



# CEROBEAR HYBRID BEARINGS FOR MOTOSPORT APPLICATIONS

# CEROBEAR HYBRID BEARINGS

## INTRODUCTION

CEROBEAR GmbH was established in 1989 and operates a 43,000 square foot facility with state-of-the-art production, metrology, clean-room assembly, and testing equipment in Herzogenrath, Germany. Its staff of more than 100 highly skilled technical employees custom design, develop, and manufacture all ceramic and hybrid ceramic rolling bearings.

In 2013, CEROBEAR became a member of the Minebea Group headquartered in Japan and comprised of 43 subsidiaries in 13 countries. CEROBEAR is a member of the New Hampshire Ball Bearings (NHBB) Business Unit based in the USA.

Today, CEROBEAR is the leading manufacturer of ceramic rolling bearings and a pioneer in rolling bearing technology. Ceramic rolling bearings are a key product for industries and processes with extreme requirements such as the semiconductor and aerospace industries as well as motor sports. CEROBEAR currently employs around 100 highly skilled technical employees.



CEROBEAR's customised Hybrid Bearings with integrated design elements lead to a compact arrangement



CEROBEAR's customised Hybrid Bearings are designed to meet your engineering requirements to perfection



CEROBEAR Hybrid Engine Bearings feature silicon nitride rolling elements in a split PEEK cage and a two-piece hardened bearing shell. This advanced bearing technology significantly reduces friction losses and leads to an increased power output of up to 8%

## MOTORSPORTS APPLICATIONS

CEROBEAR's advanced ceramic bearing technology addresses "extreme" requirements and applications:

- low friction,
- low weight,
- high temperatures,
- extreme speeds,
- minimum lubrication,
- superior load capacity and
- highest reliability.

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

Our wide product range of motorsports bearings includes engine, clutch, gearbox, differential, wheel and suspension bearings.

We supply our custom-designed ceramic and hybrid bearing products to some of the most sophisticated companies in the world.

CEROBEAR's customers include not only Formula One, NASCAR, Indy Car, WRC and LeMans racing teams, but also NASA, Pratt & Whitney, DuPont and DOW.

## CEROBEAR SILICON NITRIDE

At CEROBEAR, we only utilize high strength HIP silicon nitride ( $\text{Si}_3\text{N}_4$ ), the best quality ceramic raw material available on the market, for the production of our ceramic rings and rollers.

## VERY HIGH TEMPERATURES & EXTREME SPEED

Compared to all available bearing steels, silicon nitride has superior heat resistance, there is no measurable decrease in hardness up to 1500 °F.

The friction coefficient between silicon nitride paired with steel is 40% less than that of steel paired with steel. The reason for this is the stable nature of the silicon nitride material.

Its specific weight is 60% less than that of steel and at the same time it is twice as hard in comparison. These characteristics enable silicon nitride bearings to achieve very high speeds.

CEROBEAR's high speed technology is successfully applied not only in motorsports applications but also in the aerospace industry, machine tools, production of man-made fibres and electric and internal combustion engines.

## INCREASED BEARING LIFE

CEROBEAR ceramic and hybrid bearings serve to significantly increase the lifetime of bearing use – which substantially lowers the cost of ownership.

The lifetime of our bearings increases even when lubrication requirements drop significantly. In many applications, oil lubrication is substituted by a lifetime grease package – which CEROBEAR supplies with our custom-designed sealed bearings.



CEROBEAR Hybrid Constant Section Bearings provide superior load capacity and stiffness while reducing friction losses at the same time



CEROBEAR Angular Contact Ball Bearings replace standard tapered roller bearings in a multitude of applications



CEROBEAR Formula 1 mainshaft pinion bearing

## CEROBEAR'S CORE COMPETENCES

CEROBEAR specializes in design, engineering and production of advanced ball and roller bearings.

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 and
- customized bearing solutions from prototype to serial production.



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

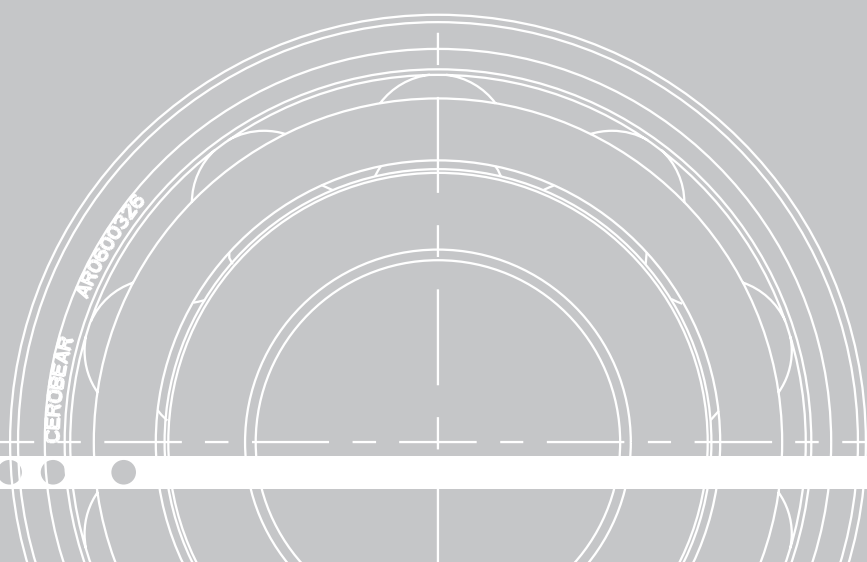
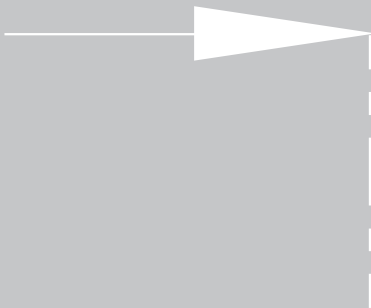
For more information on CEROBEAR and our unique technology and products, please contact us:

CEROBEAR GmbH  
Kaiserstrasse 100  
52134 Herzogenrath  
GERMANY

Phone: +49 2407 95 56 - 0  
Fax: +49 2407 96 22 4  
Email: [cb-sales@cerobear.de](mailto:cb-sales@cerobear.de)  
[www.cerobear.com](http://www.cerobear.com)

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**CEROBEAR®**  
ceramic bearing technology  
— MinebeaMitsumi Group —