

High-pressure bearing



THE DP4 BEARINGS FROM GGB ARE LESS EXPENSIVE THAN NEEDLE BEARINGS, WITH HALF THE AXIAL LENGTH



The Bosch Group of Europe produces handbrakes for Citroën, Fiat, Ford, Jaguar, Peugeot and other major automobile manufacturers. Until recently the company used needle bearings to minimize friction in these systems, which combine mechanical and hydraulic functions to apply braking force when an automobile is parked.

Torque, generated by depressing a floor-mounted pedal or pulling a lever, is converted into a clamping action by a shaft immersed in brake fluid that rotates three balls into a wedge-like mechanism. The bearings must withstand forces of up to 15,000N and reduce friction created by the relative movement of the shaft, which does not exceed 30° of rotation for durations of one second or less.

The Bosch Brake Division benchmarked the performance of these bearings and evaluated a number of alternative options, settling on lead-free, high-pressure

plain bearings to replace needle bearings. Manufactured by GGB – formerly Glacier Garlock Bearings, Heilbronn, Germany – the DP4™ bearings are designed to withstand high loads and provide superior friction and wear performance in lubricated applications.

Rare earth fibers in the bearings' internal coating enable them to stand loads of up to 250MPa. In addition the bearings exhibit excellent resistance to flow and cavitation erosion, making them suitable for start/stop applications like the Bosch handbrake systems. Their structure consists of a rigid steel backing, to which is bonded a porous bronze sinter interlayer, impregnated and overlaid with a filled PTFE bearing layer.

"The compactness and cost of DP4 bearings more than offset a slight reduction in friction performance compared with needle bearings," explains Francesco Onorato, component engineer

for the Bosch Brake Division in Bari, Italy. "At 1mm the axial length of the DP4 bearings is half that of the needle bearings, and the cost is much less. And with a friction coefficient of 0.03 compared with 0.02 for the needle bearings, the loss was negligible."

The primary criterion in specifying the bearings was long-term performance under heavy loads. Bosch tested the DP4 bearings for 100,000 cycles to ensure they would provide the required longevity of service. As a result, they were validated as a standard component for all handbrake systems produced throughout Europe.

"We have a very high degree of confidence in these bearings," concludes Onorato.



MORE DETAILS NEEDED?

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