

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

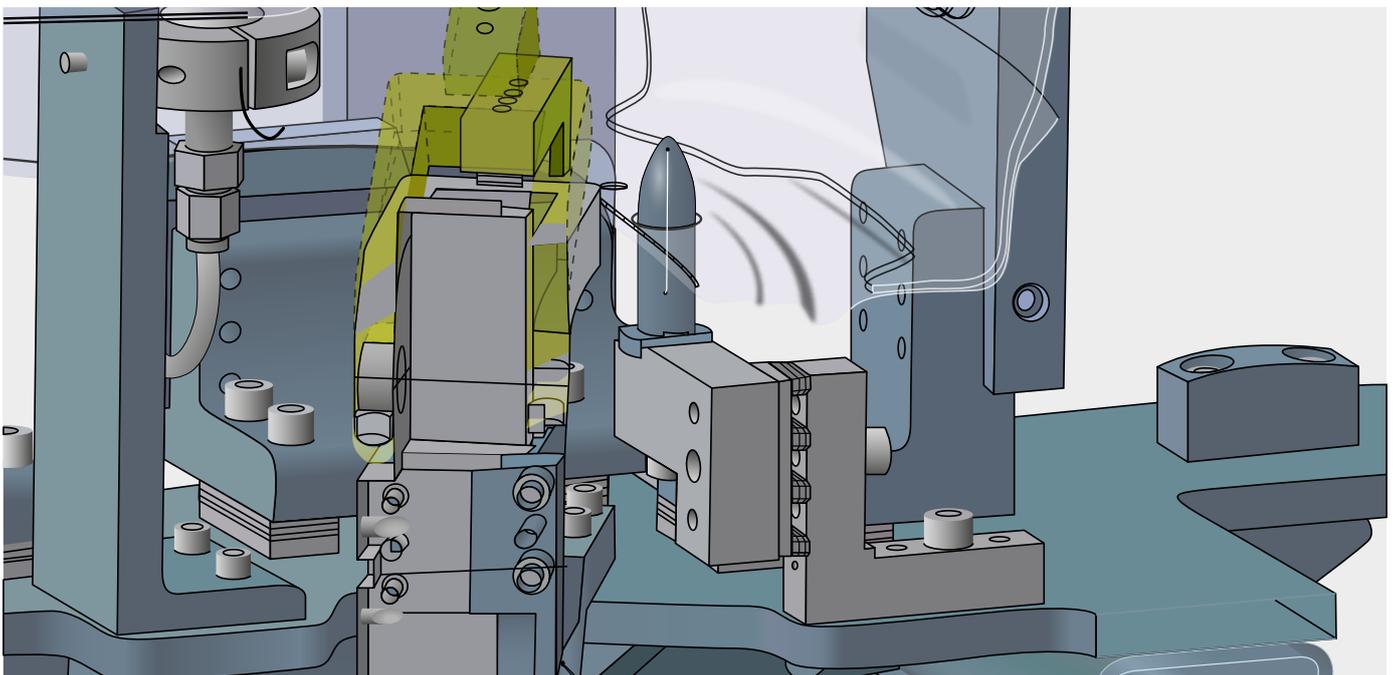
- ▶ Up to 100 times more durable than steel
- ▶ High resistance to wear-and-tear
- ▶ Extreme hardness
- ▶ Excellent stability of shape
- ▶ Absolute positioning accuracy
- ▶ Outstanding surface quality
- ▶ Electrically insulating
- ▶ High dimensional quality of the welding sets
- ▶ No deformation of sealing 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 Solutions 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)	DEGUSIT 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-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 Fin ceramics Solutions 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.

KYOCERA FINECERAMICS SOLUTIONS GMBH THIS IS US. INNOVATION IN CERAMICS.

ELEVATOR MESSAGE

"Our extensive experience in high-performance ceramics and our alliance with Kyocera as a leading global technology group grant us access to innovation and resources that allow us to realize ambitious projects and take the lead for the future. We share our knowledge, and bring it together to create something new that goes beyond our company, beyond different industries and countries. As a team. Together with our customers."

Armin Kayser, General Manager of KYOCERA Fineceramics Solutions GmbH

KYOCERA Fineceramics Solutions GmbH - Summary

Location:	Mannheim, metropolitan Rhein-Neckar region
Founding year:	2019 - Spin-off from FRIATEC GmbH
Employees:	approx. 300 incl. approx. 30 trainees and apprentices
Subsidiaries:	KYOCERA Fineceramics Nordics AB (sales office for Northern Europe)
Brands:	DEGUSSIT, FRIDURIT

We look back on a long tradition in the manufacturing of ceramic products: Founded in Mannheim in 1863 as a brickyard known as "Deutsche Steinzeug", and later as "Friedrichsfeld GmbH", from 1993, the ceramics department continued its successful development under the brand FRIATEC GmbH. Since September 2019 we have been part of Kyocera Group, a leading global ceramics and technology company.

Kyocera companies benefit from the group's cross-department way of thinking and working. We share our knowledge and bring it together to create something new – something that goes beyond our company, beyond different industries and countries. Because innovation and real milestones can only be achieved together. This is what we believe.

With our brands DEGUSSIT and FRIDURIT, we provide innovative solutions for numerous industries: system components for high-tech applications in electrical and sensor technology, mechanical engineering, analysis technology, medical and semiconductor technology, as well as laboratory technology.

We possess internationally recognized know-how in the field of high-performance ceramics, especially for ceramic-to-metal assemblies. Our products are characterized by high quality, precision, and durability. Our production and development location in Central Europe and our customized supply-chain solutions make us extremely agile and ensure maximum reliability for our customers.

We see ourselves as a partner in the development of high-performance ceramics solutions that provide added value for our customers and ensure their technological advantage in their respective markets. Our focus today is on where we want to be tomorrow – together. We develop sustainable solutions that meet the demands of the future, supported by an experienced team of 50 highly qualified and quality-oriented engineers, scientists, technology experts, and masters.

ELECTRICAL ENGINEERING



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HIGH TEMPERATURE TECHNOLOGY



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MECHANICAL ENGINEERING



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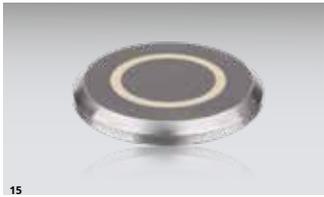
SENSOR AND MEASURING TECHNOLOGY



13



14



15



16

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
08. 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



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