electromechanical machines.

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## Gleason 245TWG Threaded Wheel Grinder

"New machines as well as new grinding and dressing technology have combined to make possible what gear designers could only have dreamed about a few years ago," says Richard Scoda, Gleason Corp.'s product manager. "Today fast, consistent, cost-efficient production of high quality ground gears can be achieved in everyday production."

And Gleason will highlight at IMTS 2004 a machine designed for such production: the 245TWG Threaded Wheel Grinder. According to Gleason, the machine can reduce floor-to-floor times on a typical 8-inch-diameter gear from the 3–4 minutes required by a conventional grinder to 1.10–1.35 minutes. Scoda says this performance improvement isn't attributable to a single technology or process development, but rather to a number of design improvements:

- Direct-drive spindles: Grinding and work spindles use

direct-drive spindles, which allow for higher grinding wheel speeds and a wide range of speeds are possible. "Because direct-drive spindles eliminate gears, belts and other mechanical connections between the motor and the spindle, direct drives produce inherently more accurate gears. This technology eliminates the possibility of introducing transmission errors found in conventional gear trains," says Scoda. He adds that higher speeds and feeds allow the machine to take full advantage of today's most advanced grinding materials.

- Multi-start grinding wheels: The 245TWG can use multi-start grinding wheels, applying a principle used for years to improve production rates in hobbing via multi-start hobs. "A grinding wheel with seven starts can improve the production rate by 5–10 times versus that of a single-start grinding wheel," Scoda says. "Dressing of multiple-start grinding wheels is a simple, straight-forward process on the 245TWG machine, with no sacrifice in quality."

- Master dressing gear process: Both CNC dressing and dressing using a master dressing gear are available on the grinder, but multi-start grinding economics are best achieved with the master dressing gear. The Gleason master dressing gear system

display its latest cutting tools, including new CBN-plated grinding wheels and shaper cutters.

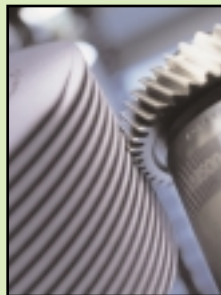
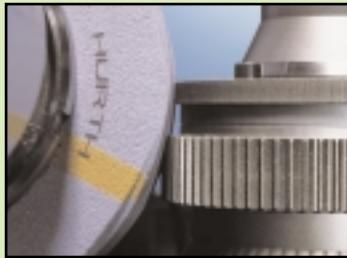
can dress a multi-start grinding wheel in the same time regardless of the number of starts. With a standard CNC dresser, the dressing time is increased with each additional start.

"We've developed a process that allows use of a diamond master gear and roller, integrated into the clamping fixture, to engage all the threads at once, thus doing in one pass what would take many passes with a typical single diamond dressing disk arrangement," Scoda says. "This becomes an enormous factor in high-volume production applications, where dressing the wheel can occur after every 20–30 parts."

For smaller lot production, prototype work and other applications requiring more dressing flexibility, the 245TWG may be equipped with a fully automatic CNC dressing unit that dresses wheels in the conventional manner.

- Automatic loading: The 245TWG comes equipped with automated carousel loading, which is similar to the loading systems used on hobbing machines. Spin stations and other features can be added to the loader system.
- Automatic stock division: Automatic stock division is a standard feature on the 245TWG grinder. In addition, Gleason employs a portable video camera mounted on the dressing spindle to ensure that the dressing tool and the grinding wheel threads are properly aligned prior to starting the dressing cycle.

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## A New Heavy-Duty Hobber from Koepfer

Koepfer America LLC will unveil a new CNC gear hobbing machine, the Model 300. This heavy-duty hobber can cut a maximum pitch of 4.0 mm (6.35 DP) with a maximum workpiece diameter of 195 mm (7.677") and a maximum workpiece length of 500 mm (19.685") when manually loading. With automatic loading, the workpiece's maximum diameter can be 140 mm or 5.512" and its maximum length 300 mm or 11.811". Other features include:

- eight axes—nine with a gantry loading system—of CNC control, allowing for nearly all types of gear cutting, including the timing of one gear to another on the same workpiece and the timing of a gear tooth to an external or internal feature;
- a composite epoxy bed for high static, dynamic, and thermal stability;
- direct-drive, digital work and cutter spindles for consistency and accuracy over the machine's life and
- an optional CNC gantry automation system.

Another new Koepfer machine will be displayed by the Kapp Group in its booth, B-6931. The Koepfer-Kapp KX120, a jointly developed machine, can hard finish external spur and helical gears up to 120 mm in diameter.



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**Zeiss' ACCURA Measures in Many Ways**

Carl Zeiss Industrial Measuring Technology will feature its new coordinate measuring machine, which has probing processes that include active scanning, single-point and optical measurement.

The ACCURA is a bridge-type CMM with a fully enclosed X-axis to reduce service and maintenance. It can be equipped with a variety of touch-trigger and passive scanning probes from Zeiss and other manufacturers.

The probes can be automatically exchanged using an RDS probe change magazine and include VAST® probes featuring active scanning technology. Also, high grade ceramic and carbon fiber materials provide stiffness necessary for fast, accurate scanning.

Each ACCURA model has a vibration isolation system, so the machines can be installed close to the production floor. Also, they offer x, y, z measuring ranges from 700 x 900 x 500 mm to 1,600 x 4,200 x 1,400 mm.

The CMM is available with CAD-based CALYPSO software. This software can be combined with HOLOS, which is designed for measuring 3-D surfaces, and with DIMENSION, which is designed for reverse engineering tasks.

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**Star Cutter, Star SU Offer  
New Tool and Cutter Grinders**

The Star Cutter Co. and Star SU LLC will unveil a new series of 5-axis, NUM CNC-controlled tool and cutter grinding machines.

The Star PTG series features 20 hp drives (continuous from 4,000–10,000 rpm), a 10" maximum wheel diameter, linear glass scale positioning, automatic wheel probing systems, direct-drive digital head stocks with a maximum of 1,000 rpm with 350 in./lbs. of torque for heavy fluting, and NUMROTOplus® software.

The series can also be equipped with an optional 3-D virtual grinding simulation and optional auto loading systems for unattended operation.

The machines were designed for solid carbide tool manufacturers and special application grinding companies.

"The machine series design and power are targeted to address the serious manufacturers of high quality cutting tools," says Brian Cluff, vice president of sales & application engineering for Star SU LLC.

The PTG-2 has a direct-drive, double-ended grinding spindle, a proprietary indexing mechanism pivoting the grinding spindle to the desired end, while maintaining the grinding wheel in the normal position of the CNC-controlled "B" axis. The system is designed to minimize the moment of error and overall distance between wheel packs.

"The result is outstanding accuracy and surface finish," Cluff says.

Also, the machine automatically probes all abrasives mounted on either end of the double-end spindle.

The PTG-4 offers a single-end, direct-drive grinding spindle with auto/HSK wheel mounting, a four-position wheel change mechanism to pre-position the selected wheel packages and coolant manifolds. The wheel change system is outside the grinding environment with interlocking operator access. All wheel and coolant exchanges are controlled via NUMROTOplus.

This software includes grinding wheel management, grinding process management for maximum cycle time development before manufacturing, single command tool file conversion from manufacture to recondition and from right hand to left hand, 2-D simulation with zoom and measurement to within 0.0001", the creation and import/export of DXF files, variable helix, and flute form adaptation.

The PTG-2 and NUMROTOplus will be interfaced with a Zoller "genius" inspection unit at IMTS '04. The combination provides complete integration for producing cutting tools, with NUMROTOplus placing the tool and the HSK Schunk "Quick Change" workholding in the "genius" unit, and automatically inspecting and adjusting the selected parameters based on inspection results.

The S130 hobber will also be exhibited. This CNC machine is designed for dry hobbing, uses a high-speed automatic loading device suitable for robotic loading, and has a modular platform that's the same as the S100's.

Star SU LLC (Booth B-6912)  
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**TTB Engineering to Exhibit Micro Tool Grinding**

A Swiss-made micro tool grinder will make its way across the Atlantic Ocean for introduction to American customers.

The CNC micro precision tool grinder comes with either five or six axes. The TGC 5 has a grinding wheel turret arrangement that allows for up to 15 grinding wheels and can grind tools with diameters of 0.0008"-0.551".

Also, NUMROTO and NTI software can handle a wide range of cutting tools, including drills, milling cutters and profile tools, whether cylindrical or tapered with square, corner or full ball nose ends.

TGC is available with either a GE Fanuc or a NUM control and can be configured with auto loading.

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**Andantex Racks & Pinions:  
For Linear Motion**

Andantex USA Inc. will feature high-performance, zero-backlash rack & pinion drive systems for providing linear motion in CNC machine tools.

Andantex is offering modular systems of racks, pinions and reducers, as well as lubrication systems. These building blocks are standardized and allow OEMs to build an axis of various lengths and move a range of weights, from 100-100,000 lbs. with axis drive forces from 5-15,000 lbs.

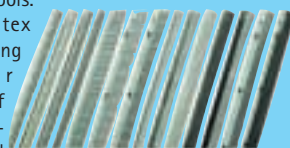
The racks are available in modules from 2-10 in lengths of 500 mm, 1,000 mm and 1,500 mm with spur or helical teeth in standard quality levels up to DIN 6 (~AGMA Q12). These racks can be linked together to form an axis of the required length, with companion racks to ensure proper tooth spacing.

"The modular design of the rack system allows a machine tool builder to design machines in sections," says David Regiec, Andantex's vice president-engineering, "so that they can provide different length axes to meet their customer requirements."

According to Regiec, the standard hardened, ground AGMA Q12 rack has a pitch error of 0.022 mm/300 mm (0.00087 in./ft.), which is equivalent to a precision-ground ball screw.

Because the racks are installed in modular sections, it is now possible to connect sections so the total error over four meters is less than the accumulated error of a 4-meter-long ball screw.

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**All About Honing: Sunnen  
Mandrels, Tools and  
Machines**

Multi-stone superabrasive mandrels for honing pinion gears, diamond-plated helix honing tools for sprockets and gears, and a honing machine for bore sizing and finishing are the new offerings that Sunnen Products Co. will highlight.

The mandrels are for bore sizing and finishing of pinion gears for automotive and industrial transmissions. The Single Stroke® honing tools are for progressive honing. And the honing machine, the VSS-86, features an eight-station rotary table and six-spindles for progressive honing.

Sunnen will also feature two new vertical spindle machines for medium- to high-production bore sizing and finishing of parts with large diameters (up to 200 mm) and small diameters (less than 65 mm). The machines use servo axis control with Windows-based software and a color GE Fanuc touch-screen display for their vertical motion control.

Five other machines for bore sizing and finishing will be displayed: the ML-2000, ML-5000, SV-200, SV-1005, and HTC-2120.

Since IMTS '02, Sunnen has invested in tooling development and manufacturing production of tooling for medium- to high-production honing (bore sizing and finishing) of fuel injectors, hydraulic valves, gears of all types, and other applications.

"The cost to hone, bore size and finish, a workpiece depends on the labor cost and abrasive cost," says Gary Schnitzler, Sunnen's senior product manager-machines. "Sunnen has invested in the tooling and abrasives product development required to optimize the customer's cost per bore."

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**A Linear Guide System, A Cable Carrier: igus' New Products**

igus Inc. will feature two products introduced earlier this year, the DryLin® W and the Triflex® R. The DryLin W is the newest addition to the DryLin group of linear bearings and slides with plastic glide elements. DryLin W is available in multiple rail configurations to provide more design options. It comes as a combination of two supported round shafts in one profile, or in a split rail configuration. And it's well suited for automation, packaging, textile and medical applications.

Triflex R, igus' new robotic cable carrier product line, will be highlighted through demonstration. This cable carrier has 3-D and multi-axis freedom of movement and can twist up to 380° per yard. While it protects moving cables and hoses, Triflex R's tubular design allows it to glide over a robot's exterior without catching or tilting.

Also, Triflex R has a trailer hitch (ball-in-socket) design, providing tensile strength and flexibility without needing steel inserts.

The carrier line is well suited for robotic applications that involve linear and radial movements in a confined space.

"Now customers gain the benefits of a fully protected energy supply system that can twist in any direction," says Farrah Phillipio, igus' public relations representative.

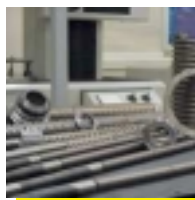
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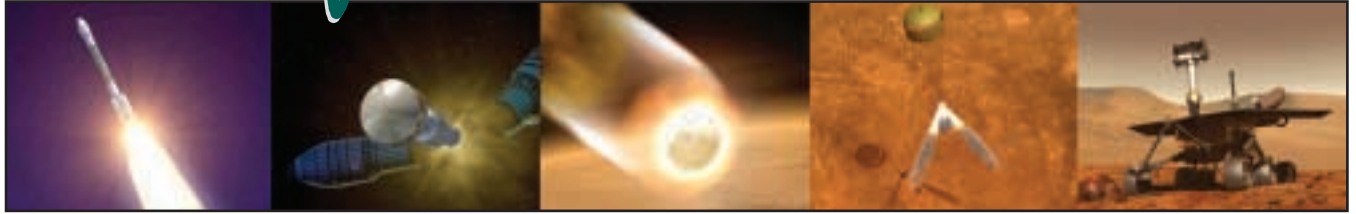
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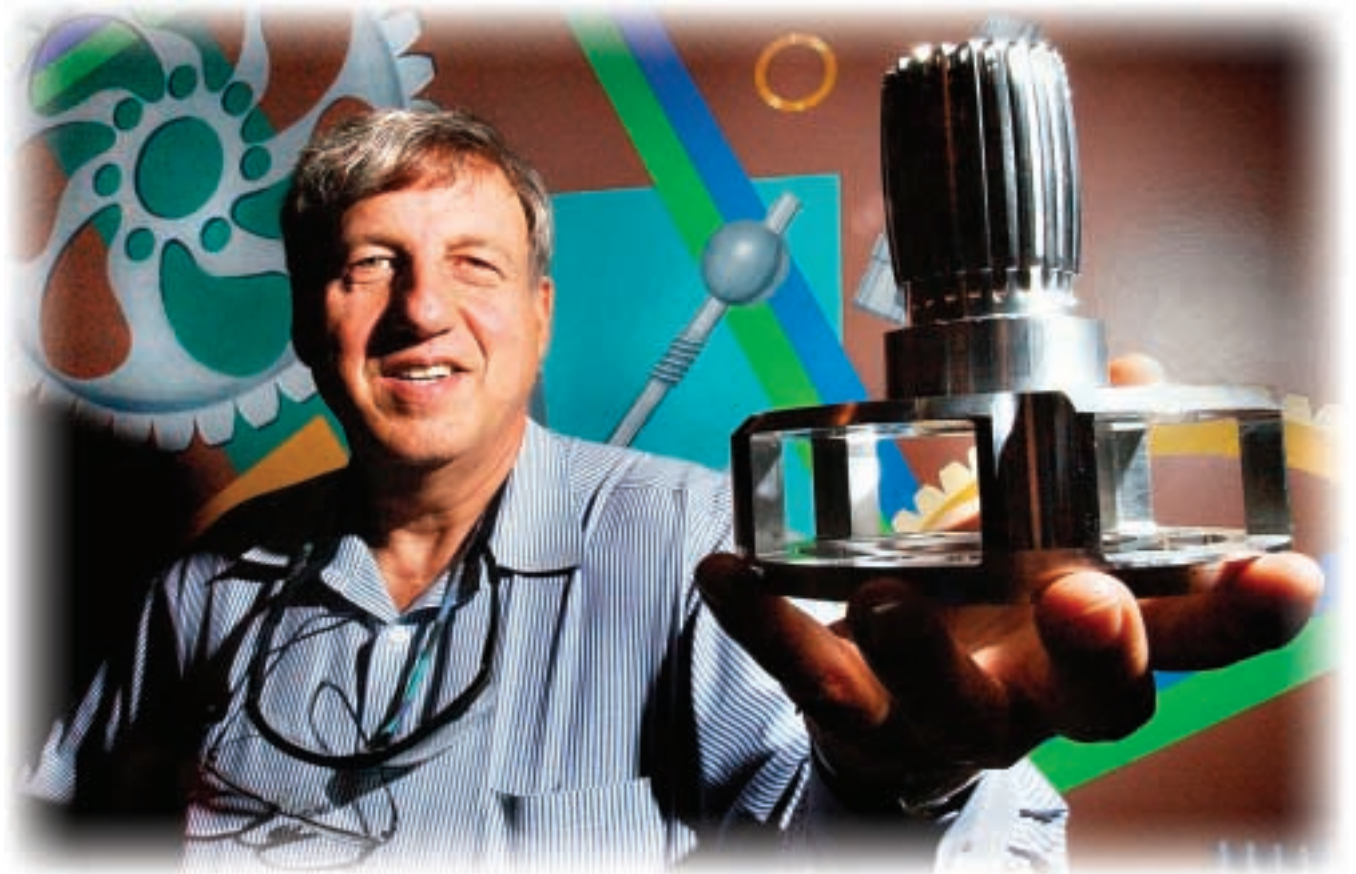


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## Timken Rolls Out New Ceramic Bearings

The Timken Co. will unveil its hybrid ceramic tapered roller bearings for high-speed spindle applications.

The bearings are designed for maximum capacity and stiffness, to allow for higher speeds and lower heat generation than other tapered roller bearings. Also, the bearings include improved wear resistance and lubrication characteristics to extend their service lives.

Timken will also feature Fafnir® THSS super precision angular contact ball bearings, a full range of single- and double-row ball screw bearings, and pre-assembled cartridge units. The contact ball bearings are designed to deliver accuracy and reliability at today's high spindle speeds.

The ball screw bearings include integral, low-torque contact seals to exclude contaminants for reliable operation and extended service life. ABEC9/ISO P2 axial running tolerances reduce runout to deliver accuracy for precise tool positioning and repeatability.

"Timken has improved its friction management technology through advanced materials," says Anthony Romero, Timken's North America marketing manager for applications engineering—super precision. The materials include ceramics for bearing rolling elements, seals for low-torque/high-speed designs, steels, and engineered surfaces that may be applied to steel and other metals to reduce wear and corrosion while reducing friction.

Also, Timken engineers researched the causes of field failures in spindle bearings, learning that hard contamination was the most common cause. So they designed WearEver™ bearings, which resist contamination-induced surface damage. Romero adds that the bearings feature a silicon nitride ceramic ball complement and an advanced new steel that resists wear debris and hard contaminants for extended service life.

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Meccanica Nova's products include internal, external and combined-operation CNC grinding machines, typically used in the automotive, anti-friction bearing, aircraft, aerospace, and general mechanical industries.

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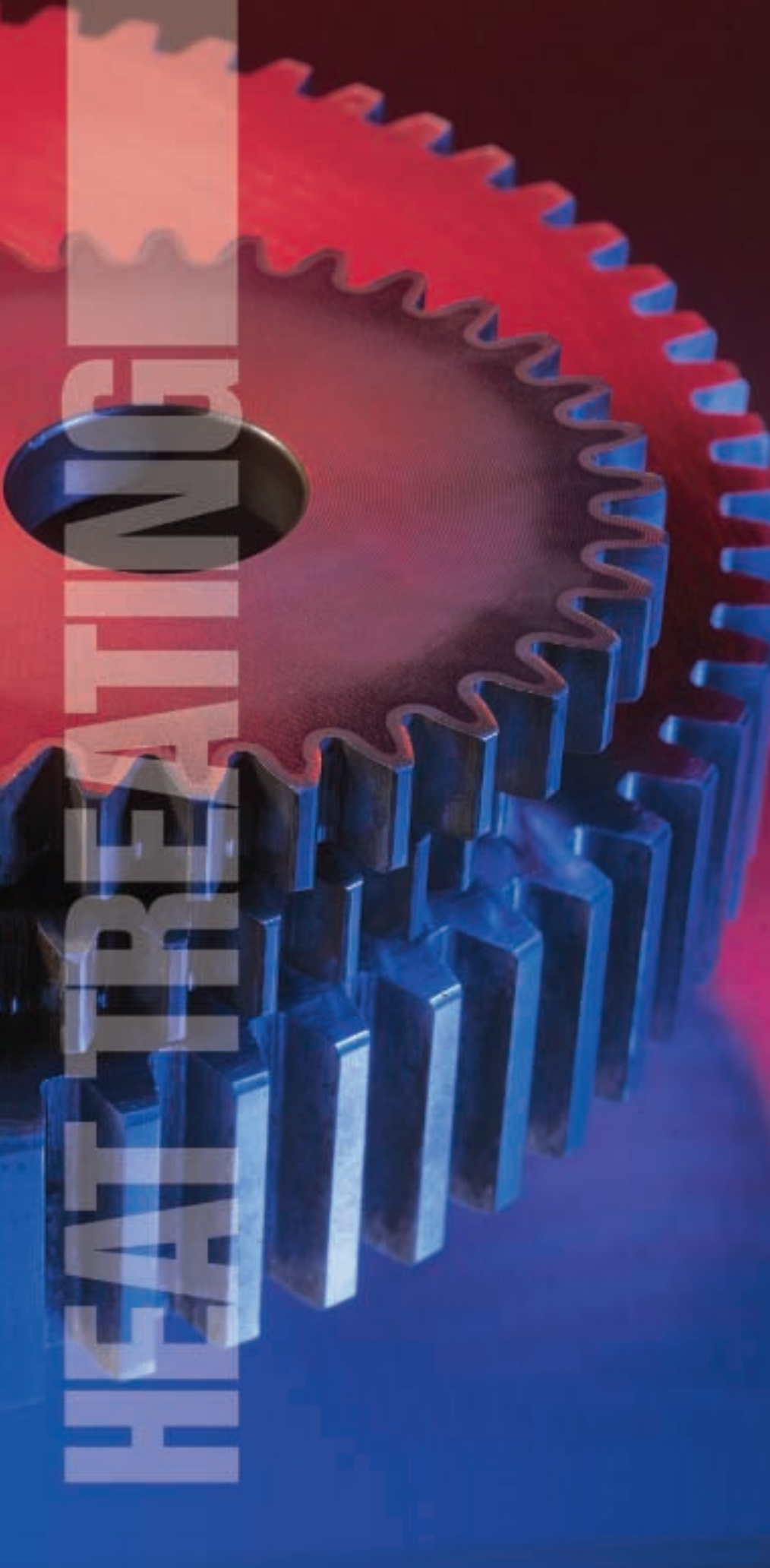
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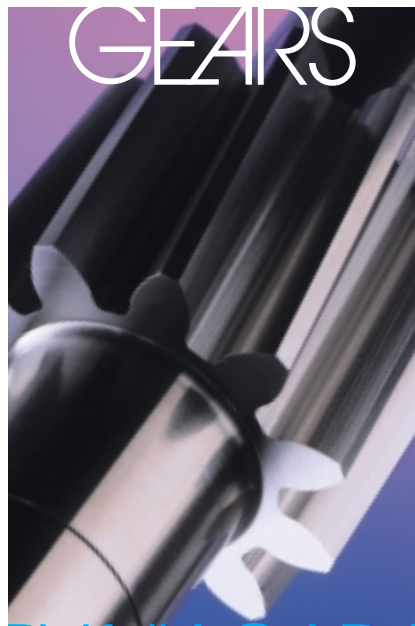
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## IMTS COVERAGE

### Hangsterfer's Offers New Straight Oil

Hangsterfer's Laboratories Inc. will feature its highly advanced straight oil, Hard Cut NG. The oil contains synthetic and vegetable compounds and derivatives combined through infusion, a process that blends and aligns molecular structures. The process allows for a low viscosity without compromise to lubricity or flash point levels.

The company will also emphasize a second new product, SuperAllTap, a heavy-duty compound used for severe thread-cutting and thread-forming operations.

"Due to its ability to emulsify into water, SuperAllTap is excellent for machines using coolants since it will easily wash off into the coolant system," says Tina Seitzinger, Hangsterfer's marketing coordinator.



Hangsterfer's Laboratories Inc.

(Booth E-2047)

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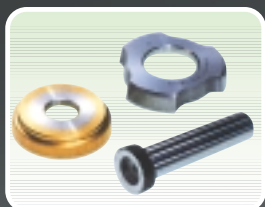
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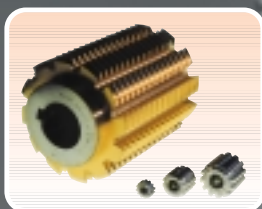
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## SureFire: Bijur's New Lubrication System

Bijur Lubrication Corp. will feature its new SureFire lubrication system, consisting of the SureFire automatic lubricator and the ZEM series positive displacement injectors.

The lubricator can pump oil and soft grease to as many as 100 lubrication points. It's a self-contained, electric-motor-driven gear pump that can adapt to a range of production machinery and is available in three reservoir sizes: 1.8 liters, 2.7 liters and 6.0 liters.

The injectors are pre-fixed volumetric injectors that help ensure each lubrication point receives the right amount of lubricant. Users can choose the number of injector outlets. The four series of injectors are available with 10 output volumes ranging from 0.01 cc to 1.5 cc per lubrication cycle.

Also, the injector's modular design allows for different outputs within a single manifold.

"It will help customers increase their productivity and lower maintenance costs and downtime," says Thomas W. Arndt, Bijur's president and COO about the lubrication system.



Bijur Lubrication Group (Booth D-4148)  
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Morrisville, NC 27560  
Phone: (919) 465-4448  
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Internet: [www.bijur.com](http://www.bijur.com)

## Leistriz to Make Worms by Whirling

Leistriz Corp. will demonstrate the whirling process at IMTS '04 by making a three-start worm used in an automotive steering system.

The company will do this with the PW-90, a CNC whirling machine, which will be integrated with an automatic parts loader.

Whirling is a machining operation in which profiled cutters remove material by passing over a workpiece moving at cutting speeds of 350-650 SFM and advancing so a helical form results.

Whirling removes material like milling, using carbide cutters arranged along a ring's inside to a predetermined cutting circle diameter calculated from worm data.

In this process, worms are machined to their finished tolerances and surface roughnesses, then are induction hardened. According to Leistriz, the worms are produced faster, less expensively, and with fewer handlings.

Also, whirling doesn't require undercuts at the ends of a worm's area, so the worm face width can be optimized and overall shaft length reduced. According to Leistriz, the optimizing and reducing make for a more rigid, compact and stronger design.

The result, says the company, is a speed reducer drive with higher efficiencies, greater power ratings and lower weight.

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# Workholding

## For Hobbing, Grinding: Riten's New Mechanical Face Driver

Riten Industries Inc. will introduce a new mechanical face driver custom designed for gear hobbing and grinding applications.

"This driver gives the user the opportunity to drive the shaft from the face, exposing the entire outside diameter for gear cutting or grinding," says Travis Horton, Riten's national sales manager.

The workholding company will also unveil a new line of actuated face drivers.

"The new Riten actuated face driver has a fixed center point that allows the workpiece to be machined from a fixed datum, while offering drive pins that are actuated by the draw tube of the machine," Horton says.

Riten Industries Inc. (Booth E-2856)  
 1100 Lakeview Avenue  
 Washington Court House, OH 43160  
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## Three Chucks and a Table: LMC Workholding's New Products

LMC Workholding will introduce four new products at IMTS 2004: a three-jaw chuck, a rotary table and two wheel chucks.

The GHA6-8-66 is a big-bore, three-jaw chuck. At eight inches, the high-speed chuck offers a 66 mm thru-hole capacity to allow chucking of larger parts and larger diameter bars. Clamping repeatability of less than 10 microns ensures greater repeatability and improved quality parts, according to Jay Duerr, sales & market manager for Logansport Matsumoto Co.

For two-axis EDM applications, there's the MDET rotary table with a 5.91" diameter table and two-axis control with manual tilting/NC rotary axis operation.

"The MDET rotary table is an affordable answer for two-axis submersible EDM work," Duerr says.

Two new lines of wheel chucks will round out LMC's display: the WTi and WDF series. Model WTiQ-323 is for quick changeover—from one wheel size to the next can take less than five minutes—and it can chuck wheels with 15"–25" diameters at up to 2,800 rpm.

The WDF deflash/degate wheel chuck is suited for pre-machining operations for removing the flash and gating from cast aluminum wheels. The WDF series chucks wheels in diameters from 15"–24" (all on a single chucking).

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# Workholding

## Pratt Burnerd Introduces a New Power Chuck

Pratt Burnerd/Atlas Workholding will introduce a new self-contained pneumatic power chuck best suited for machines that lack hydraulic systems.

The new MK5 model improves on Pratt's previous model with a higher rpm rating and larger thru-holes, says B.J. Lillibridge, vice president of Pratt Burnerd America.

"The MK5 will save you money," he says, "because you won't have to purchase an expensive hydraulic pump, tank and control unit or expensive hydraulic actuator or a custom-made drawtube and hydraulic actuator mounting adapter."

Also, the new chuck is controlled by a push button, which is located on top of the chuck's distributor ring for easy operator access. Foot pedal control is optional. No drawtube or rear-actuating cylinder is needed, allowing full use of the machine's thru-hole.

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## Schunk Presents New Chucks, Toolholder

Schunk Inc. will present a toolholding system with clamping based on the principle of a stiff body as a clamping medium.

"The holders can easily be actuated with a wrench to clamp the tool," says Matthias Koch, Schunk's marketing manager.

Schunk will also present a new lathe chuck, a new generation of its THWplus quick-jaw change chuck, and a new set-up unit for its TRIBOS product line.

The new two-jaw wedge hook chuck, the ROTA 2-B, is designed for normal applications and for stationary applications because of its low height. According to Koch, it also offers a large jaw stroke and high clamping forces.

The THWplus was designed with a larger through hole, improved grease retention and better sealing against particle/coolant intrusion. Other new features include a jaw installation safety system: an internal interlock prevents removal of the chuck wrench unless the quick-change jaw is properly installed. After proper installation, the wrench is automatically ejected from the chuck body.

Also, the chuck's center sleeve is removable from the front and available in many configurations including through hole, closed, adjustable coolant, adjustable stop and part ejector.

The SVP-3 is an automated set-up unit, further facilitating tool change for the TRIBOS system. The complete TRIBOS line has been extended with a variety of CAT tapers. Schunk will present the TRIBOS' new holder size, which allows for clamping of tool diameters as small as 0.3 mm.

Since IMTS '02, Schunk has redesigned its TENDO hydraulic toolholders, which now can clamp many types of tool shanks directly in the hydraulic holder without needing an intermediate sleeve. Also, the TENDO program was expanded with American mounting shanks to meet market demand.

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## SMW to Unveil Two Series of Sealed Chucks

New, sealed-body lathe chucks will be displayed by SMW Autoblok Corp. at IMTS 2004.

The AP and NT series' internal parts are sealed and operate in a grease bath, so clamping force is constant, says Sidney Roth, SMW's president.

"The result," he adds, "is reduced maintenance, less scrap and higher productivity."

The two series are closed center with standard sizes from 6.5"-16" and can accommodate coolant or compressed air through the chuck body. They also have case hardened bodies for rigid, accurate workholding.

The AP series is designed for high-speed turning and is available in inch or metric, serrated or tongue-and-groove jaw configurations. The AP chucks are also available as quick-jaw-change chucks using a newly developed angled t-nut mechanism, suiting them for pick-up machines as well as horizontal or vertical operation.

The NT series is available in the same configurations as the AP but features a centrifugal force compensation when operating at high speeds.

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