

David Brown Girth Gear

SETS SIZE RECORD

David Brown delivered a girth gear weighing more than 65,000 kilograms to FL Smidth Minerals for a mining operation in Zangezour, Armenia. The original order was delivered in early 2008, and the company is currently working on a second girth gear order for 2009.

The single helical SAG mill girth gear, which is cast in four pieces, has 362 teeth, 0.75 DP, 863.6 mm face width, 12.4 m outside diameter and a 10.5 m diameter bore. It's manufactured from steel with a hardness range of 269/321 BHN, and gear teeth cut to AGMA grade 10.

David Brown also supplied three mill pinions to suit the girth gear, each having 18 teeth, 3,810 mm overall length, and weighing 5,090 kilograms, according to the company's press release. The company was able to meet the demands of its client due to a partnership with casting specialist Scaw Metals and an investment in a 14 m Maag gear cutting machine. The casting specifications were developed jointly by Scaw and David Brown during the past 15 years.

Besides the obvious engineering challenges of a gear this size, one of the major difficulties was the location



David Brown engineers inspect the 12.4 m diameter girth gear under construction at the Benoni plant in South Africa.

where the equipment was installed. Armenia is the smallest of the former Soviet republics and is landlocked by Georgia in the north, Azerbaijan in the east, Iran to the south and Turkey to the west. The operation extended over a year and a half as the company dealt with the logistics of shipping and the breakdown of the girth gear into four separate parts.

"The SAG mill is 34 ft. in diameter, dual pinion with 12,000 hp," says Neal Biege Sr., head of global marketing for FL Smidth. "The ball mill is 20 ft. in diameter with 8,580 hp. The gears should be operational by mid 2009."

With investments in machining and gear-cutting technology, along with development of new materials

used in the manufacturing process, David Brown has seen a reduction in lead times and the ability to achieve standards of accuracy to AGMA Level 13 and beyond.

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WITH LEITZ PMM-G

Hexagon Metrology of Wetzlar, Germany has introduced two new models of the Leitz PMM-G, a gantry-type CMM designed for precise inspection of large gears, gearbox housings and other components.

The new models come with shorter z-axis travels (1,200 mm and 1,600

mm) and are aimed specifically at gear manufacturers who may not need the additional height required to inspect housings or other components. The original models were introduced in 2006 with z-axis travels of 2,000, 2,500 and 3,000 mm.

"We have just introduced the new

series with short z-rams, especially for the gear business,” says Juergen Roos, Asia-Pacific regional manager and Leitz technical specialist. “And we are going to introduce them aggressively in the gear industry.”

In addition to the new z-axis options, the PMM-G is available in three

different diameter ranges. Machines are available for measuring gears up to 2,950 mm (116"), 3,950 mm (155") and 4,450 mm (177").

The PMM-G machines do not employ a rotary table, as traditional dedicated gear inspection systems do. This is especially an advantage when it

comes to measuring larger gears, Roos says.

For one thing, because there is no rotary table, there is no weight restriction on the part being measured. In addition, the weight of the part has no effect on the accuracy of the measurement results.

“Also, the setup of the gear is very simple,” Roos adds. “It can be placed anywhere in the measuring volume. An alignment or centering is not required. Because of this method, Leitz machines can measure gears on pallets.”

According to Roos, the measuring speed for smaller gears is comparable to that of a dedicated gear tester, but the larger the gear, the greater the speed advantage of the PMM-G. “For large and heavy gears, the Leitz machines are faster,” he says.

Another potential big gear advantage is that gears manufactured in segments can also be inspected. After measuring the individual segments, the software can even put them together and evaluate pitch and runout of the gear.

Finally, the PMM-G is capable of inspecting multiple gears and splines on shafts up to 7 meters long.

Leitz machines use *QUINDOS* software. The software was originally introduced for gear inspection in 1986, and inspection modules are available

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for cylindrical gears, straight bevel gears, spiral bevel gears, worms, worm wheels and cutting tools, including hobs, shaving cutters, shaper cutters and broaches. In 2008, Leitz added a module for inspecting curvic couplings, as well.

Evaluations can be performed according to most common gear inspection standards, including AGMA, ANSI, ISO, DIN, JIS, CNOMO and CAT.

The larger the diameter of the gear, the better the price of a Leitz gear inspection systems compares with traditional dedicated gear checkers, Roos says. For small gears, up to 400 mm diameter, dedicated gear testers are less expensive. For medium-sized gears, the prices are comparable between dedicated gear checkers and the Leitz systems. But for gears larger than one meter, the price advantage swings toward the Leitz systems, Roos says.

So far, Leitz has sold about a dozen of these large-size gear inspection machines, including a number to wind turbine gearbox manufacturers in Europe and China.

“We see an ongoing high demand from the world’s leading producers of big gears, in particular from the fast growing wind power industry,” says Sebastian Henry, Leitz product manager. “It proves that we were right with both our machine concept and the...high quality standards we have set with the PMM-G.”

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a stock dividing sensor integrated into the grinding head speeds up setup time.

The 160TWG features several dressing systems to maximize dressing speed or flexibility depending on user preferences. A diamond-plated master dressing system incorporated into the clamping fixture is utilized for high

volumes at high productivity; it can dress multi-start grinding wheels in 10–20 percent less time than traditional dressers. A CNC dressing unit with a single-flank dressing tool focuses on flexibility by creating any profile adjustment. A conventional CNC dressing unit with a double-flank



dressing tool is capable of dressing both flanks concurrently.

Other features include an anti-twist capability to help control flank twist, and Gleason's VRM grinding process makes delicate kinematic modifications in the grinding process to make quieter gears.

As one of Gleason's Genesis machines, the 160TWG has a single-piece frame cast from a polymer material used for accuracy and rigidity. The platform allows for a compact footprint and requires no special lifting equipment or foundations to move the machine.

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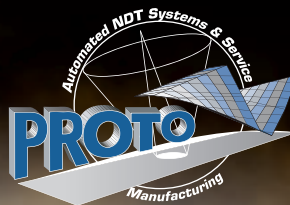
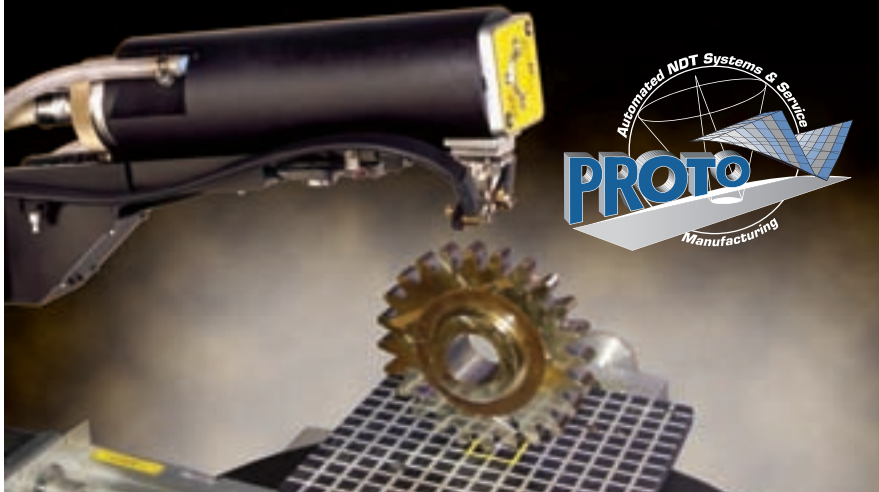
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Distributed by the Richard Alan Group, Pumps and Gearboxes Limited,

the Yilmaz monoblock M series gearboxes are in-line units displaying high strength and designed for flange or shaft mounting in demanding applications, such as quarrying, mining, mixing, crushing, winding and materials handling. A European footprint enables them to be interchanged with most makes on the market.

“The engineering expertise within the Richard Alan Group means that we are the only Yilmaz distributor in Europe authorized to stock gearboxes in component form,” says Steve Gill of Pumps and Gearboxes. “This provides great flexibility and security for the user, as it enables us to assemble gearboxes to exact customer specifications at very short notice.”

The M series units are capable of single, two or three stages in one housing, so they have a high power rating, with nominal torques up to 8,547 Nm, which is produced from the smallest product envelope. The gearbox’s efficiency is not compromised by the power density. Several cooling options support the units including heat exchangers, cooling coils, fan cooling and forced lubrication systems.

As monoblock units, the Yilmaz M series gearboxes are built from one-piece housings for rigidity, gear strength, operating noise levels and oil integrity. The gearbox bearings are not supported by cover plates but by the housing. Each axis is machined at the same mounting plate for precision and tight tolerances. The M series’ design

offers higher bearing and gear life.

Options for the Yilmaz M series gearboxes include ATEX specification, extended and hollow shafts, cooling and lubrication systems, synthetic lubricants, shrink disks, brakes, variable speed drives and IEC frame custom motors, according to the company’s press release.

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A right-angle AC gearmotor in six standard models is the latest product released in the Von Weise Drop-In Replacement gearmotor line from Bison Gear and Engineering Corp. The gearmotors have 1/12 hp or 62 watts dual voltage, dual frequency and single-phase permanent split capacitor electric motors.

The integral gear reducers use hardened steel worm gearing and cast iron output gears with ratios from 37:1 to 1,205:1. Fixed output speeds are from 40 to 1.5 rpm with continuous torque rating from 89 to 250 in-lbs. They are available with left, right or dual output shafts; they are reversible and have all-position foot mounting with overhung load capability of 100 lbs.

The VWDIR33 AC right-angle gearmotors are designed for commercial and industrial applications from food service equipment to welding positioners. UL and CSA recognition are standard.

“This is the 10th new Von Weise Drop-In Replacement Gearmotor we have introduced in the past three months, and there are more to come,” says John Morehead, vice president, strategic planning and marketing for Bison Gear. “We’re finding that OEM customers for these products are particularly interested in shortening their supply chain with dependable deliveries of a quality product. We’re able to meet those requirements by manufacturing

these gearmotors here in our St. Charles, Illinois facility to Bison's high quality standards to ensure reliable, long-life operation."

Bison also recently introduced the 107 series Verdant Duty gearmotors in response to customer demand for improved efficiency in equipment using fractional horsepower electric motors. They come in five standard, off-the-shelf models rated at 1.20 hp (37.3 watt) at 230 volt and 60 Hz. The three-phase gearmotors operate between 6 and 90 Hz, supplying a 15:1 range of adjustable output speeds in maintenance-free applications.

The Verdant Duty gearmotors have enclosed, non-ventilated AC motors built with insulation systems that guarantee long life if driven by compact, economic frequency inverters that convert conventional AC single-phase to three-phase power. They use integral gear reducers with gear ratios from 6.7:1 to 95.5:1 to provide output speeds from 368 to 1.7 rpm and output torques up to 100 in-lbs. They are RoHS compliant, UL, cRUus and CE certified, and Bison can customize models to meet individual OEM requirements.

"Our customers require more efficient products, and being able to utilize three-phase over single-phase fractional horsepower gearmotors provides an immediate payback in reduced energy consumption with improved efficiency," says Matt Hanson, VP, portfolio management for Bison. "These new

Verdant Duty products are a wise choice for variable speed applications, such as packaging equipment, machine drives and conveyors."

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and longer tool life, according to the company's press release. Fret corrosion is also avoided by the tool holder's ability to keep vibration to a minimum; it reduces cutter deflection, and no axial movement occurs under high-speed operation.

The ER16 and ER32 collet chucks come in BIG-PLUS CAT40 and 50 tapers, and they can supply coolant through either the spindle itself or the spindle flange. The ER16 is available in gauge lengths of 2.5, 4 and 6 inches for 40 taper as well as 3.5, 5 and 6 inch gauge lengths for 50 tapers. The ER32 chuck comes in 3, 4 and 6 inch gauge lengths for 40 taper and 3.5, 5 and 6 inch lengths for 50 tapers.

The ER series chucks come with the tool body and collet nut, and they can accept ER collets or sealed nuts from any manufacturer.

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