

## Effortlessly Moving a 88,000 Pound Machine Table



■ Gleason-Pfauter of Ludwigsburg, Germany built the world's largest machine for gear grinding. One of the engineering highlights of this machine is the use of a hydrostatic bearing system for the rotating table. This table design makes it possible to very accurately machine gears up to 40 metric tons in weight.

The new machine can grind hardened gears with a diameter of 3 meters, a width of 2 meters, and a weight of 40,000 kg with a guaranteed accuracy of 4 per DIN Specification 3962. The maximum profile depth is 100 mm. The grinding wheel is powered by a 50 kW / 75 hp drive motor. The machine is designed to manufacture precise gears for steel mills and other large-gear applications.

The high table load and machining forces are not a problem for the hydrostatic bearings.

Dampening of the hydrostatic system is 10 to 100 times better than with roller

bearings, resulting in better surface quality of the gear. The round table floats — independent of speed — on a number of 20 micron hydrostatic bearing pockets. The end result is a totally wear-resistant system with very high stiffness. The accuracy of the machine can be expected to be unchanged over many years of operation since no wear takes place. With the use of a HYPROSTATIK PM controller system for the oil flow, the hydrostatic pockets are so stiff that a 40 ton gear load will change the bearing gap by only a few microns. The mechanical PM flow controller employs a unique and patented design and is manufactured by HYPROSTATIK of Goeppingen, Germany.

The achievable roundness accuracy of the rotating table is much better than that of tables with comparable roller type bearings. At low RPM, friction is virtually nonexistent. In fact, friction is so low that one person can easily move the table with a 40 ton workpiece

**The world's largest gear and profile grinding machines use hydrostatic bearings.**

on it by hand. This low friction allows the table to be positioned second-angle movements without backlash or high initial friction. Such slow and accurate positioning is only possible because of the hydrostatic bearing.

The typical oscillating motions used during gear grinding cause wear when using ballscrews. This results in loss of accuracy and can lead to failures over time. When using hydrostatic guide ways and hydrostatic lead screws, oscillating machine motion does not cause wear or loss of accuracy.

In addition, to further reduce friction and wear, hydrostatic bearings from HYPROSTATIK are installed on the table drive worm gear spindle and on the ways for the machine column.

The engineering calculations required for implementing the hydrostatic system were made by HYPROSTATIK. Since the hydrostatic pockets are machined directly into the frame of the machine and the table sits directly on the frame, there is no need for additional components between the table and machine frame. Hydrostatic bearings not only improve the machine's accuracy but also reduce the cost!

Hydrostatic systems that improve machine accuracy can also be used on machining centers, grinding machines, lathes, and spindles for rotating tables, guide ways, bearings, and threaded spindles. For more information, contact Transatlantic Connection, Inc. — US Representative for Hyprostatik.