

Liebherr

INTRODUCES INTERNAL GEAR TOOTH PROFILE GRINDING TECHNOLOGY

Liebherr offers a new internal gear tooth profile grinding technology, based on its proven OPAL grinding technology, involving a belt drive spindle, which can be fitted to the standard GH 4.0 grinding head as well as to the new GH 5.0 and GH 6.0 grinding heads. Initially, the internal gear grinding arm is available in two different sizes, while others are to follow shortly. Custom internal gear grinding arms can be developed to match customer workpieces.

Gear grinding to Liebherr quality standards is feasible for internal gears, using a range of different grinding arms that each fit the GH 4.0, GH 5.0 and GH 6.0 grinding heads.

Faster switch between external and internal

“Simple changeover between external and internal gears takes a maximum of half an hour,” Dr. Hansjörg Geiser, head of the gear cutting machinery development and design engineering team, explains. “You detach the external gear grinding disk or worm, hang the internal gear grinding arm on the hardened stop bars to ensure repeat accuracy and fix it in place with a handful of screws, then tension the belt-drive disk and the belt and attach the cover.”

Internal gears can then be ground using a grinding disk of 100 or 125 millimeters in diameter — a Liebherr innovation. The external gear grinding head does not have to be touched, and external gear grinding quality is again the same as before once the internal gear grinding arm has been detached.

IG Opal 4.0 is the name of this innovation that functions at a maximum spindle speed of 12,000 rpm. A larger version, the IG Opal 4.1, featuring a maximum grinding disk diameter of 125 millimeters, is also already available. Both arms were successfully tested using CBN and corundum disks. Where dressable grinding disks are used, the internal gear grinding arm travels up to the grinding dresser that is also used for external gear grinding.

One sophisticated customer comes from within the Liebherr Group

All internal gear grinding arms are modelled in 3D and can be used in very confined spaces. “Collision inspections are simple and extremely reliable,” emphasizes Andreas Mehr, who is responsible for grinding and shaping technology development and consultancy at Liebherr-Verzahntechnik GmbH. “Small-diameter internal gear teeth can therefore also be machined quickly and easily.

Liebherr-Aerospace, which uses Liebherr gear cutting machinery to manufacture their own components, is one of three first buyers of this new technology. As in the case of exter-



nal gears, this new internal gear teeth technology works with a multi-rib grinding disk system that can rough- and finish-grinding. That is particularly important to users, who regard speed and costs as important, for instance customers from the aerospace industry. Grinding disks made of dressable corundum or electroplated CBN can be used in conjunction with the spindle. These are also manufactured at Liebherr's plant in Ettlingen (Germany).

For more information:
Liebherr Gear Technology, Inc.
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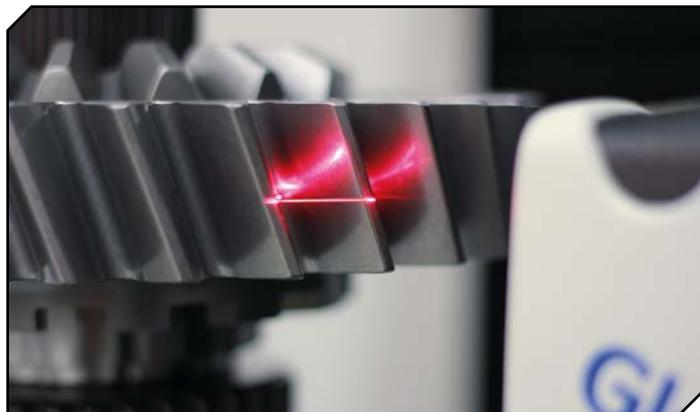
Gleason Corporation's new 300GMSL Multi-Sensor Gear Inspection System had its European première at the Control Show in Stuttgart/Germany May 9-12, 2017.

The versatile platform of Gleason's 300GMSL Inspection System provides the classic tactile probing methods for inspecting conventional gear data on spur and helical cylindrical gears as well as straight, spiral and hypoid bevel gears with a diameter of up to 300 mm. In addition, the new inspection system allows non-contact laser sensor scanning of tooth flanks to support gear development. Complete topography data can be recorded far more rapidly than with conventional tactile probing, with comparable results.

The integration of laser scanning and associated 3D graphics with CAD interface considerably expand both the functionality and the range of applications for this machine platform. The new option makes the 300GMSL the ideal solution for research and development applications for both prototype and production parts or when reverse engineering is required. The 300GMSL Inspection System is also an ideal fit for rapid measurement of topography in regular production operation and satisfies the increasingly stringent requirements on gear inspection. Compliant, soft materials (such as plastic gears, for example) can be inspected without sustaining damage.

Further options such as surface finish measurement or Barkhausen noise analysis to inspect grind burn reduce operating costs, annual maintenance and certification costs and space requirements by offering multiple technologies on a single machine platform.

Another highlight at the Control Show in Stuttgart was the 300GMSP Analytical Gear Inspection System which was designed for use directly in the production environment and which yields reliable measured results in demanding environmental surroundings. To achieve this, the 300GMSP has integrated systems to compensate for temperature fluctuations and to dampen vibration in the production environment. The 300GMSP is especially suitable for applications in the aerospace and automotive industries, but of course also well suited for the inspection of high-quality gears in other sectors of industry.



The Closed-Loop Function, available for many years in bevel gear production and developed by Gleason for cylindrical gears in 2015 for direct transmission of measured data to the production machine, is part of the standard repertoire of the GMS series of machines from Gleason Metrology Systems.

The inspection systems presented was accompanied by high-precision workholding solutions for metrology applications to boost measuring efficiency to the next level.

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Klingelberg

EXHIBITS CLOSED LOOP SYSTEM AT CHINA INTERNATIONAL MACHINE TOOL SHOW

At the China International Machine Tool Show (CIMT) in April, Klingelberg unveiled a range of new products — including the closed loop concept for cylindrical gears. The innovative concept was demonstrated on the Viper 500 cylindrical gear grinding machine in combination with the P 26 precision measuring center.

CIMT is one of the world's largest trade shows for machine tools and a meeting place for machine manufacturing companies from around the globe. The show took place in Beijing April 17–22, 2017. Klingelberg is reaffirming its role as a systems supplier with a broad product portfolio, which it highlighted at the show. But the main focus of this year's exhibit was the closed loop system, which is now capable of networking a cylindrical gear machine directly with a measuring device. With the closed loop concept, Klingelberg presented its Chinese customers an innovative solution for a fully-automated quality loop in cylindrical gear manufacturing.



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Focus on digitization in production

Until now, the technology of the closed loop concept with networking of machine tools and measuring machines was reserved for bevel gear machines. Klingelberg unveiled the transfer of automated machine correction to cylindrical gears for the first time in Asia at CIMT. The technology doesn't just create a network of in-house machinery alone. Rather than developing a self-contained solution, the company has set its sights on compatibility. The closed loop for

cylindrical gears is based on a universal XML-file. The description is freely available.

Klingelberg has established an integrative cyber-physical system in its own bevel gear manufacturing side, which fully links design processes to production processes. For this system the company received the Industry 4.0 Award in the "Integration Design & Production" category late last year.

Viper 500 cylindrical gear grinding machine

The new closed loop concept for cylindrical gears can be implemented with the Viper 500 cylindrical gear grinding machine, among others, which Klingelberg demonstrated live at CIMT.

The Viper 500 delivers cutting-edge technology for a fast, efficient production process. It is designed for component diameters up to 500 mm, and specifically for small to medium-sized batches, and is available in three different configurations: profile grinding, small grinding wheels for special jobs and multi-grinding wheel technology (K), as well as generation grinding (W). The Viper 500 W configuration allows both profile grinding and continuous generation grinding on the same machine — with minimal retooling time.

P 26 precision measuring center

Klingelberg consistently strives to develop innovations and solutions to enhance productivity — and sets the same standard for measuring technology, focusing on shop floor deployment of measuring centers in addition to integration into the closed loop concept. Thus the P 26 precision measuring center provides improved conditions for direct use on the production line — and can be networked into the closed loop system.

The fully automatic CNC-controlled precision measuring center is designed as a compact unit for the workpiece diameter range up to 260 mm. The machine can be used for a host of measurement tasks: inspection of cylindrical gears, pinion type cutters, and shaving cutters; worms and worm wheels; hobs and bevel gears; general dimension, shape, and positional deviations of axially symmetrical workpieces; measurement of cams and camshafts; and measurement of rotors.

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Mahr Federal

ADDS DYNAMIC MEASUREMENT AND OTHER FEATURES TO MILLIMAR C1200 DIGITAL IC AMPLIFIER

Several new features have been added to Mahr Federal's Millimar C1200 Digital IC amplifier, increasing its application range and user security. The new functions include dynamic measurement capability, enhanced display tolerance viewing, and password protection for the setup menu. The Millimar C1200 Digital IC amplifier is a low cost, easy to view and use readout. It is designed to replace analog meters, as it offers analog-like display performance with very fast response technology. The high-resolution display provides clear digital and analog readings with selectable resolutions/scales.

The dynamic measurement capability added to the C1200 allows users to capture max, min, or max-min (TIR) values. During measurement, the digital value is held while the analog position is marked by blue lines on the scale.

The second new feature allows asymmetric tolerance markers to be displayed on the scale. The display can be set to center on the tolerances rather than the nominal size.

Finally, security is enhanced with password protection for the setup menu, which can now be locked and accessed using a 4-digit PIN number. When enabled, a prompt appears when accessing the setup menu. Arrow keys are used to enter the password.

Operating features for the Millimar C1200 Digital amplifier are set up using the five-button keypad and visual menu options. In addition to the new features, the C1200 comes with these standard features: Unit selection (in/mm/ μm); Normal/Reverse polarity; Measuring range; Preset; Factor; Tolerance entry. When tolerances are used the display shows pass/fail status using green/red color on the backlit display. Data output is available using MarConnect cables

for Digimatic, Opto-RS 232, or USB interface. Output type is auto-sensed by the cable connected to it. External wireless may also be used.

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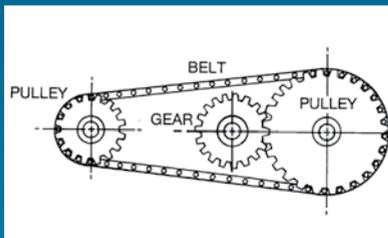
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well as collet pads, and more. Full grip “pie” jaws from 6 to 24-inches in diameter, as well extra high jaws to 10-inches in height for longer service life. The company also exhibited collet pads and collet pad jaws, monoblock jaws, and vise jaws. Dillon featured special soft

ishing across virtually all industrial markets. All Dillon jaws and related products are made in the United States.

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Mitutoyo

RELEASES INSPECTION INSTRUMENT FOR INDICATORS

Mitutoyo America Corporation recently announced the release of the i-Checker, an inspection instrument specially designed to calibrate a variety of indicators, including bore gages, Digimatic indicators, dial indicators, dial test indicators and linear gages. The latest iteration of the i-Checker is at least 2× more accurate than the previous model, achieving the highest accuracy level in its class of $(0.1+0.4L/100)\mu\text{m}$. At 10 mm/s, speed also is improved 2.5× vs. the current model. All functions necessary for inspection are combined in the control box, reducing operator fatigue. Adjustment of the measurement position is easily accomplished due to semi- and fully automatic measurement functions, thereby dramatically reducing inspection time. Digital indicators equipped with a data output function are efficiently checked due to spindle positioning at the inspection points and measurement results are fully automatic. Operators can create and print simplified inspection certificates. Hardware setup is simple and straightforward—simply plug in a USB cable. The updated i-Pak software includes the most recent standards for ASME, ISO, and JIS. Previous models can be upgraded with new software and controller.



For more information:

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www.mitutoyo.com

Lucifer Furnace

MODEL 42GT-H12 OVEN INSTALLED AT R. HUETER

R. Hueter Co, a northeast CNC machine shop specializing in male and female RF connector contact production has added a Lucifer Furnaces' heat treating oven to meet their growing heat treating needs.

Adam Hueter, operations manager, chose Lucifer Furnaces because of their reputation for delivering high quality products at an affordable price. Model 42GT-H12 was customized as a bench top unit. With a chamber size of 9-inches x 12-inches x 12-inches, this oven is insulated with 5 inches of both insulating firebrick and mineral wool backup. 4kW power allows fast heat up to 1200 degrees Fahrenheit.

GT ovens, built for operation using inert atmosphere, are crafted with a continuously welded outer steel shell and gasketed roof plate. A strong seal on the double pivot door is achieved with a square gasket around the door perimeter to form a tight seal to the oven faceplate. Swing bolts with T handles make clamping easy.

The stainless-steel liner baffles the work chamber from the side wall heating elements and directs the air flow horizontally through the chamber for uniform heating. Hueter chose a Honeywell DC2500 temperature controller with a soak timer to shut off heating elements at the end of a programmed cycle in addition to a flowmeter mounted and piped to the oven for easy connection their atmosphere supply. Hueter plans to use the furnace primarily around 600 degrees Fahrenheit for 2-hour cycles to achieve a specific Rockwell hardness with small lots of Becu pins under a nitrogen atmosphere to reduce surface oxidation in order to achieve a scale free, bright finish. After installation, Hueter notes: "Right now the oven is running like a dream! I am completely satisfied with my Lucifer Oven and your team has given me great support along the way."

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