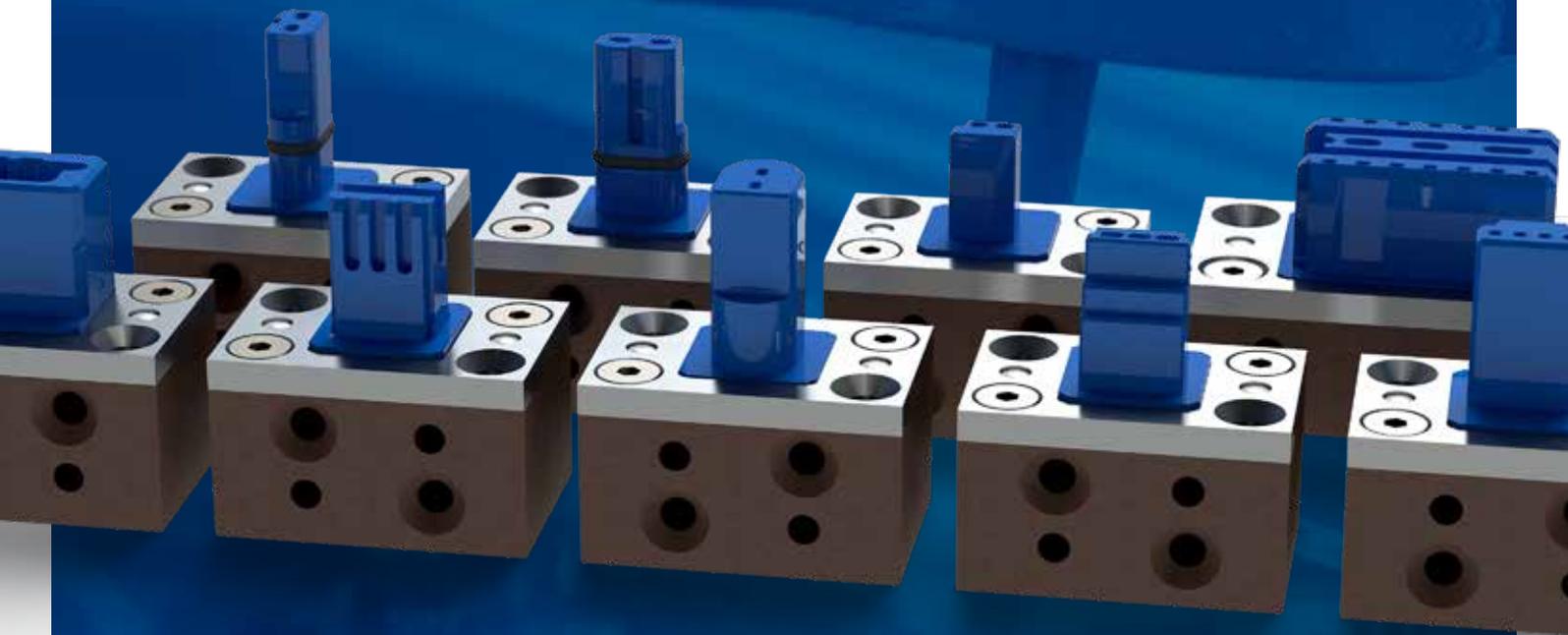


EXTREMELY ANTI-WEAR HIGH-PERFORMANCE CERAMIC

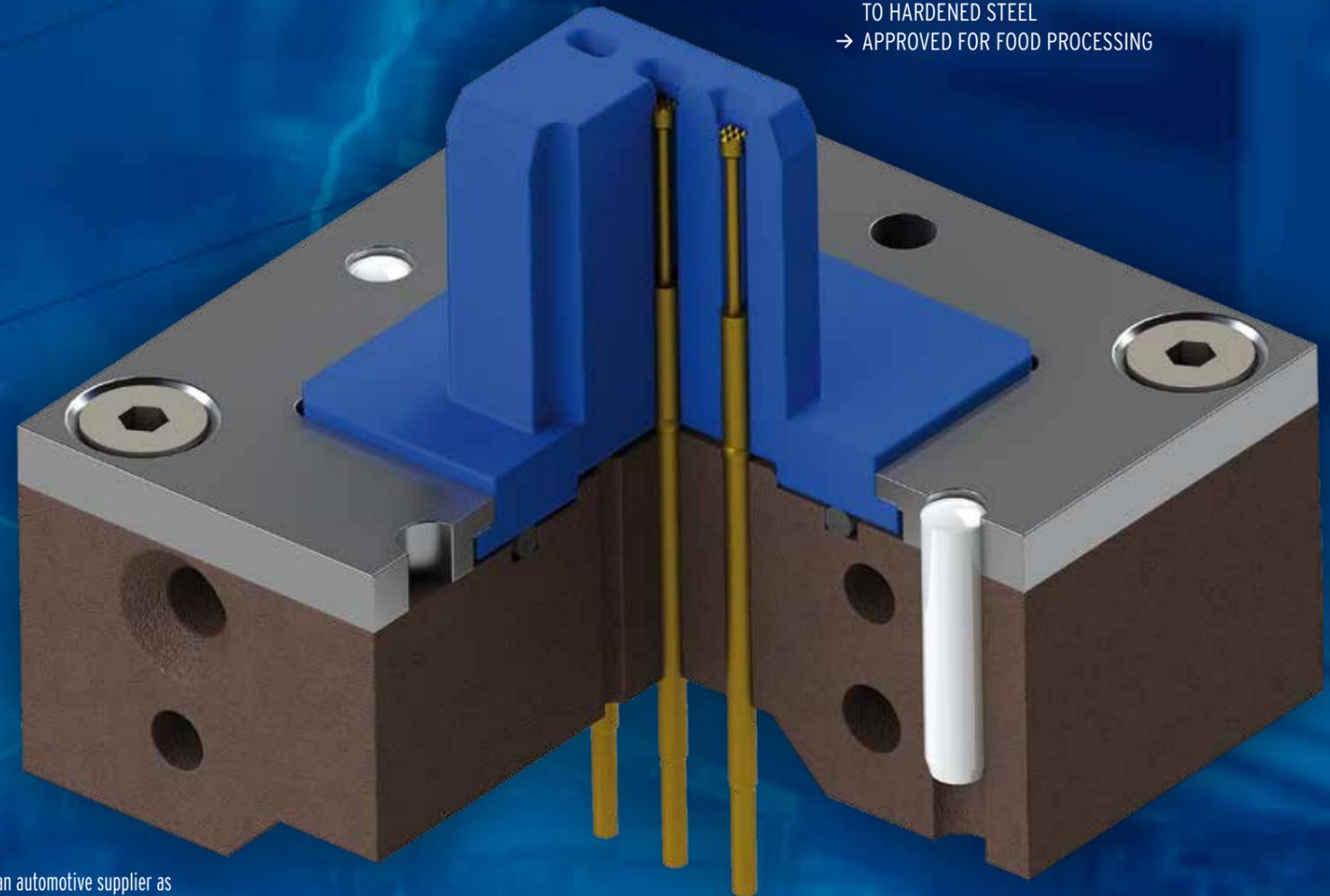


DEVELOPED AS PART OF 5 YEARS' INTENSIVE RESEARCH.
SUCCESSFULLY IN USE FOR 16 YEARS.

CERAMIC: TODAY!

- EXCEPTIONALLY WEAR-RESISTANT
- EXTREMELY TEMPERATURE-STABLE
- ELECTRICALLY AND MAGNETICALLY NEUTRAL
- FREQUENCY-NEUTRAL
- SOLDER-RESISTANT AND ABRASION-RESISTANT
- RESISTANT AGAINST GALLING, PREVENTS ANY MATERIAL ACCUMULATION
- IDEAL FOR CLEAN ROOMS
- CHEMICALLY INERT
- MORE THAN 20 TIMES THE SERVICE LIFE COMPARED TO HARDENED STEEL
- APPROVED FOR FOOD PROCESSING

CERAMIC: IN THE PAST!



Example: test plug for an automotive supplier as an assembly with components made of high-performance ceramic, plastic and metal

WHY CERAMIC COULD TRANSFORM YOUR TESTING ONCE AND FOR ALL

THE SUPERIOR PROPERTIES OF DOCERAM HIGH-PERFORMANCE CERAMIC WITH REGARD TO HARDNESS, WEAR RESISTANCE, TEMPERATURE RESISTANCE, IMPACT STRENGTH, ABRASION-RESISTANCE AND ANTI-ADHESION CONTRIBUTE TO MAKING PROCESSES AND SEQUENCES OF MACHINES AND PLANTS MORE SECURE AND QUALITY-FOCUSSED. COMPONENTS MADE OF HIGH-PERFORMANCE CERAMIC ARE INCREASINGLY REPLACING CONVENTIONAL MATERIALS SUCH AS METAL AND PLASTIC.

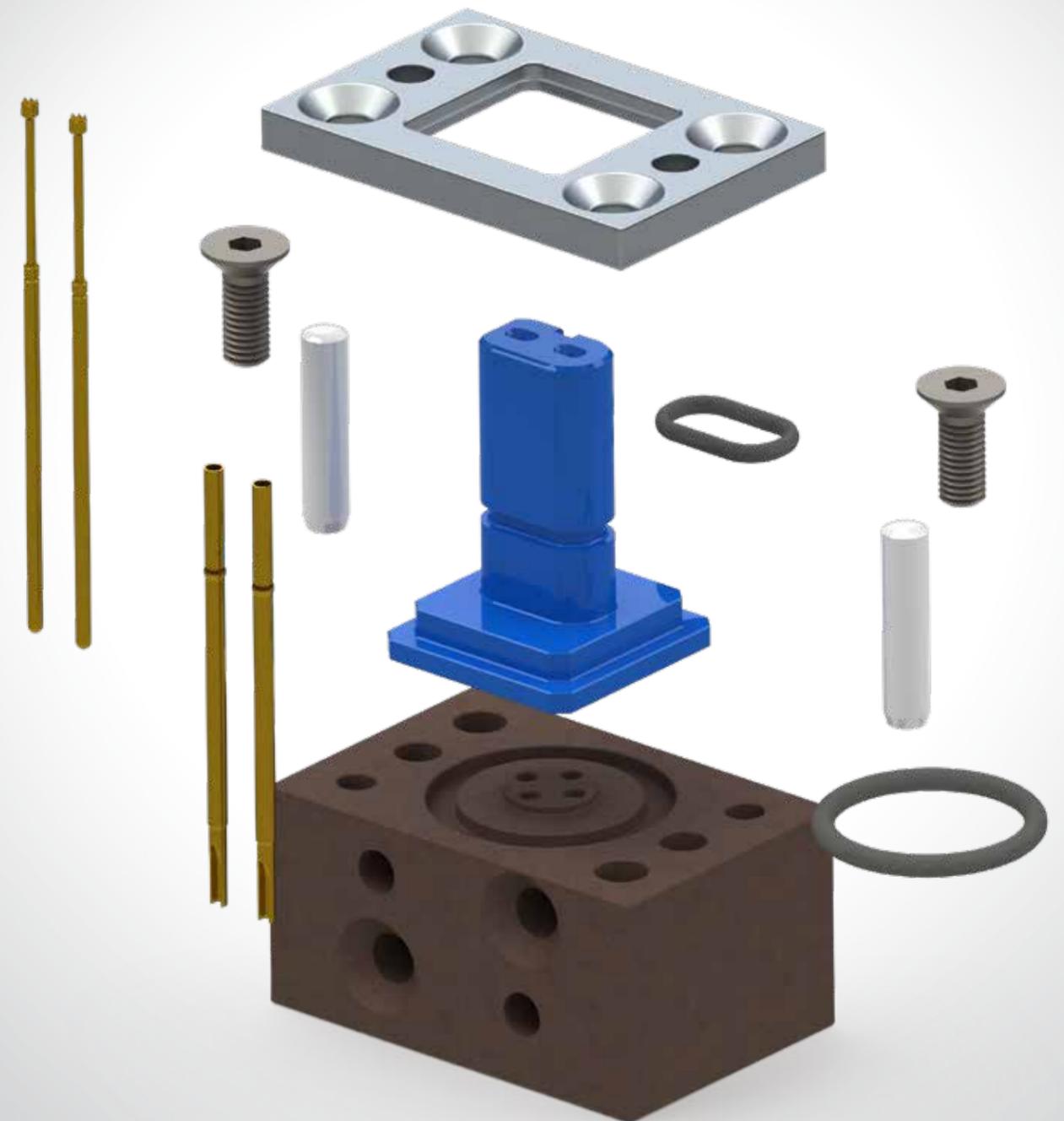
BENEFITS OF TEST PLUGS MADE OF HIGH-PERFORMANCE CERAMIC:

- EXTREME ANTI-WEAR PROPERTY, LEADING TO SIGNIFICANTLY EXTENDED SERVICE LIVES
- IDEAL ALSO FOR COMBINED FUNCTION / SWASH CIRCUMFERENCE TESTS
- CAN BE REALISED EVEN FOR THE SMALLEST OF GEOMETRIES: 0.3 MM WALL THICKNESS
- HIGH TECHNICAL PURITY: THE COMPONENT IS NOT SUBJECT TO ABRASION OR INCORRECT MEASUREMENTS; THE SPRING CONTACT PINS DO NOT BECOME PREMATURELY FAULTY
- OPTIONALLY WITH INFEEED CHAMFER (FOR TESTING SWASH CIRCUMFERENCE)
- THE PLUG CAN BE CONSTRUCTED USING THE COUNTERPART (SOCKET)



CERAZUR IS A REGISTERED TRADEMARK OF DOCERAM GMBH (REGISTER NUMBER 2908516)
DOCERAM IS A REGISTERED TRADEMARK (REGISTER NUMBER 2061094)
'BLAUE KERAMIK' IS A REGISTERED COLOUR MARK OF DOCERAM GMBH (REGISTER NUMBER 301 12 473)

TEST PLUG ASSEMBLY FROM DOCERAM, COMPLETELY ASSEMBLED WITH CERAZUR COMPONENT. SUPPLIED EX WORKS AS AN INSTALLATION-READY MODULE IN CUSTOMER-SPECIFIC CONFIGURATION.



PROCESS SECURITY, PRODUCT QUALITY - WE KNOW WHAT IS IMPORTANT

TESTING SWASH CIRCUMFERENCE PLUGGABILITY



Contact pin outside of the swash circumference = not OK



Not OK contact pin is bent
No contact possible

CERAMIC

DOCERAM TEST PLUGS MADE OF HIGH-PERFORMANCE CERAMIC ARE ALREADY BEING USED AS STANDARD BY RENOWNED CAR MANUFACTURERS FOR DEPENDABLE 100% TESTING OF CAR ELECTRONICS.

SIGNS OF ABRASION/WEAR

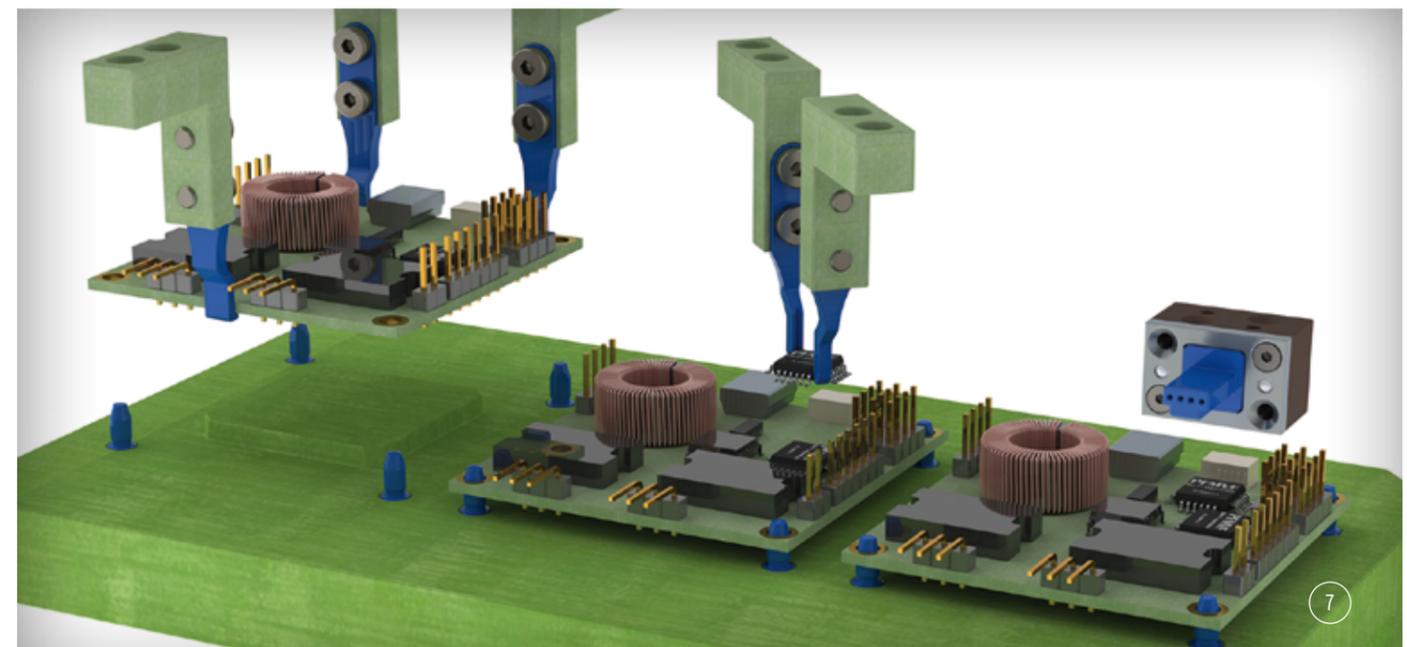
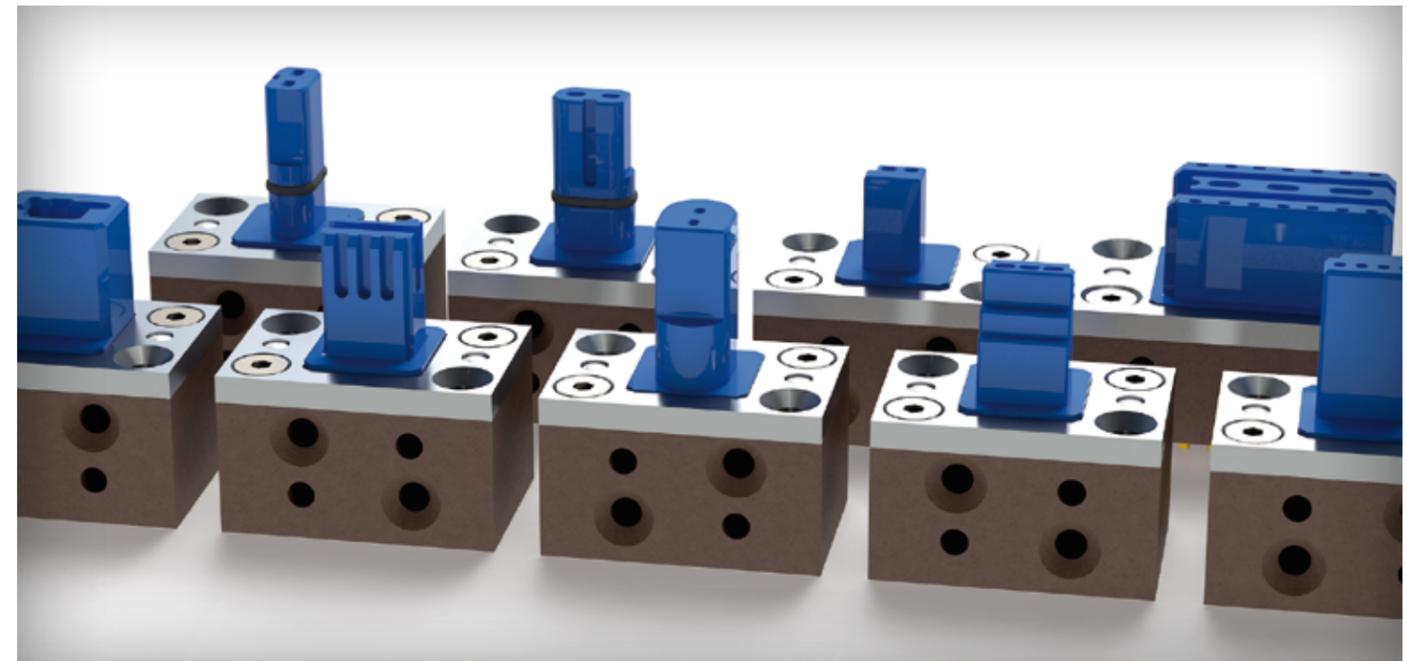
PLASTIC



Not OK contact pins = abrasion/dirt



Abrasion/dirt = Spring contact pins' service life massively reduced
= Plug's shape/tolerance not OK



| PROPERTIES | Unit | Cerazur | Aluminium oxide |
|-------------------------------|-------------------------------------|------------------------|---------------------------------------|
| Composition | - | ZrO ₂ Y-PSZ | Al ₂ O ₃ >99.7% |
| Colour | - | blue | ivory |
| Density | (g/cm ³) | 6 | 3.9 |
| Bending strength | (MPa) | 1300 | 390 |
| Compressive strength | (MPa) | 3000 | 3900 |
| E-modulus | (Gpa) | 205 | 390 |
| Impact strength | (Mpa m1/2) | 12 | 5.2 |
| Weibull modulus | - | 25 | 12 |
| Vickers hardness | (HV 0.5) | 1150 | 2000 |
| Thermal expansion | (10 ⁻⁶ K ⁻¹) | 10 | 5.5-8.4 |
| Thermal conductivity | (W/mK) | <2 | 28 |
| Thermal shock resistance | (ΔT°C) | 280 | 120 |
| Maximum operating temperature | (°C) | 1000 | 1700 |
| Specific resistance at 20°C | (Ω cm) | >10 ¹⁰ | >10 ¹⁷ |
| strength | (kV/mm) | - | 22 |

THIS IS THE REAL VALUE

SUMMARY: FOR USE IN TECHNICAL APPLICATIONS, CERAZUR® OFFERS YOU AN VAST RANGE OF OPPORTUNITIES TO DESIGN PROCEDURES AND PROCESSES IN A MORE STABLE, LONG-LASTING AND SECURE MANNER. YOU CAN FIND OUR PRODUCTS IN THE FOLLOWING INDUSTRIES:

- ✓ MECHANICAL AND PLANT ENGINEERING
- ✓ AUTOMOTIVE AND SUPPLIERS
- ✓ WELDING TECHNOLOGY
- ✓ FIXTURE CONSTRUCTION
- ✓ FOOD INDUSTRY
- ✓ MEDICAL TECHNOLOGY
- ✓ CHEMICAL INDUSTRY
- ✓ METAL FORMING
- ✓ ELECTRICAL/ELECTRONICS INDUSTRY AND MECHATRONICS
- ✓ TESTING TECHNOLOGY
- ✓ PUMP INDUSTRY
- ✓ PAPER INDUSTRY
- ✓ TEXTILE INDUSTRY
- ✓ WIND POWER PLANTS
- ✓ OTHER INDUSTRIES

If you have any questions about high-performance ceramic, please contact us.

Philipp Froese
Application Technology

- ☎ +49 (0) 231 / 92 50 25 - 949
- ✉ p.froese@doceram.com