



***MORE THAN 50 YEARS
OF EXPERIENCE
IN WIRE DRAWING***

**WELDING AND
FORMING TECHNOLOGY**

High-performance ceramics

ABOUT KYOCERA



The global Kyocera corporation - a strong partner.

- ▶ **Headquarters:** Kyoto, Japan
- ▶ **Foundation:** 1959
- ▶ **Employees:** over 83.000 worldwide
- ▶ **European headquarters:** Esslingen, Germany
- ▶ **European production sites:** Mannheim, Germany
Selb, Germany
(further subsidiaries in Europe)

KYOCERA = KYOTO CERAMICS

KYOCERA – it all began with ceramics

KYOCERA Fineceramics Europe GmbH is part of KYOCERA Corporation, headquartered in Kyoto, Japan, one of the world's leading manufacturer of high-performance ceramic components for the technology industry. Today, the Kyocera Group offers over 200 different ceramic materials and state-of-the-art technologies and services tailored to the individual needs of each market

KYOCERA Fineceramics Europe GmbH has grown steadily in recent years – and is now a leading European supplier of customised solutions made of technical ceramics. Working in partnership, we develop and manufacture products that offer our customers added value in their respective markets and secure their technological lead in the long term. We are committed to this every day.

Throughout Europe, we are represented by two production and development sites in Mannheim and Selb, as well as six sales offices –

in Mannheim, Selb, Esslingen, Neuss, Rungis (France) and Frimley (United Kingdom).

Our hearts beat completely for ceramics. Our team provides comprehensive advice on the selection of ceramic materials, product design and project execution – from the development stage to prototyping.

We supply system components for high-tech applications in numerous industries. Our products are characterised by high quality, precision and durability.

Our business partners benefit from the fact that we think and work across divisions within the Kyocera Group. Because innovations and real milestones can only be achieved together – across industries and national borders.

This is what we believe.

QUALITY AND KNOW-HOW

The technology of machines and systems for wire drawing has been proven and reliable for over 50 years. In this well-established system Kyocera stands out by offering high-quality products, that can help reducing wear and optimizing production steps. With decades of experience, Kyocera achieves outstanding product quality. Furthermore, Kyocera supports its partners in all questions concerning the wire drawing process. Our employees are always happy to provide their customers with competent advice, whether it is the use of lubricants, the correct draft, assistance if wire breaks occur or if there is excessive wear on the ceramic parts. Thanks to their excellent networking in the industry and their comprehensive knowledge, our experts can quickly help you with all questions concerning the wire drawing process.

**More than 50 years
of experience in
wire drawing**

OPTIMAL SOLUTIONS FOR YOUR PRODUCTION

Kyocera supports you with special components, knowledge in forming technology and welding technology. Together we can find a solution for your production.

- ▶ Drawing tools for steel and stainless steel
- ▶ Tube processing, bending mandrels, expanding mandrels, drawing die
- ▶ Welding rollers
- ▶ Forming technology
- ▶ MIG/MAG gas nozzles made of Si₃N₄
- ▶ Tools for wire drawing
- ▶ Special components for mechanical engineering
- ▶ Bearing for pump technology



EXCELLENT MATERIALS MADE OF HIGH-PERFORMANCE CERAMICS

Wide range of applications through a combination of excellent material properties.



Products made of Silicon nitride



Products made of Silicon carbide



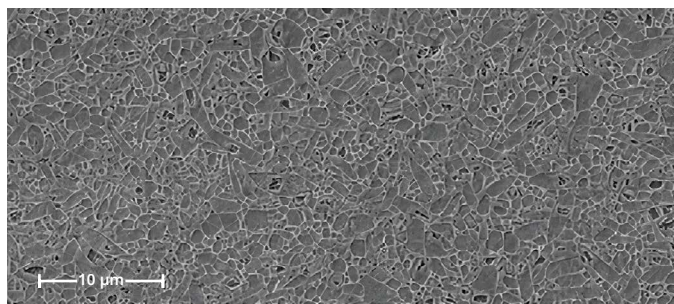
Products made of Zirconium oxide



Products made of Alumina

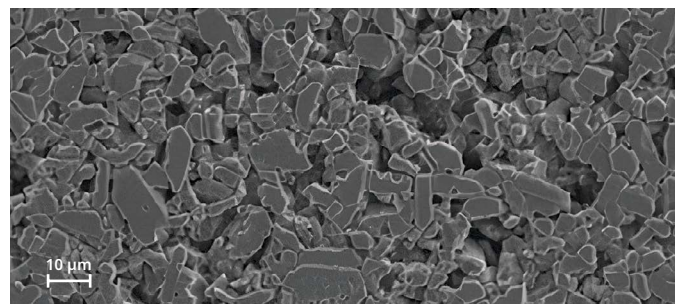
SILICON NITRIDE – STARCERAM® N (Si_3N_4)

- ▶ Low density
- ▶ High specific strength
- ▶ Very good thermal shock resistance
- ▶ Low coefficient of thermal expansion combined with high stiffness, strength and fracture toughness
- ▶ Electrical insulation



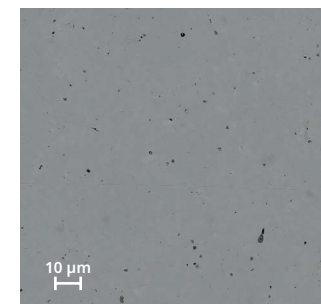
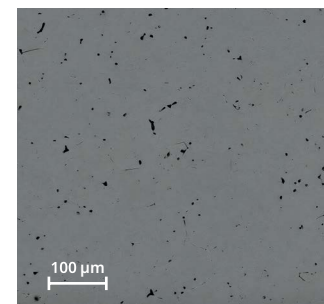
SILICON CARBIDE – STARCERAM® S (SiC)

- ▶ High wear resistance due to high strength and hardness
- ▶ Outstanding corrosion resistance even in high temperature ranges
- ▶ Good thermal shock resistance, as well as high thermal conductivity to dissipate the generated process heat
- ▶ Excellent chemical resistance



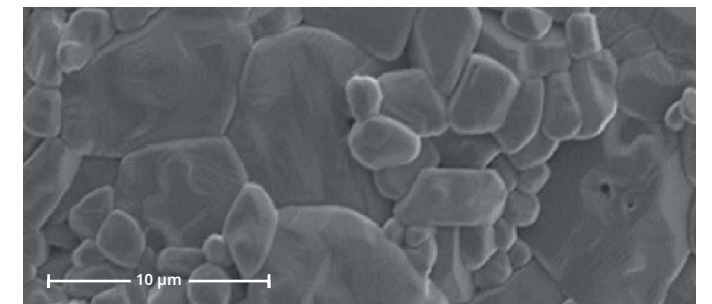
ZIRCONIUM OXIDE – FZM AND FZM+ (ZrO_2 , MgO)

- ▶ Very good thermal insulation
- ▶ High thermal expansion – "similar to steel"
- ▶ High fracture toughness
- ▶ Young's modulus: 210 GPa – "similar to steel"
- ▶ Very ductile
- ▶ Very good tribological properties compared to metallic materials



ALUMINA – STARCERAM® A (Al_2O_3)

- ▶ High wear resistance due to high strength and hardness
- ▶ Outstanding corrosion resistance even in high temperature ranges
- ▶ Low co-efficient of friction
- ▶ Excellent chemical resistance
- ▶ Electrical insulation



KYOCERA'S ADVANCED CERAMICS – RELIABLE AND DURABLE TOOLS

In welding technology, extreme demands are placed on the tools used. High temperatures and strong temperature changes are no problem for components made of Kyocera technical ceramics. In particular, our StarCeram® N materials made of silicon nitride (Si_3N_4) have proven to be highly reliable in this area.

- ▶ High thermal shock resistance
- ▶ No cold welding compared to steel
- ▶ Low weld spatter adhesion
- ▶ High compressive strength
- ▶ High hardness
- ▶ Welding rolls with up to 25 times the service life compared to AMPCO rolls
- ▶ Gas nozzles for MIG/MAG welding



Well on wire with technical ceramics from Kyocera - always process reliable, efficient and economical with FZM and FZM+ (ZrO_2 , MgO).

- ▶ Longer service life compared to steel coated
- ▶ High wear resistance
- ▶ High thermal resistance
- ▶ Low maintenance costs
- ▶ No cold welding
- ▶ No damage to coated wires
- ▶ Improved contact area due to the cobblestone structure



Your reliable partner.





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