

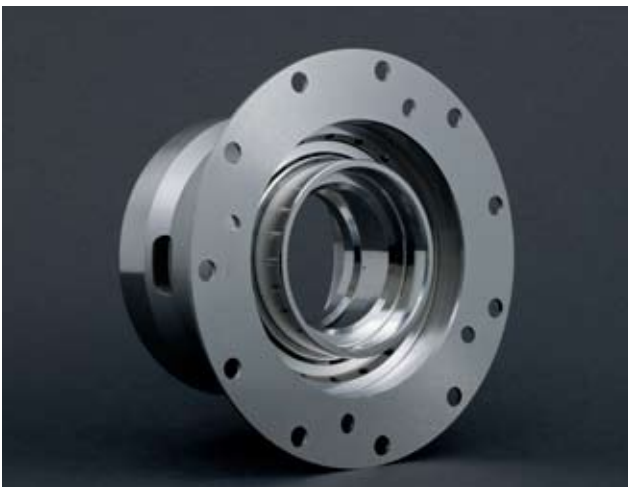
TURBOMACHINERY

Advanced Rolling Bearing Solutions for

Aeroderivative Gas Turbines

Rolling bearings for Aeroderivative Gas Turbines, whether for the compressor or for the turbine shaft, have to perform absolutely reliable. As the loads on these bearings are, by design, fairly low the goal seems easy to achieve. But there are challenges to the bearings beyond fatigue. Particle induced surface defects, caused by polluted air, and lubrication issues, deriving from modern fuels like LNG and LH₂, have to be overcome. CEROBEAR's advanced hybrid rolling bearings provide a superior alternative to traditional bearing technology.

CEROBEAR rolling bearing solutions for gas turbines are available as three-point or four-point contact designs for the fixed bearings and as cylindrical roller bearings for the floating bearings. The product range comprises sizes up to 520 mm OD and includes all-steel bearing types as well as hybrid ceramic bearings.



CEROBEAR hybrid cylindrical roller bearing with flange

For the bearing rings, the portfolio of classic turbine bearing steels like M50, M50 NiL, or M50 nitrided is completed by modern Cronidur 30, a corrosion resistant, martensitic High-Nitrogen Steel, featuring a very low content of carbides and thus providing very good contact fatigue resistance in a corrosive environment, as well as by advanced Powder Metallurgical Steel grades (PM-Steel), the latter providing a hardness of up to 69 HRC and an absolutely fine and isotropic structure, which leads to an unrivaled contact fatigue resistance and wear behavior.

For the rolling elements the engineering ceramic silicon nitride (Si₃N₄) is the preferred material choice, as it combines

inertness with an extreme hardness of 1550 HV (~ 80 HRC), and therefore provides the best resistance against particle contamination or compromised lubrication. However, the classic specs like M50 and M50 nitrided are also available.

CEROBEAR offers built-to-print or fully self-developed bearing solutions.

As CEROBEAR produces the Si₃N₄ ceramic rollers inhouse, there are literally no limits in terms of available dimensions and shapes. CEROBEAR will manufacture every needed ratio of diameter and length. And even the crown drop of the rollers can be chosen customized, to better cope with potential shaft bending or misalignment of the bearing seats.

The bearing retainers are made from AISI 4340 steel. Silver coatings in various specifications, with or without NADCAP certification, are part of CEROBEAR's offering.

CEROBEAR's gas turbine bearings can feature all types of anti-rotation devices, like flanges, collars, splines, notches or grooves. The bearing races can be equipped with oil feeds through the inner and the outer ring and they can incorporate design elements for speed or temperature sensing.



CEROBEAR hybrid three-point contact bearing with split inner ring

CEROBEAR offers build-to-print manufacturing service as well as co-engineered and self-developed bearing solutions, and provides all related engineering services including bearing life calculation as well as bearing stiffness or friction. CEROBEAR bearing engineers work with the customers to help integrate the bearings to the mating structure the best way possible.