

So your pump runs for longer
High-performance ceramics from CeramTec

CeramTec
THE CERAMIC EXPERTS

Keeps on running – high-performance ceramics from CeramTec

In complex applications, as for pumps, compressors and machine components, the high-performance ceramics from CeramTec are indispensable due to their unique properties: for perfect function, better performance and process reliability, a longer service life and increased economic efficiency.

Where other materials cannot handle the specific high strain of the area of application, high-performance ceramics from CeramTec offer crucial advantages and additional benefits. This innovative material is ready for the challenges of the future.

For each application and each requirements profile – from micro-dosing pumps in medical technology to large power plant pumps – we provide economical solutions with optimum selection, combination and setup of materials as well as component design. As a leading supplier of high-performance ceramics with over 100 years of experience in ceramics, we have comprehensive knowledge in the areas of materials, manufacturing and application in all industries worldwide.

- + Higher operational safety, longer service life
- + Increased process reliability
- + Better economic efficiency, reduced costs
- + Excellent wear and corrosion resistance through unique tribological properties
- + Variety of ceramic high-performance materials
- + Comprehensive product and service range, such as:
 - Friction bearings and bushings, seals, pistons, piezo drives, ceramic wear protection, ceramic sensors, solutions for periphery systems, ...
- + Worldwide presence in international markets, local presence on site. Customer proximity through subsidiaries, sales companies, representations and retail partners worldwide

For large-scale applications



For miniature applications



Less wear, more efficiency: everything for your high-performance pump

High-performance ceramics set standards for process reliability and performance

We have developed gliding, bearing, sealing and control technology with high-performance ceramics – with outstanding tribological, chemical and physical properties. This allows highly strained components in pumps, condensers, machines and systems to run reliably, with high economic efficiency and low wear, even under extreme operating conditions.

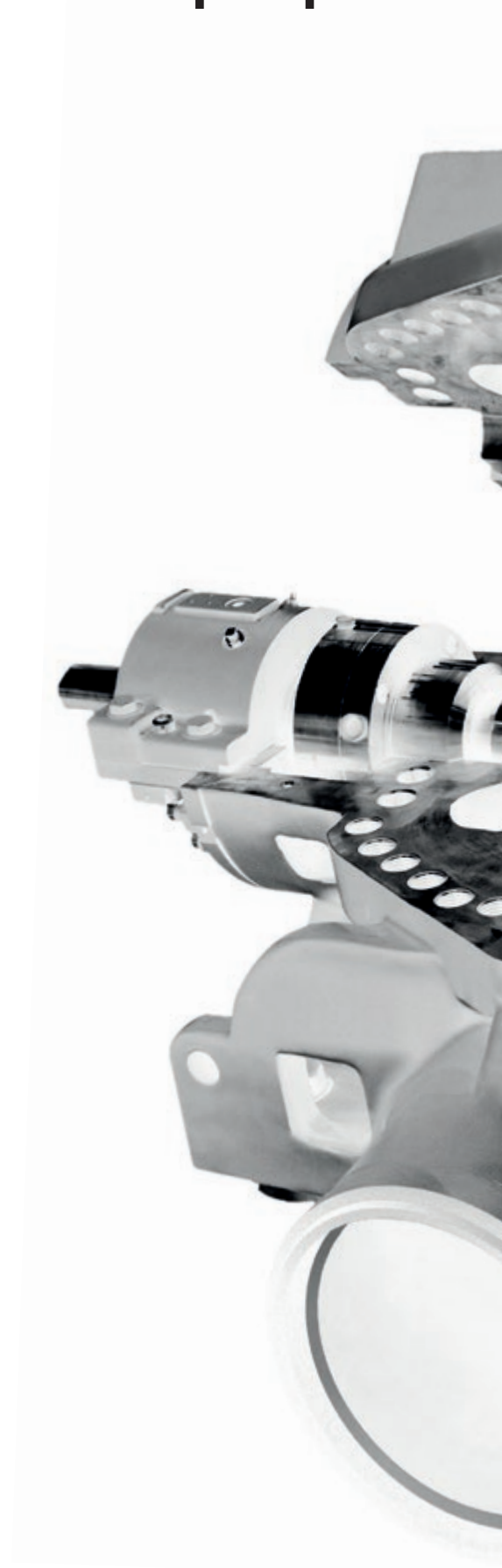
Leading customers worldwide – from automotive, chemicals and mechanical engineering to plant engineering and medical technology – rely on our exceptional quality and ceramics competence.

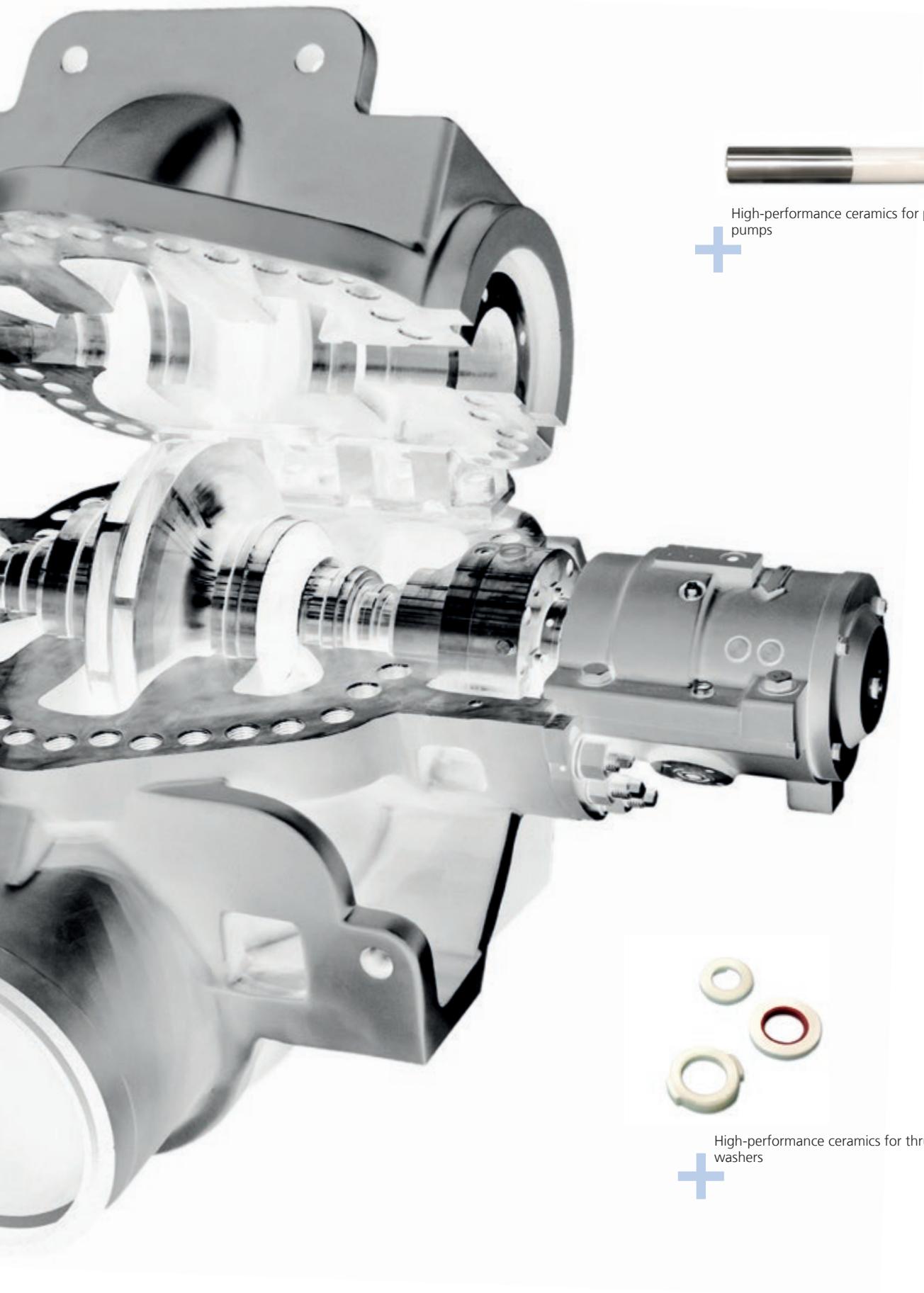


Sealing components and slip rings made of high-performance ceramics



High-performance ceramics for bushings





High-performance ceramics for pistons in pumps



High-performance ceramics for thrust washers



Better in motion: friction bearings and bushings

Reliably in top form for longer

Ceramic slip rings, bearing bushings (for axial and radial bearings) ensure a high level of reliability during operation and long service lives for applications with liquids in pumps or gases in compressors: in mechanical engineering and plant engineering, in automotive engineering, in medical technology systems and analysis devices, all the way to coffee machines and many other areas of application. The suitable ceramic material for the respective requirements is selected based on an optimally adjusted properties profile.

Advantages of high-performance ceramics:

- Best possible operational reliability with longest mean time between failure (MTBF)
- Highest possible manufacturing quality
- Excellent running properties – dry running or mixed friction
- Outstanding gliding properties
- Minimum wear, high wear resistance
- Excellent resistance to corrosive and abrasive media
- Excellent thermal shock behaviour, high temperature resistance
- Resistance to deformation and ageing
- Optimum biocompatibility



Everything running, everything tight: seals

For high performance, service life and economic efficiency

Customised engineering and product design with a variety of ceramic materials and material combinations make our application-optimised sealing components reliable and the first choice worldwide. For example: radial shaft seals and axial shaft seals – as mechanical seals, flat seals, valve shaft seals and piston rings. They have become an established component of pumps and pump housings in the manufacturing of devices and machines, in automotive manufacturing and in medical technology.

Advantages of high-performance ceramics:

- Very resistant to chemical influence, corrosion and abrasion
- Optimum glide pairing – hard/hard and also hard/soft – surface quality and macro structures perfectly adapted
- Excellent running characteristics
- Mechanical seals in large dimensions up to 1000 mm
- Tight, homogeneous ceramic structures formed through state-of-the-art production processes



Exact and reliable: everything for your piezo micro pump

Micro pumps with piezo elements and actuators

Piezo ceramics from CeramTec in micromembrane pumps, microdosing pumps and medical pumps ensure reliable flow and dosing of liquids and gases in the right quantities – for example in medical and laboratory technology, chemical analysis, biotechnology and process engineering. Piezoelectric actuators are predestined for micropump drives due to their compact size. With precision and reliability, they ensure extremely small dosing volumes, continuous flow and variable flow rates.



Piezo ceramics for reliable drives in
micropumps





Piezo-ceramic actuators
for micropumps



Customised materials: combination for each application

Optimally adapted for pump engineering

The unique materials properties make high-performance ceramics from CeramTec one of the most high performing materials for especially high requirements. The properties range from wear resistance, heat resistance, temperature resistance and thermal shock resistance to biocompatibility and food compatibility. For a large number of applications, the specific mechanical, thermal, biological-chemical and electrical properties of the high-performance ceramics can

be combined, developed further, optimised and coordinated. The materials groups of silicate ceramics, oxide ceramics, non-oxide ceramics and piezo ceramics allow the production of components which fulfil their task perfectly while being far superior to components made from materials such as metal or plastic. This means that high-performance ceramics are often the only solution for technical problems which cannot be implemented with conventional materials.

Ceramics materials and their primary use in pump engineering

Material	Friction bearings and bushings	Seal	Wear protection	Sensor	Active chamber component
Aluminium oxide	●	●	●		●
Zircon oxide	○	○	●		●
Silicon nitride	●	○	●		●
Silicon carbide SiSiC	●	●	○		●
Silicon carbide SSiC	●	●	●		●
Piezo ceramics				●	

● Main area of application ○ Suitable area of application

Reliable measuring: piezo ceramics for sensor systems

CeramTec has developed piezo-ceramic high-performance materials for the different measuring applications. They fulfil their tasks with maximum reliability, even under very tough operating conditions. Combined systems are most often used, combining transmitter and receiver in one sensor. High thermal resistance and a long service life, high coupling factors and large load constants are outstanding properties of the material. Piezo-ceramic components can be adapted perfectly to the various measurement applications through individual shaping and special materials. CeramTec also offers complete sensor systems which measure flow rate and flow velocity, fill level and formation of bubbles in liquids and gases.



Resisting tough conditions: ceramic wear protection on periphery systems

Protection for all periphery systems

On systems connected to pumps and compressors for conveying, such as pipes, hoppers or chutes for solid, liquid or gaseous media, wear protection and wear linings made of the ALOTEC® high-performance ceramics ensure the highest level of process reliability and economic efficiency. They are indispensable where abrasive and corrosive substances are conveyed, transported and processed.

As a system supplier, CeramTec delivers everything to custom specifications and from a single source, in close cooperation with customers. The possibilities range from single ceramic plates to fully integrated wear protection systems, from standard linings and compound systems to highly complex special components in different shapes and sizes.

Example: Wear protection for pneumatic lines

The award-winning compact bend solves wear problems even for small radii and completes the ALOTEC® portfolio of wear protection components for pipes.



The multi-award winning compact bend is the economical alternative to impact absorbers.

Whatever your complex application – please contact us. We will develop an innovative, custom-fit high-performance ceramics solution for you.



CeramTec GmbH
CeramTec-Platz 1-9
73207 Plochingen, Germany
Phone: +49 7153 611 0
Fax: +49 7153 611 673
info@ceramtec.de
www.ceramtec.com

The measured values shown here were determined for test objects and have to be regarded as guide values. The values were determined based on national or international standards. If no such standards were available, the measured values are based on internal specifications from CeramTec. Statements on the suitability of products for specific application types are based on the typical requirements which are often made for CeramTec products in general applications. These must not be transferred to special applications. This also applies to the values stated. The information provided here does not constitute any warranty for specific properties. CeramTec and its subsidiaries accept no responsibility for the correctness of this information or for any damage resulting from compliance with this information. Please note that all products, product specifications and information provided here are subject to change without notice.