NEW CERMADUR HIGH-PERFORMANCE MATERIAL

The material solution for media-lubricated hybrid bearings

The latest generation of rolling bearings developed by Schaeffler feature a special, optimized bearing design and are based on the new highly corrosion and wear-resistant Cermadur material.

Rolling bearings usually have to be lubricated with oil or grease so that they deliver the nominal load carrying capacity and achieve the required operating life – the same applies to all bearing solutions for pumps, compressors, and generators.

In the case of the new, open, and completely unsealed bearing solutions with Cermadur, the medium (a fluid such as seawater, coolant, or cleaning agent) surrounds the bearing and takes over the task of lubricating and cooling it. This extraordinary material concept is also resistant to hard particles.

Characteristics:

- Bearing rings made from Cermadur
  - Metal matrix composite: Ceramic-like material with extremely high durability
  - Hardness > 1,300 HV
  - Extremely robust
  - Qualified, validated, and patented by Schaeffler
- Rolling elements made from high-performance ceramic
- Cages made from high-performance plastics, e.g. POM or PEEK with special fillers
- No seals – no lubrication
- Optimized bearing design, adapted to the material combination
- Suitable for deep groove ball bearings, angular contact ball bearings, and cylindrical roller bearings with outside diameters of up to 200 mm.

ROLLING BEARINGS WITH A “FIT AND FORGET” EFFECT

For the harshest environments

The advantages for you at a glance:

- **Direct exposure to ambient media**
  Fresh water, seawater, process media, cleaning agents, etc.
- **No conventional lubricants**
  Washing out and degassing are no longer required, and products being processed are not contaminated
- **No maintenance required**
  For applications with poor accessibility
- **Extremely robust**
  In the presence of ambient media, temperatures, contamination, etc.
- **Extremely high wear resistance**
  Minimal abrasion despite dry running or media lubrication
- **High energy efficiency**
  No particle retention systems or seals are required

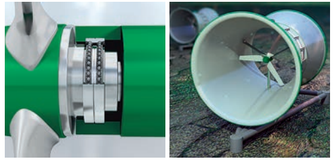
Cermadur bearing from a rope grab after 37 weeks of test operation. A thin layer of contamination has separated on the ring surface. The raceway is bright apart from salt deposits. The bearing is unrestrictedly functional.

BROAD RANGE OF APPLICATIONS

New levels of freedom for designers

This new development opens up a whole new range of possibilities for machine and system manufacturers, who can now dispense with complex sealing systems and a separate supply of conventional lubricants to the rolling bearings, e.g. in systems for generating electricity from ocean currents and wave motion, for agitators in water treatment plants, in air conditioning compressors, in the pharmaceutical and food industries, and in oil production.

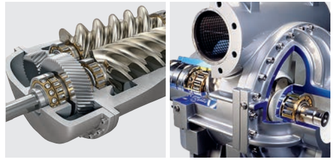
Marine and current turbines



Challenging applications

- Underwater operation
- Aggressive seawater environments
- High particle content/contamination: Mud, sand, and shell limestone
- Poor accessibility: Maintenance is impossible
- High energy efficiency, sustainability, and operational reliability

Pumps, compressors, and turbines



Customer advantages

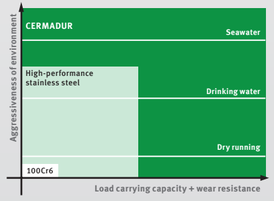
- Increased energy efficiency
- Increased robustness
- Smaller design envelope through the omission of sealing systems
- Low total cost of ownership
- Sustainability: Ecological solution due to the omission of lubricants

For process media-lubricated bearing applications

Rolling bearing characteristics	High-performance stainless steel	Cermadur
Hardness	700 HV	1,300 HV
Maximum permissible bearing load (seawater)	100 %	> 300 %
Suitability for constant speeds (seawater)	+	+
Suitability for speed/standstill cycles	-	+
Corrosion resistance (seawater)	o	++
Robustness in the presence of hard particles (mud/sediments)	100 %	200 %
Bearing rigidity	100 %	285 %
Thermal stability	150 °C	400 °C
Product costs (depending on the bearing type and quantity)	100 %	200 – 400 %

o reference; + good; ++ very good; – poor

Dismantled bearing unit from Schaeffler's river water test rig



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