

## POSITIONING AND WELDING PINS

High-Performance Ceramics

[www.kyocera-solutions.de](http://www.kyocera-solutions.de)

# LOW COSTS HIGH QUALITY IN CAR BODY CONSTRUCTION

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

## YOUR BENEFITS

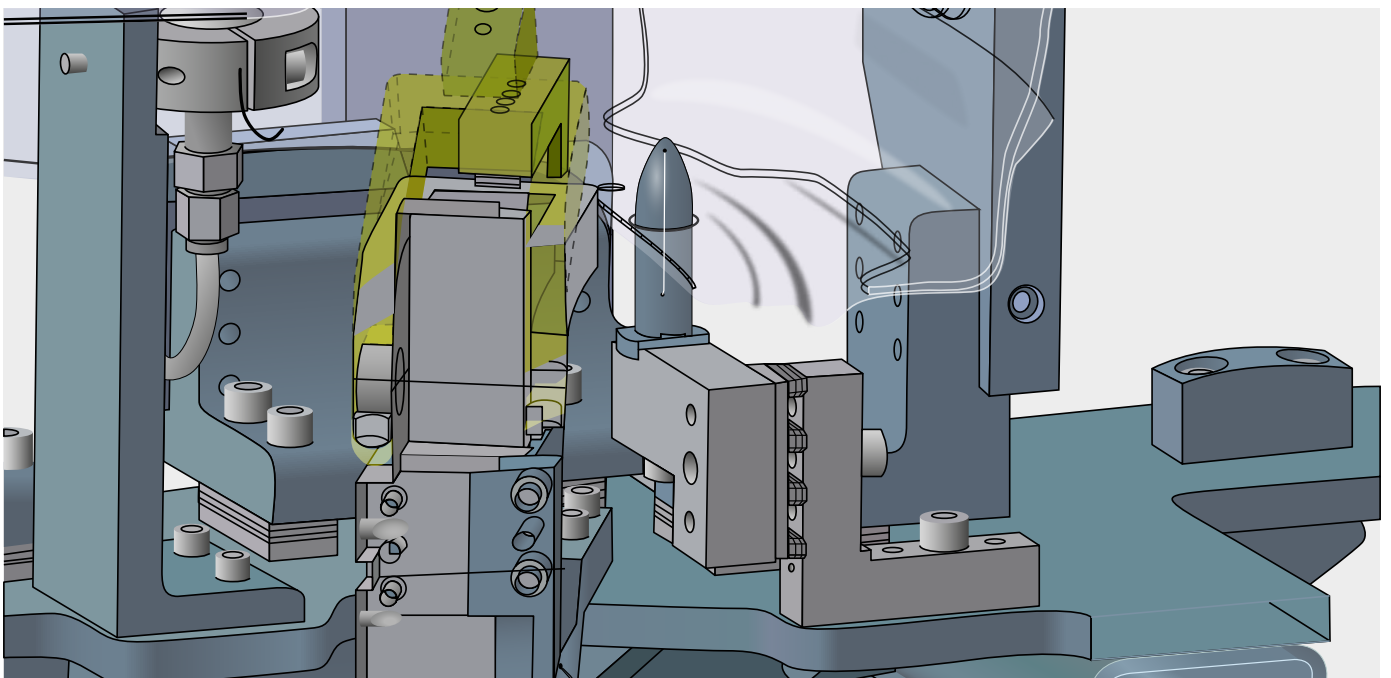
- ▶ Up to 100 times more durable than steel
- ▶ High resistance to wear-and-tear
- ▶ Diamond-like hardness
- ▶ Excellent stability of shape
- ▶ Absolute positioning accuracy
- ▶ Outstanding surface quality
- ▶ Electrically insulating
- ▶ High dimensional quality of the welding sets
- ▶ No deformation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



**Pins are manufactured  
in several models.**

## **GREATER PERFECTION AND PRECISION IN CAR MANUFACTURE**

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 Solutions 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 <sub>2</sub> O <sub>3</sub> (+ZrO <sub>2</sub> ) (white)	DEGUSIT DD57 Ceramics Al <sub>2</sub> O <sub>3</sub> (red)
Density	g/cm <sup>3</sup>	7.9	≥ 5,70	≥ 4,10	≥ 3,90
Hardness HV1		<sup>1)</sup>	1.220	1.880	1.660
Compressive strength	MPa	<sup>1)</sup>	2.000	3.000	3.000
Bending strength	MPa	<sup>1)</sup>	500	460	300
E-Modulus	GPa	200	185	360	380
Corrosion resistance		limited	very good	very good	good
Thermal expansion 20-500°C	10 <sup>-6</sup> /K	11	10,4	7.5	8.5

<sup>1</sup> Values are different for each steel grade (see Key to Steel)

The characteristic values of other materials can be found at [www.kyocera-solutions.com](http://www.kyocera-solutions.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 Solutions 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.

# HIGH-PERFORMANCE CERAMICS

## ELECTRICAL ENGINEERING



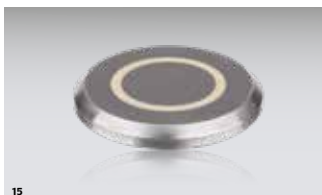
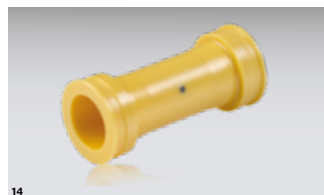
## HIGH TEMPERATURE TECHNOLOGY



## MECHANICAL ENGINEERING



## SENSOR AND MEASURING TECHNOLOGY



- 01. UHV vacuum chamber
- 02. Special insulation tube for research institutes
- 03. Feedthroughs with ISO-KF flange
- 04. High-voltage feedthrough

- 05. Rectangular tubes
- 06. Multi-bore tubes
- 07. Crucibles, boats and annealing boxes
- 08. Plates with hole

- 09. Forming tools used in body construction
- 10. Dosing unit used in the pharmaceutical and cosmetic industry
- 11. Containment shells for the pump industry
- 12. Grinding tools used in metal processing

- 13. Pressure sensor for aerospace
- 14. Flow meters
- 15. Humidity sensor
- 16. Oxygen sensor

# INNOVATIVE SOLUTIONS FOR THE GLOBAL MARKET

## INNOVATIONS FOR MORE THAN 150 YEARS

With more than 150 years of experience in ceramic manufacturing, we offer a range of innovative solutions for many industries: system components for high technology applications in electrical and sensor technology, mechanical engineering, analytical technology, medical and semiconductor technology as well as laboratory technology. In the field of ceramic-to-metal assemblies we possess international leading know-how.

## SPECTRUM OF INNOVATIVE SOLUTIONS

We see ourselves as a partner in the development of high-performance ceramic solutions, which give our customers added value and ensure their technological advantages. Our team advise comprehensive on the selection of ceramic materials, product design and project execution - from the development stage over the prototype fabrication to the serial.

## PARTNER OF A POWERFUL COMMUNITY

Founded in 1863 in Mannheim as brickyard, known as “Deutsche Steinzeug” and later as “Friedrichsfeld GmbH”, the business area Ceramics continued its successful development. Since September 2019, we are part of the KYOCERA Corporation, a world-leading ceramic and technology company.

**Kyocera Fin ceramics Solutions GmbH**  
is a specialist company for products  
made of non-corroding and  
wear-resistant materials.



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