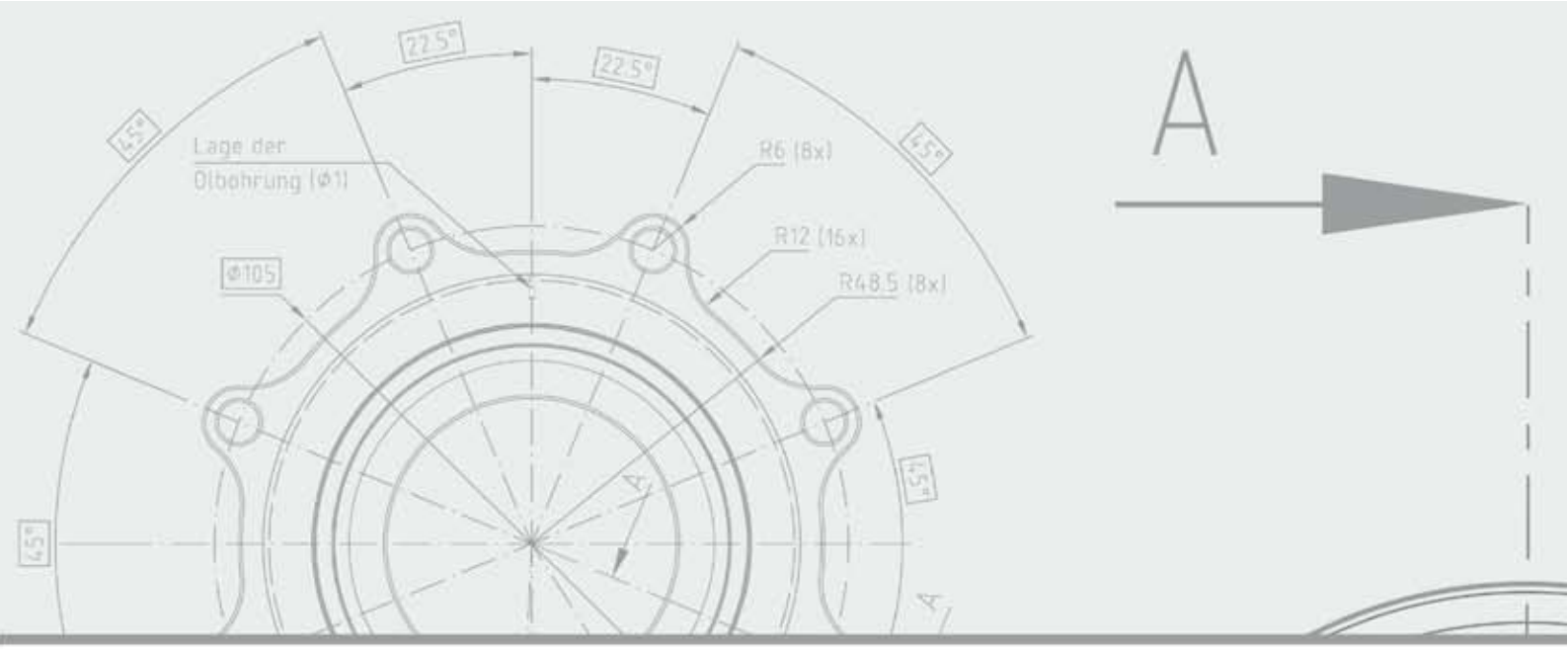
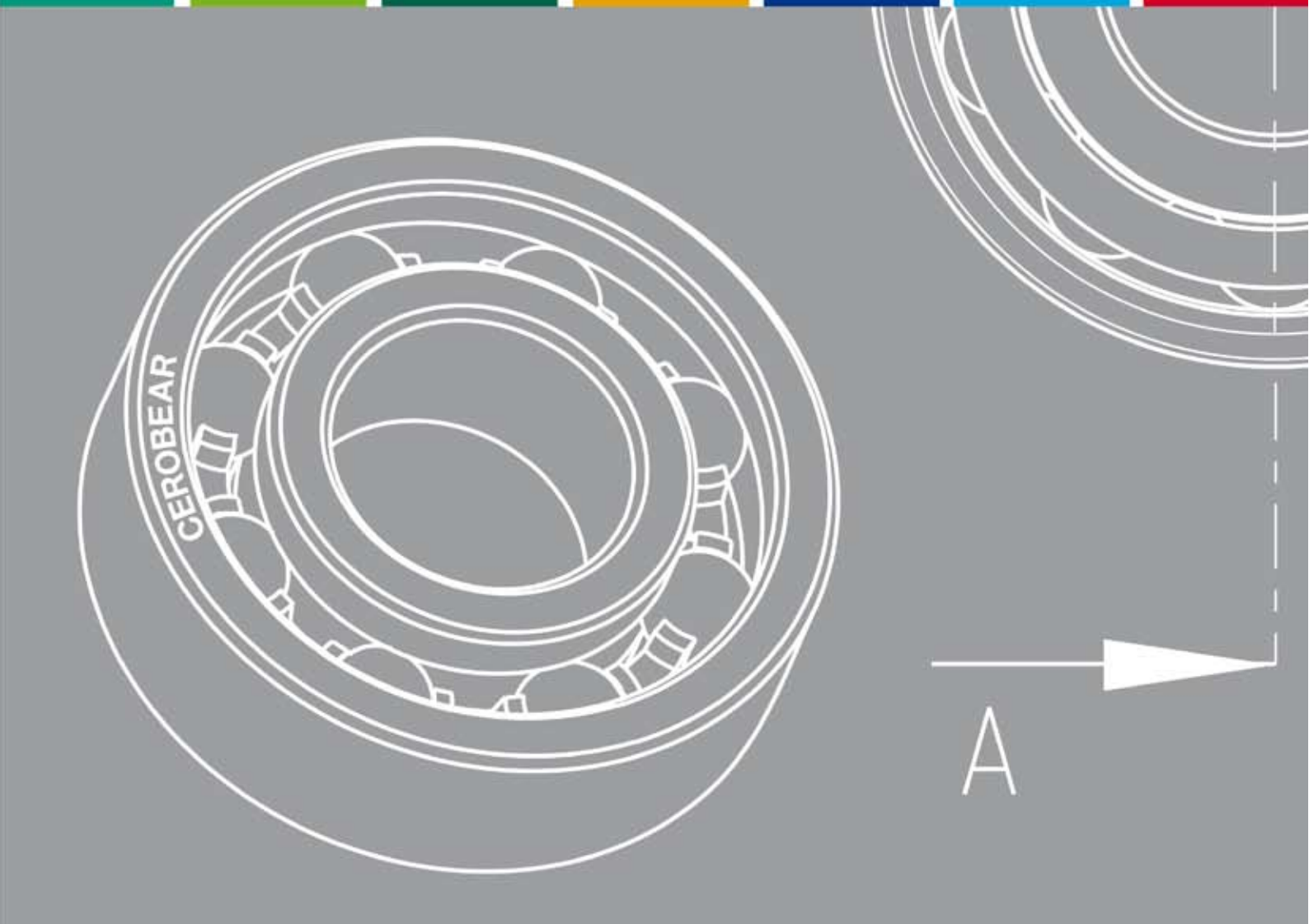


CEROBEAR®

ceramic bearing technology



Cerobear - The Company

Committed to the abbreviation **CE**ramic in **RO**lling **BEAR**ings, CEROBEAR GmbH is the renowned world leader in the design, manufacturing and marketing of bearings that feature highly advanced ceramic material technology.

CEROBEAR GmbH was founded in 1990 as a spin-off from the Fraunhofer-Institute of Production Technology at the Technical University of Aachen, Germany. Today, the company is still in owner's hand and under owner's management and is located just outside Aachen in Herzogenrath, a small city near Cologne in the westernmost part of Germany.

CEROBEAR operates an impeccable 2400 m²/26000 sqft facility with state-of-the-art production, metrology and testing equipment, and we have a staff of more than 100 highly skilled technical employees.

View into CEROBEAR production

Management System

Our commitment to highest quality standards, not only for our products, but also for our organizational processes, is reflected by our integrated management system. Our strategy and quality management system promote continuous quality improvement, while metrics quantify measurable results.

To maintain continuous achievements we have adopted international quality standards and have earned the following certifications:

- Aerospace quality management system to EN 9100
- Quality management system to DIN EN ISO 9001
- Environmental management system to DIN EN ISO 14001
- Occupational health and safety management system to BS OHSAS 18001

Simultanous inner and outer diameter grinding of a silicon nitride bearing race.

Curvature inspection of an inner raceway.

Competencies

CEROBEAR specializes in design, engineering and production of customized ball and roller bearings in dimensions from 5 mm/ 0.2" bore to 420 mm/ 16.5" outer diameter. Races, rolling elements and cages are manufactured in house by mastered production technologies such as ultra precision hard turning, grinding and five-axis milling. CEROBEAR's claim is to deliver a tailor-made bearing from a clean sheet of paper to the customer's hands in 12 to 16 weeks.

Our key competencies also include:

- analysis, calculation and lifetime-prediction for bearings with ceramic components
- computer-aided machining of advanced materials
- non-destructive testing and computer-aided inspection of ceramic bearing components
- customized bearing solutions from prototype to serial production

Products

CEROBEAR's advanced ceramic bearing technology addresses "extreme" requirements and applications. Based on the outstanding chemical stability of the materials, seizure, fretting, cold welding or adhesive wear between the tribological interacting partners is impossible, even in "oil-off" situations. Result is a strongly improved bearing reliability and lifetime.

Our primary product lines include **Ceramic Bearings** and **Hybrid Bearings**.

CEROBEAR hybrid bearings feature races made from unique corrosion and heat resistant steel and silicon nitride rolling elements. Compared to conventional steel bearings they operate at higher speed, generate lower friction and need less lubrication.

CEROBEAR ceramic bearings are totally made from silicon nitride or zirconia ceramics. They show outstanding corrosional resistance, dry-running capabilities, have a 60% reduced weight compared to steel bearings and are absolutely non-magnetic.

Although supplying products on top of today's rolling bearing technology, CEROBEAR's engineers are always looking for innovation in bearing design, material and performance. Every year CEROBEAR spends more than 10% of its revenues for research and development projects.

CEROBEAR hybrid and ceramic bearings

CEROBEAR Formula 1 hybrid bearings

CEROBEAR race-car gearbox bearings

Applications

From the beginning, CEROBEAR has been intently focused on delivering superb products and offering the best quality available – anywhere in the world.

In fiscal year 2011 we supplied 70000 custom-designed ceramic and hybrid bearings to some of the most sophisticated industry branches.

In the world of professional motor racing every Formula 1 car today relies on CEROBEAR hybrid bearing technology. Minimum friction, minimum weight, maximum speed and maximum reliability of our bearings take care that 100% of the engine's power and the driver's intention is transferred to the track. CEROBEAR is able to follow the short development cycles of the race-car engineers and delivers bearing improvements several times during the season if required.

CEROBEAR silicon nitride cylindrical rollers are the key elements for high-speed hybrid roller bearings

Even more speed than in motor racing is required from bearings for machine-tool spindles since speed is directly equivalent to productivity. With its unique ceramic grinding and polishing technology CEROBEAR has concentrated on superprecision hybrid cylindrical roller bearings, which can improve the radial spindle stiffness more than 3 times compared to ball bearings - without any rpm-restrictions. In many applications, oil lubrication can be substituted by a lifetime grease package – which CEROBEAR supplies with our custom-designed sealed bearings.

CEROBEAR superprecision hybrid roller bearings for machine-tool spindles

In clean-room-, vacuum- and chemical processes CEROBEAR ceramic and hybrid bearings break the rule of oil and grease being absolutely necessary for lubrication. Our bearings are able to run dry or can be lubricated with everything having a viscosity. Today "lubricants" like deionized water, hydrochloric acid, jet fuel, liquid hydrogen, sea water or orange juice successfully operate together with CEROBEAR bearings. Driven by these advantages, our bearings also work perfectly in a wide variety of applications in food and beverage production.

CEROBEAR hybrid double-row ball bearings for beverage processing under aseptic conditions

CEROBEAR hybrid bearings performing in high-pressure autoclave reactors

CEROBEAR ceramic bearings for semiconductor production machinery

Superlative corrosional resistance, no particle emission and zero maintainance characterize bearing requirements for applications in semiconductor manufacturing. 90% of all microprocessors and DRAM chips worldwide are produced with machinery equipped with CEROBEAR ceramic bearings. The often more than ten times gain in lifetime compared to conventional bearings drops the cost of ownership of the capital investment substantially into those limits this mass-production industry needs.

CEROBEAR hybrid constant section thin ring bearings

Silicon nitride cylindrical rollers, working in the US Space Shuttle's main engines lubricated by liquid hydrogen at minus 253 degrees Celsius/ minus 423 Fahrenheit and 36200 rpm were the beginning of CEROBEAR's aerospace heritage in early 2000. The introduction of ceramic bearing components improved the time between overhaul for the engines by factor 12.

Today satellites, servo actuator and auxiliary power units, gearboxes and accessories in aviation and space take advantage of the low weight, low torque and superlative reliability of our bearings.

CEROBEAR hybrid bearings for the use in accessory gearboxes

CEROBEAR hybrid bearing with flange for high-speed applications

CEROBEAR®
ceramic bearing technology

We welcome your enquiries from around the world and look forward to hearing from you.

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