

POSITIONING AND WELDING PINS

High-performance ceramics

HIGH QUALITY LOW COSTS IN CAR BODY CONSTRUCTION

Renowned automobile manufacturers use positioning and welding pins made of high-performance ceramics.

BENEFITS

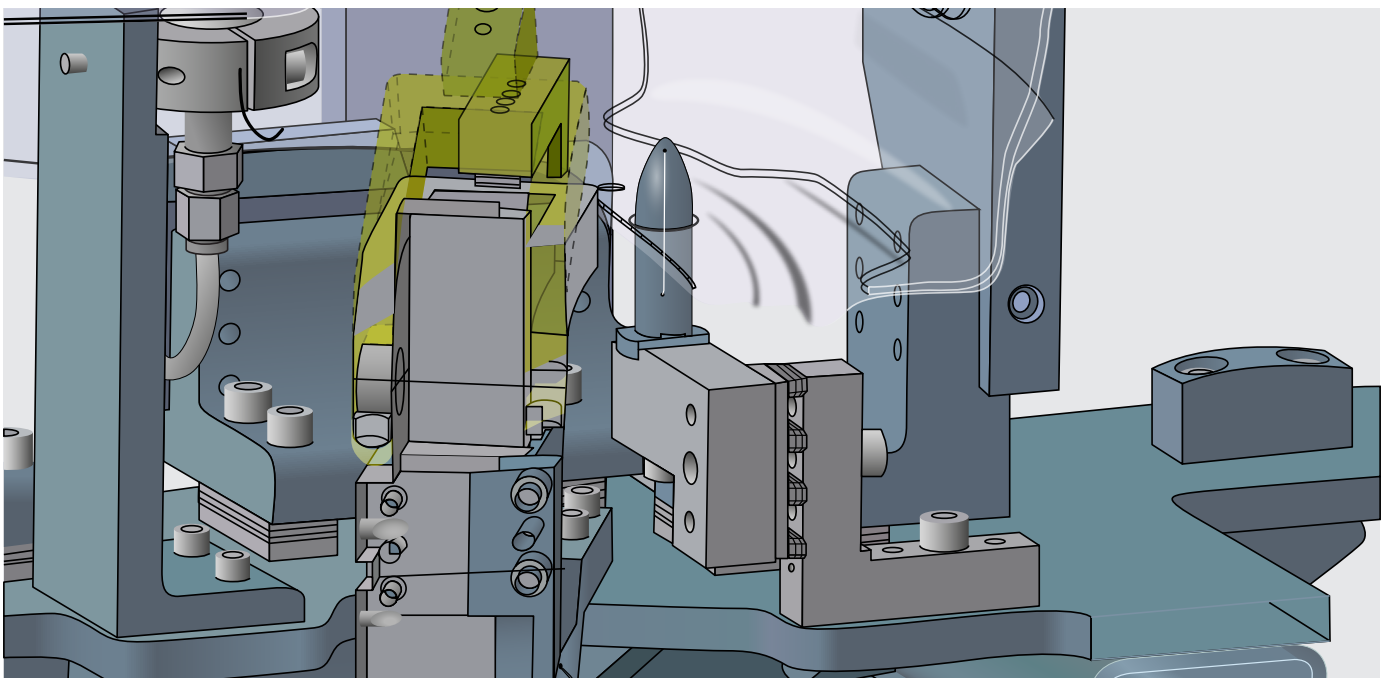
- ▶ Up to 100 times more durable than steel
- ▶ High resistance to wear-and-tear
- ▶ Extreme hardness
- ▶ Excellent stability of shape
- ▶ Absolute positioning accuracy
- ▶ Outstanding surface quality
- ▶ Electrically insulating
- ▶ High dimensional quality of the welding sets
- ▶ No deformation of sealing holes
- ▶ No insulation necessary
- ▶ Low process variations



**Pins are manufactured
in several models.**

GREATER PERFECTION AND PRECISION IN CAR MANUFACTURING

Only pins with high-performance ceramics meet the high demands of the automotive industry. A material combination of metal and ceramics guarantees an optimised utilisation of special material properties. Our ceramic-to-metal components outclass a single material considerably.



**Ceramic-to-metal
components for
highest demands
in car body
manufacturing.**



Positioning pins – ceramic rod version in metal substrate



Positioning pins – ceramic cap version in metal substrate

EXTREME RESILIENCE

Due to their unique properties, ceramic-to-metal components from KYOCERA Fineceramics Europe GmbH are highly impressive.

Our high-performance ceramics are extremely resistant to heat, corrosion, high voltage and chemical influences. They also have excellent stability of shape and resistance to wear-and-tear, thus longer retaining their functionality.

PRECISION AND ECONOMY

Our materials have become a must in the automobile industry. Positioning and welding pins made of high-performance ceramics exactly and precisely align the body parts to be welded and fix them securely. A vast number of car manufacturers all over the world are highly impressed by our components and benefit from advantages like low tool costs, reduced downtimes and also minimum service charges.

TOP RATINGS FOR OUR HIGH-PERFORMANCE CERAMICS

With their outstanding material properties, components made of DEGUSSIT high-performance ceramics have become firmly established in the global automobile industry.

Precision solutions for various requirements are achieved by the wide range of Kyocera materials.

With the development of high-performance ceramics, Kyocera successfully combined the outstanding properties of the individual materials metal and ceramics into one single component. Our high-performance ceramic products are extraordinarily resistant to high temperatures, wear-and-tear and corrosion. Together with their breaking strength and integrity of shape their extremely long lifetime makes high-performance ceramics highly convincing.

Our customers expect tailor-made solutions for their individual needs and tasks. The comprehensive range of materials enables us to manufacture optimal components according to customer requirements. The physical material properties listed in the table clearly illustrate the potential of high-performance ceramics.

Long lifetime thanks to individual solutions.



Properties	Unit	Steel	FZM Mg-PSZ (yellow)	FZT Ceramics Al ₂ O ₃ (+ZrO ₂) (white)	DEGUSSIT DD57 Ceramics Al ₂ O ₃ (red)
Apparent density	g/cm ³	7.9	≥ 5.70	≥ 4.10	≥ 3.90
Hardness (HV1)		¹⁾	1,220	1,880	1,660
Compressive strength	MPa	¹⁾	2,000	3,000	3,000
Bending strength	MPa	¹⁾	500	460	300
Modulus of elasticity	GPa	200	185	360	380
Corrosion resistance		limited	very good	very good	good
Expansion coefficient 20-500 °C	10 ⁻⁶ /K	11	10.4	7.5	8.5

¹ Values are different for each steel grade (see Key to Steel)

The characteristic values of other materials can be found at www.kyocera-fineceramics.com

WIDE RANGE OF TOOLS FOR THE AUTOMOBILE INDUSTRY

The car manufacturing industry only permits low production tolerances. This requirement can easily be met with the help of positioning and welding pins made of high-performance ceramics.



**Exact positioning for
smooth welding
processes.**



POSITIONING PINS

The fully automated positioning procedures in automotive body-shell assembly demand the very highest standards of precision. This explains why so many car manufacturers rely on positioning pins made of high-performance ceramics. These fully ensure that all body parts can be welded with exact precision. The development of the ceramic rod version has enabled KYOCERA Fineceramics Europe GmbH to again surpass the extreme breaking strength and shape integrity of their pins. The special arrangement of the ceramic rods resulted in optimisation of the product characteristics. In this way, even components with a small centering diameter (\varnothing 10 mm) achieve a high degree of stability.

In the conventional production process metal bolts had to be fitted as place-holders for pins without the rod version at the plant commissioning stage due to early damage to the delicate ceramic pins during plant set-up. The advantage of using break and bend-resistant positioning pins in the ceramic rod

version is especially obvious in the case of the small centering diameters described above. They can be inserted already at the very start of set-up and transfer-line arrangement. This saves time-consuming as well as cost-intensive plant conversion, from initial set-up through to the production stage. In terms of handling, our positioning and welding pins made of high-performance ceramics are also most impressive. Thanks to the electrically insulating effect of ceramics no additional insulation is needed. There is virtually no welding bead adherence on the ceramics, and disruptive metal abrasion has no chance of developing.

WELDING PINS


In case of projection welding, pins made of high-performance ceramics ensure that the nuts to be welded can be exactly positioned on the metal sheet. Here again, the manufacturer benefits from an increased plant lifetime and additionally from the high quality of the finished product.

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.

About the KYOCERA Group

KYOCERA Corporation (Kyoto) is one of the world's leading manufacturers of high-performance ceramic components for the technology industry. Strategically important business areas of the Kyocera Group, which consists of around 300 subsidiaries, are information and communications technologies, products to improve the quality of life, and environmentally friendly products. The technology group is also one of the most experienced producers of smart energy systems worldwide.

The products marketed by the company in Europe include printers, digital copying systems, semiconductor-, fine ceramic-, automotive- and electronic components as well as printing devices and ceramic kitchen products.

Kyocera is represented in Germany by four independent companies:

- **KYOCERA Europe GmbH** (Esslingen and Neuss),
- **KYOCERA Fineceramics Europe GmbH** (Mannheim, Selb, Esslingen and Neuss)
- **KYOCERA Automotive and Industrial Solutions GmbH** (Dietzenbach)
- **KYOCERA Document Solutions GmbH** (Meerbusch)

The company also takes an active interest in cultural affairs. The Kyoto Prize, a prominent international award, is presented each year by the Inamori Foundation – established by Kyocera founder Dr. Kazuo Inamori – to individuals worldwide who have contributed significantly to the scientific, cultural, and spiritual betterment of humankind.





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