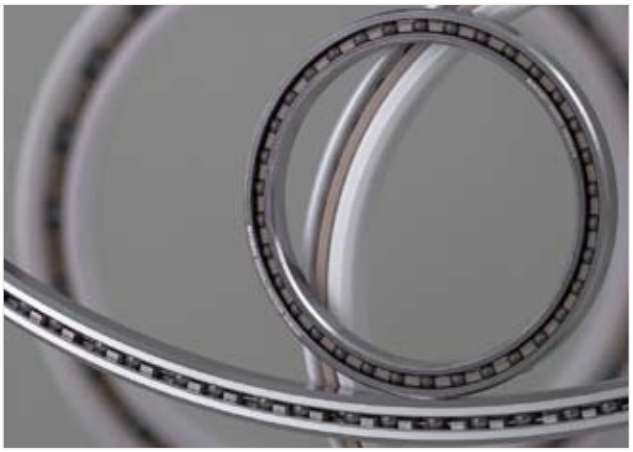
CEROBEAR®
ceramic bearing technology
— MinebeaMitsumi Group —

Semiconductor Industry

Rolling Bearing Solutions for
Semiconductor Applications

At first sight, sufficient bearing life does seem to be less of an issue in the Semiconductor Industry. The handled weights are typically low and so are the resulting bearing loads. However, harsh operating conditions, such as extreme temperatures, ultrahigh vacuum, or corrosive environment constitute the actual challenges. Whenever conventional steel bearings reach their operational limits, CEROBEAR's sophisticated bearing solutions offer a new level of performance.

Because in more than 25 years of providing custom engineered rolling bearings to leading OEMs of the Semiconductor Industry, for lithography, coating, tempering, or cleaning processes, CEROBEAR has created an unique portfolio of bearing materials. It comprises extremely corrosion and heat resistant, hardened steels (High-Nitrogen Steels, Powder Metallurgical Steels) for the bearing races and advanced engineering ceramics (Si_3N_4, Y-TZP zirconia, SiC) which can be either used for the races or for the rolling elements. For the retainers a wide variety of high-performance polymers (PEEK, PI, PAI, PCTFE, PTFE grades) is available.



CEROBEAR hybrid thin section bearings

These materials form the ideal base for application optimized bearing solutions. Over the years CEROBEAR has gained the ability to perfectly transfer material properties into superior bearing performance. No wonder then that CEROBEAR hybrid and all-ceramic bearings outperform conventional bearings made from SAE 52100 chrome steel or 440C stainless steel by far and achieve life times which are up to 100 times higher than the ones of standard bearings.

CEROBEAR's product portfolio comprises extremely corrosion resistant bearings for the use in aggressive process gases or fluids. Even selenium or fluorine atmosphere cannot harm these bearings. Catalogue load figures do no longer apply at media lubrication or dry-run, but CEROBEAR bearing engineers provide free of charge engineering consultancy to help customers make the right bearing choice even under these operating conditions.

CEROBEAR hybrid bearing with integrated design features

The requirement of clean room equipment, to emit particles as low as possible, can be best fulfilled by using the hardest and most contact fatigue resistant materials, which wear out extremely little, even when running dry. Powder Metallurgical Steels which feature a hardness of up to 69 HRC and silicon nitride (Si_3N_4) which features 80 HRC, are the materials of choice. CEROBEAR does also offer special greases which do not evaporate in ultrahigh vacuum and therefore provide clean room capability. CEROBEAR bearings which are meant for the use in clean room operations, are assembled, cleaned, sealed, and packaged in a clean room themselves. For the end user this results in reproducible high quality and reduced effort during system builds.

CEROBEAR bearing solutions for the Semiconductor Industry can feature integrated design elements, like flanges, threads or splines to ease the integration into existing systems. They can be sourced as ball and roller bearings, even thin section bearings are available.

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