精益生产
提高效益

用于机械工程领域的高技术陶瓷材料

For more Economy and Process Reliability

Advanced Ceramics for Mechanical Engineering

CeramTec
THE CERAMIC EXPERTS

用于机械工程领域的高技术陶瓷材料专家

赛琅泰克是全球领先的高技术陶瓷生产商和制造商，有着超过百年的历史。赛琅泰克的高技术陶瓷产品用于很多工业领域，化工领域、设备制造以及施工工程等，为生产安全提高保障，为精确工艺控制做出贡献，降低了工业排放，节约了资源利用。

其中，工业应用事业部研发和生产的高技术陶瓷部件主要在工业应用领域建立标杆，包括金属成形、化工与环境领域、以及精密工程领域。

这些产品为延长设备的使用寿命，提升设备系统的工艺性能，做出杰出贡献，尤其体现在解决客户具体问题、恶劣工况、高温场合情况。

赛琅泰克公司在全球范围内有着超过3,600名员工，生产基地及分支机构遍布欧洲、美洲和亚洲，是全球化的生产商和供应商。

The Experts for Technical Ceramics in Mechanical Engineering

With over a century of developmental experience and application expertise, CeramTec is a leading global manufacturer and producer of advanced ceramics.

CeramTec advanced ceramics enable safe process control, reduce emissions and ensure responsible use of resources in many areas of industry, process engineering, equipment, machine and plant engineering.

Technical ceramics components developed and produced in the Mechanical Applications Division set standards in industrial applications – whether in forming, chemical or environmental technology or precision engineering.

They make a decisive contribution to increasing the operating life and performance capability of machines and systems, especially in situations where customer-specific problems, aggressive media and high temperatures play a role.

With over 3,600 employees worldwide and production sites and subsidiaries in Europe, America and Asia, CeramTec is present around the globe as a manufacturer and supplier.

陶瓷专家：为各个应用领域提供完美解决方案

赛琅泰克目前的解决方案由超过10.000种不同的陶瓷产品、组件和部件构成，使用了多种不同的高技术陶瓷原料。

在**成型技术**方面，赛琅泰克的高技术陶瓷可以胜任即使是最极端的耐压工况，提供优化的耐磨性能并提升经济效益。

在**焊接技术**方面，赛琅泰克的高技术陶瓷产品降低磨损，提升工具的寿命。

在**特种零件与特种应用领域**，赛琅泰克生产的客户定制高技术陶瓷产品保证了强大的竞争优势，因为没有其他的常规性材料可以胜任此种耐磨、耐腐蚀、耐高温工况。

用于机械工程领域的高技术陶瓷产品及方案

- 定位销
- 加强组件
- 定制及专件
- 成型部件
- 轻质化加强组件
- 金属陶瓷(MMC)
- MIG/MAG焊接喷嘴
- 阻捻器
- 工业切刀
- 纺织机械组件
- 管材成型
- 焊接轧辊及工装
- 线缆拉伸工具

Ceramic Expertise: The ideal Solution for every Application

CeramTec's current portfolio comprises well over 10,000 different products, components and parts made from technical ceramics, along with a wide variety of advanced ceramic materials.

In **forming technology** CeramTec advanced ceramics can handle even the most extreme stress conditions, delivering wear-optimized and especially economical performance.

In **welding technology** advanced ceramics from CeramTec minimize wear and increase tool life.

For **special parts and applications** custom-tailored advanced ceramics from CeramTec secure an enormous competitive advantage because no other conventional material is as wear, corrosion or temperature resistant.

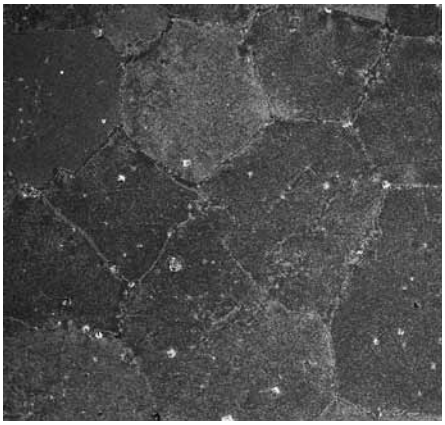
Products and solutions for mechanical engineering

- Centering pins
- Component reinforcement
- Customized and special parts
- Forming tools
- Light-weight design reinforcement
- Metal matrix composites (MMC)
- MIG/MAG gas nozzles
- Navels
- Technical cutters
- Textile machinery components
- Tube forming
- Welding rollers and tools
- Wire drawing tools

坚不可摧：
氧化锆陶瓷

氧化锆陶瓷有效避免微裂纹的扩散，其热膨胀系数也很高，在金属与陶瓷共同装配场合成为具体的方案。

- 高的热膨胀系数(α =11 x 10^{-6}/K,与某些金属相近）
- 极好的热绝缘性/低的热导率 (2,5 bis 3 W/mK)
- 很好地防止微裂纹扩散，断裂强度高(6,5 bis 8 MPam$^{1/2}$)
- 可以传导氧离子（用于测量含氧压力）



Seriously Tough:
Zirconium Oxide ZrO_2

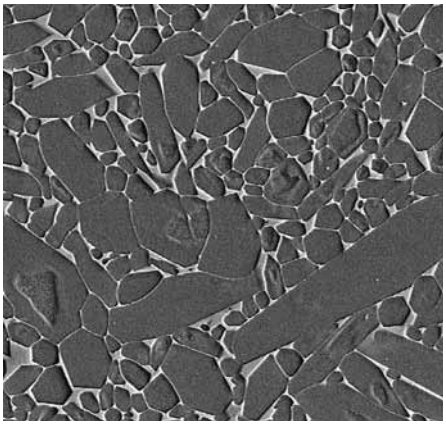
Zirconium oxide is highly resistant to crack propagation. Zirconium oxide ceramics also have very high thermal expansion and are therefore often the material of choice for joining ceramic and steel.

- High thermal expansion (=11 x 10^{-6}/K, similar to some types of steel)
- Excellent thermal insulation/low thermal conductivity (2.5 to 3 W/mK)
- Very high resistance to crack propagation, high fracture toughness (6.5 to 8 MPam$^{1/2}$)
- Ability to conduct oxygen ions (used for the measurement of oxygen partial pressures in lambda probes)

锤炼摔打：
氮化硅陶瓷

氮化硅陶瓷是很多优异性能的结合体。材料特别轻，接近碳化硅；微观结构赋予的抗热震性；很高的断裂强度；耐冲击，耐摔打。

- 密度低(3,21 g/cm^3)
- 断裂强度高(7 MPam$^{1/2}$)
- 抗弯强度高(850 MPa)
- 优异的抗热震性，高耐热强度参数 (569开尔文)
- 氧化气氛中最高使用温度：1,300 度
- 中性气氛中最高使用温度：1,600 度



Can even withstand Shock: Silicon Nitride Si_3N_4

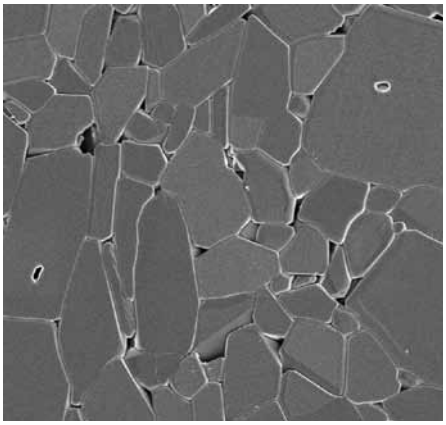
Silicon nitrides feature an excellent combination of material properties. They are nearly as light as silicon carbide, but their microstructure gives them excellent thermal shock resistance and their high fracture toughness makes them resistant to impacts and shocks.

- Very low density (3.21 g/cm^3)
- Very high fracture toughness (7 MPam$^{1/2}$)
- Good flexural strength (850 MPa)
- Excellent thermal shock resistance: high thermal stress parameters (569 K)
- Maximum operating temperature in an oxidizing atmosphere: 1,300°C
- Maximum operating temperature in a neutral atmosphere: 1,600°C

无往不胜：
氧化铝陶瓷

氧化铝陶瓷有着不同的纯度，有着比其他陶瓷更广泛的应用场合。赛琅泰克公司提供多种适用于不同的目标应用场合的产品，并体现出不同的产品特性。

- 极好的电绝缘性(1x10^{14} to 1x10^{15} Ωcm)
- 中等到极好的机械性能(300 bis 630 MPa)
- 很高的抗压性能(2,000 to 4,000 MPa)
- 高硬度 (15 to 19 GPa)
- 中等的热导率(20 to 30 W/mK)
- 高的耐腐蚀及耐磨损性能
- 好的摩擦性能
- 低密度 (3.75 to 3.95 g/cm^3)
- 不承压时的工作温度可达1,000到1,500度
- 生物亲和性，符合食品认证



Material with Substance for any Challenge: Aluminum Oxide Al_2O_3

Alumina in its various levels of purity is used more often than any other advanced ceramic material. CeramTec offers a wide range of material types with different property profiles that can be adjusted via a targeted matrix design.

- Excellent electrical insulation (1x10^{14} to 1x10^{15} Ωcm)
- Medium to extremely high mechanical strength (300 to 630 MPa)
- Very high compressive strength (2,000 to 4,000 MPa)
- High hardness (15 to 19 GPa)
- Moderate thermal conductivity (20 to 30 W/mK)
- High corrosion and wear resistance
- Good gliding properties
- Low density (3.75 to 3.95 g/cm^3)
- Operating temperature without mechanical load 1,000 to 1,500°C
- Bioinert and food compatible

胜任最严酷的工况：
赛琅泰克高技术陶瓷产品

严酷工况对材料提出了更高要求。未来的创新解决方案基于各种陶瓷材料，如氧化铝，氧化锆，氮化硅和碳化硅。这些材料可以胜任各种场合：高耐磨性、耐腐蚀性、耐高温性。在其他材料到达工况极限时，这些陶瓷材料就成为完美的选择。

Can withstand toughest Conditions: CeramTec Advanced Ceramics

Withstanding even the toughest conditions requires material with substance. Ceramic materials such as alumina, zirconium oxide, silicon nitride or silicon carbide are the cornerstone of our innovative solutions of the future. These materials can withstand virtually anything: Their high wear, corrosion and temperature resistance makes them the perfect choice everywhere other materials reach their limits.

用于金属成型的高技术陶瓷

高压力及高耐磨的工况：高技术陶瓷在此种工况下，有着比其他材料远为优异的性能。其可以在金属成型的各个工序提升性能，提高效益。

金属机械成型的各种工具：

- 拉伸，折弯，扩孔
- 不产生冷焊接效应
- 优异的耐磨性能
- 优异的抗化学腐蚀和抗热腐蚀性能
- 优异的表面粗糙度和形位公差精度
- 超长的使用寿命

In Top Form with Technical Ceramics

Stress conditions and extreme wear: Technical ceramics are often far superior to other materials in these conditions and help form metals in every process step for enhanced performance and cost-effectiveness.

Tools for mechanical forming

- Drawing, bending or widening
- No cold welds
- High wear resistance
- High chemical and thermal resistance
- Improved surface quality and dimensional accuracy
- Vastly extended service life

拥有优秀表面质量的线缆拉丝机组件

- 成型辊，塔轮，和拉丝盘
- 大拉环，成型环，大尺寸组件
- 全陶瓷或陶瓷/金属组合件
- 碳喷涂组件
- 附属部件：导位辊，导位组件，导嘴，导位瓷眼
- 陶瓷表面的晶粒大小精确设定
- 精抛光产生鹅卵石型接触表面
- 恒定的扭矩使得线径稳定
- 防止漆包线表面被破坏
- 防止线缆断头
- 降低维修费用，延长维护周期
- 延长机器使用寿命

Wire drawing tools with optimized ceramic surfaces

- Forming rolls, cones and drawing discs
- Large drawing rings, forming rings and large components
- Solid ceramic or ceramic/metal composites
- Carbide-coated drawing tools
- Auxiliary tools: guide rolls, guide elements, nozzles, eyelets
- Exact particle size definition in the ceramic surface material
- Increased contact area with cobblestone pattern thanks to a finely polished surface
- Constant torque levels yield consistent wire thicknesses
- Prevention of damages to coated wires
- Prevention of wire breakage
- Low maintenance costs and extended maintenance intervals
- Extended machine service life

高技术陶瓷的完美结合

赛琅泰克研发出理想的氮化硅陶瓷用于焊接生产，其表现：焊接生产组件有着优异的硬度与耐磨性，耐高温并耐化学腐蚀。这些特性延长使用寿命，减少了更换工具导致的停机时间，增加了机器连续运转时间，并提升最终产品的质量。

用于焊接生产的陶瓷工具：

- 气压烧结高技术氮化硅陶瓷SL200B/BG
- 极好的硬度和抗弯强度
- 很好的抗热冲击性，耐高温
- 极好的电绝缘性
- 降低冷焊效应，焊渣不粘结
- 极好的抗拉强度和抗压强度

A perfect Union with Technical Ceramics

CeramTec has developed the ideal silicon nitride ceramic for use in the welding process. The outcome: welding process components featuring remarkable hardness and wear resistance, and very high temperature and chemical resistance. They vastly extend service life, reduce overall retooling times, extend machine running times and enhance end-product quality.

Tools for the welding process

- Gas-pressure sintered advanced ceramics Si_3N_4 SL200B/BG
- Extreme hardness and flexural strength
- High thermal shock resistance and temperature resistance
- Superior electrical insulation
- Reduced cold welding and no welding spatter adhesion
- High tensile strength and compressive strength

- 用于生产轴向焊管的焊接轧辊：相比钢制轧辊，寿命可延长20-30倍
- 用于凸焊的定位销：寿命是氧化锆陶瓷的5倍
- MIG/MAG保护焊接的烧嘴:可提供全陶瓷的形式或者有0螺纹的外罩

- Welding rollers for longitudinal pipe welding: 20 to 30 times longer service life compared to steel rollers
- Welding pins for projection welding: 5 times longer service life compared to zirconium oxide
- Gas nozzles for use in MIG/MAG welding in solid ceramic or as threaded caps

高技术陶瓷的独到之处

赛琅泰克研发及生产的客户定制方案，正是针对常规的设备、系统或材料在遭遇其技术极限时提供。其耐磨性、耐高温、耐腐蚀性使得全新的应用成为可能，并能对现有系统的性能进行再提升。作为高技术陶瓷领域的先行者，我们的目的就是进一步扩展这些材料的应用，并开发其材料的潜在性能。

Special Forces made from Technical Ceramics

CeramTec develops and delivers custom-tailored solutions made from technical ceramics everywhere conventional equipment, systems and mechanical engineering materials reach their limits. Their high wear, temperature and corrosion resistance make it possible to realize completely new applications and further optimize existing systems. As a pioneer in the field of technical ceramics, our aim is to further expand the application and development potential of these materials.

客户定制的专用部件

- 对常规材料进行替换
- 全陶瓷方案或者陶瓷/金属结合件
- 具体应用场合的陶瓷设计方案及建模
- 生产优化，以提升耐磨性，延长设备寿命，或延长维护周期

Customer-specific special parts

- Replacement for conventional materials
- Solid ceramic solutions or ceramic/metal composites
- Ceramic and application-specific design and construction
- Process optimization for improved wear, tool life or maintenance intervals

决定性优势：
赛琅泰克高技术陶瓷

赛琅泰克的高技术陶瓷，也被称为先进陶瓷，其生产使用了各种不同的陶瓷原料，性能得到综合优化，更适用于不同的技术场合。各种不同的性能包括：

- 热导率和抗热震性
- 硬度和耐磨性
- 抗化学腐蚀性
- 压电性
- 抗折，压力下尺寸稳定
- 抗化学腐蚀，具有生物亲和性
- 电绝缘性，介电强度高
- 耐高温
- 热绝缘性

金属或塑料等材料在无法完美满足要求时，或者新的问题无法使用常规材料进行克服时，这些性能就使得高技术陶瓷材料的应用成为可能。在不同领域，高技术陶瓷材料都可取得优势，这些领域包括：汽车行业，电子行业，医疗行业，或者是通用装备行业以及机械工程行业。

Decisive Advantages:
CeramTec Advanced Ceramics

At CeramTec, advanced ceramics – also known as technical ceramics – are manufactured from a variety of ceramic materials whose properties have been synthetically optimized and matched to suit various technical applications. Examples of these specific properties include:

- Heat conductivity and shock resistance
- Hardness and wear resistance
- Chemical resistance
- Piezo-electricity and dynamics
- Fracture resistance and pressure stability
- Corrosion resistance and biocompatibility
- Electrical insulation and dielectric strength
- Temperature resistance
- Thermal insulation

These properties make it possible to use technical ceramic materials where metals or plastics do not ideally fulfill existing requirements or where new challenges cannot be overcome with conventional materials. This gives technical ceramics an edge in a number of different applications: in the automotive industry, in the field of electronics, in medical engineering applications or in general equipment and mechanical engineering.

应用领域
Application Areas





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