DOCERAM®

ADVANCED CERAMIC SOLUTIONS

> **Innovative, ceramic moments**

DOCERAM GmbH
Advanced Ceramic Solutions
- **Automotive engineering**
- **Textile technology**
- **Laser technology**
- **Production equipment construction**
- **Electrical engineering**
- **Plastics**

DOCERAM GmbH
Medical Ceramics
- **Medical technology**

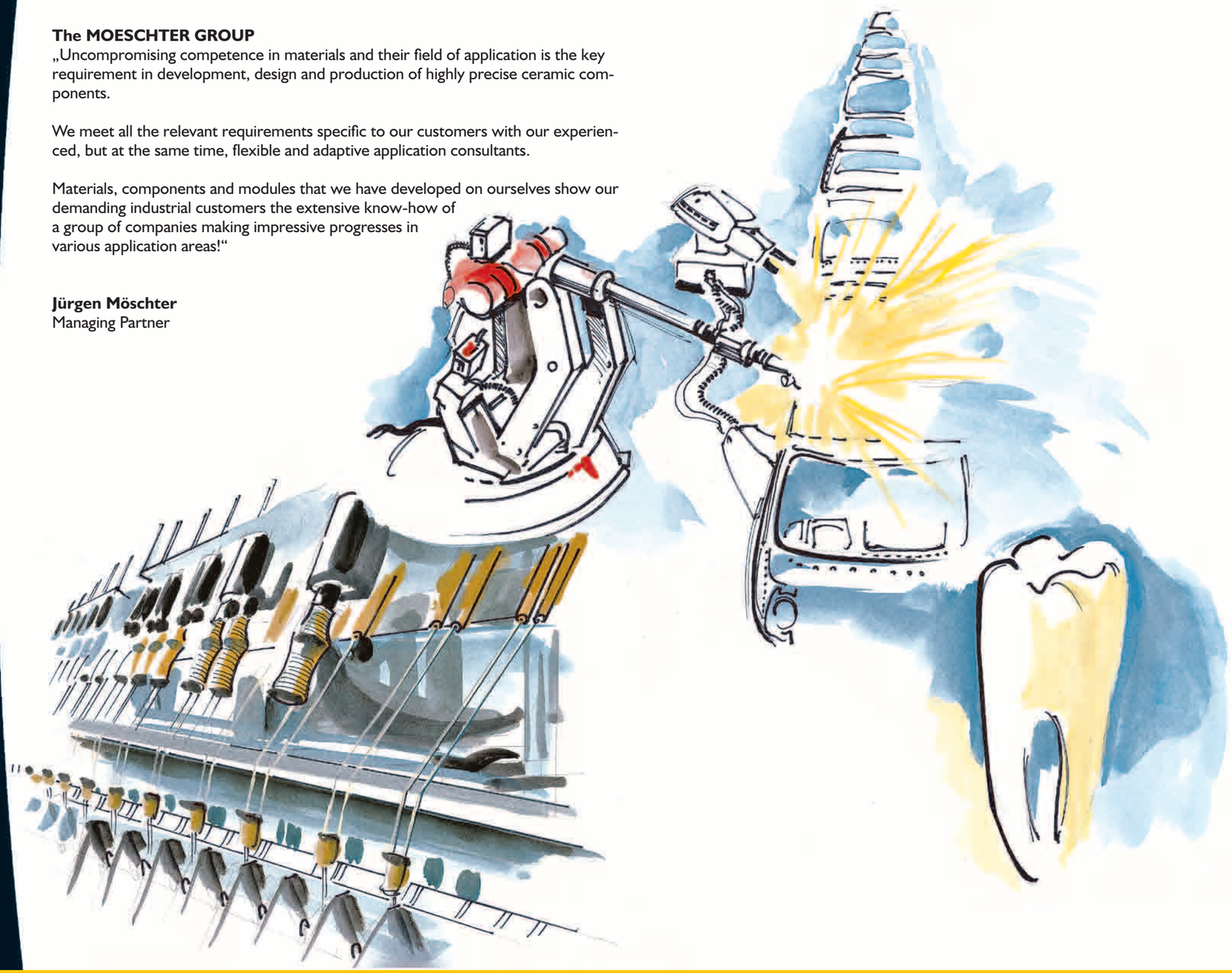
Yixing DOCERAM
Engineered Ceramics Co., Ltd.
- **Large batch production of ceramic components**
- **Manufacture of precision ceramic components**

The MOESCHTER GROUP
„Uncompromising competence in materials and their field of application is the key requirement in development, design and production of highly precise ceramic components.

We meet all the relevant requirements specific to our customers with our experienced, but at the same time, flexible and adaptive application consultants.

Materials, components and modules that we have developed on ourselves show our demanding industrial customers the extensive know-how of a group of companies making impressive progresses in various application areas!“

Jürgen Möschter
Managing Partner



DOCERAM®
ADVANCED CERAMIC SOLUTIONS

Innovative manufacturing technology

Clean-room technology

Just-in-time manufacturing

Fully automatic diamond cutting technology

> Patented high-performance ceramics for reliable processes and standardised operations

> **Technological consultation and design based on your applications engineering**

> **Ultra-modern manufacturing facilities**

> **Quality management carried out during the process**

Our proximity to people and machines
in customer applications guarantees holistic solution thinking and is a guarantor for
> **Short development cycles**
> **Optimised operations**
> **High cost-effectiveness**
> **Innovative solutions**

and communicative engineering between our application technicians and your designers - at a top professional level!

Hi-tech materials
„We present to you the third generation of high-performance ceramic made of the fully developed materials:
CERAZUR, VOLCERA, Z-1000 and NACERA.

Outstanding physical and chemical properties under extreme loads have revolutionised a whole variety of applications in the automotive sector, general industry, textile industry as well as in the field of medical technology.

This results in the highest manufacturing speeds, reliable operations and processes with the utmost precision and, at the same time, multiplies the service life in each case while complying with the tightest tolerances!“

Marcus Keulen
Cofounder and Managing Director

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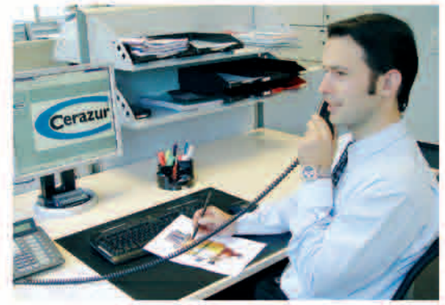
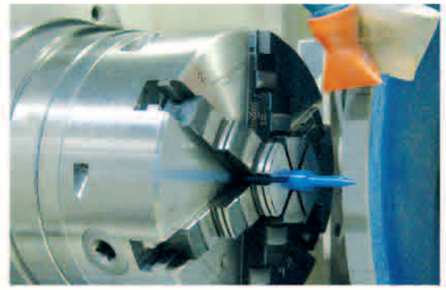
ADVANCED CERAMIC SOLUTIONS



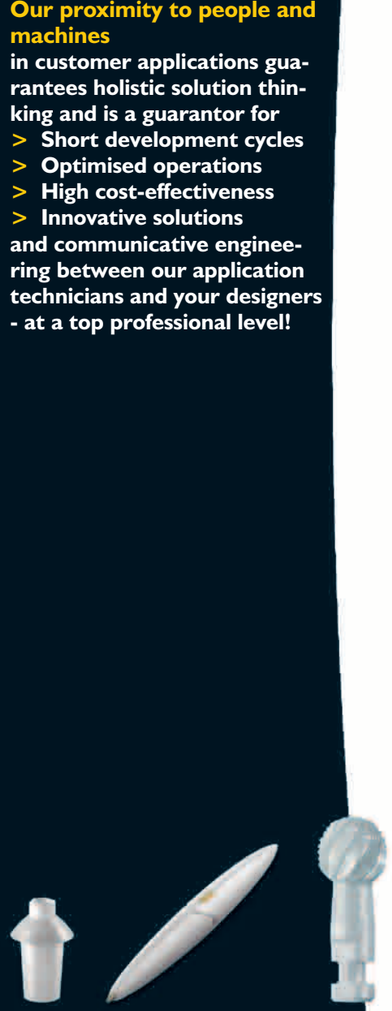
Direct technological consultation on your application

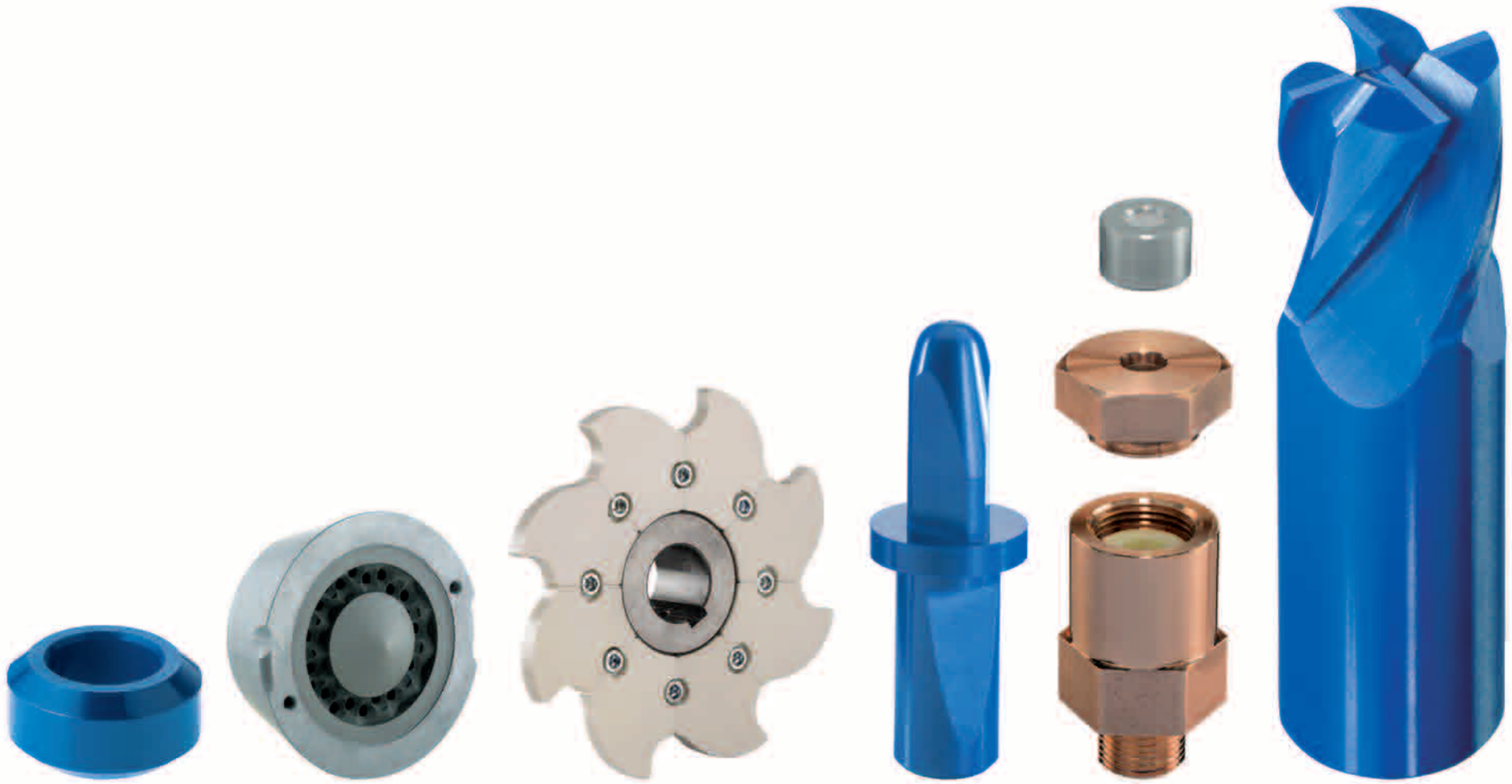
Design implementation using CAD/CATIA



Highly precise production

QA during the process and 100% inspection





> **Load capacity, process reliability, precision and cost-effectiveness**

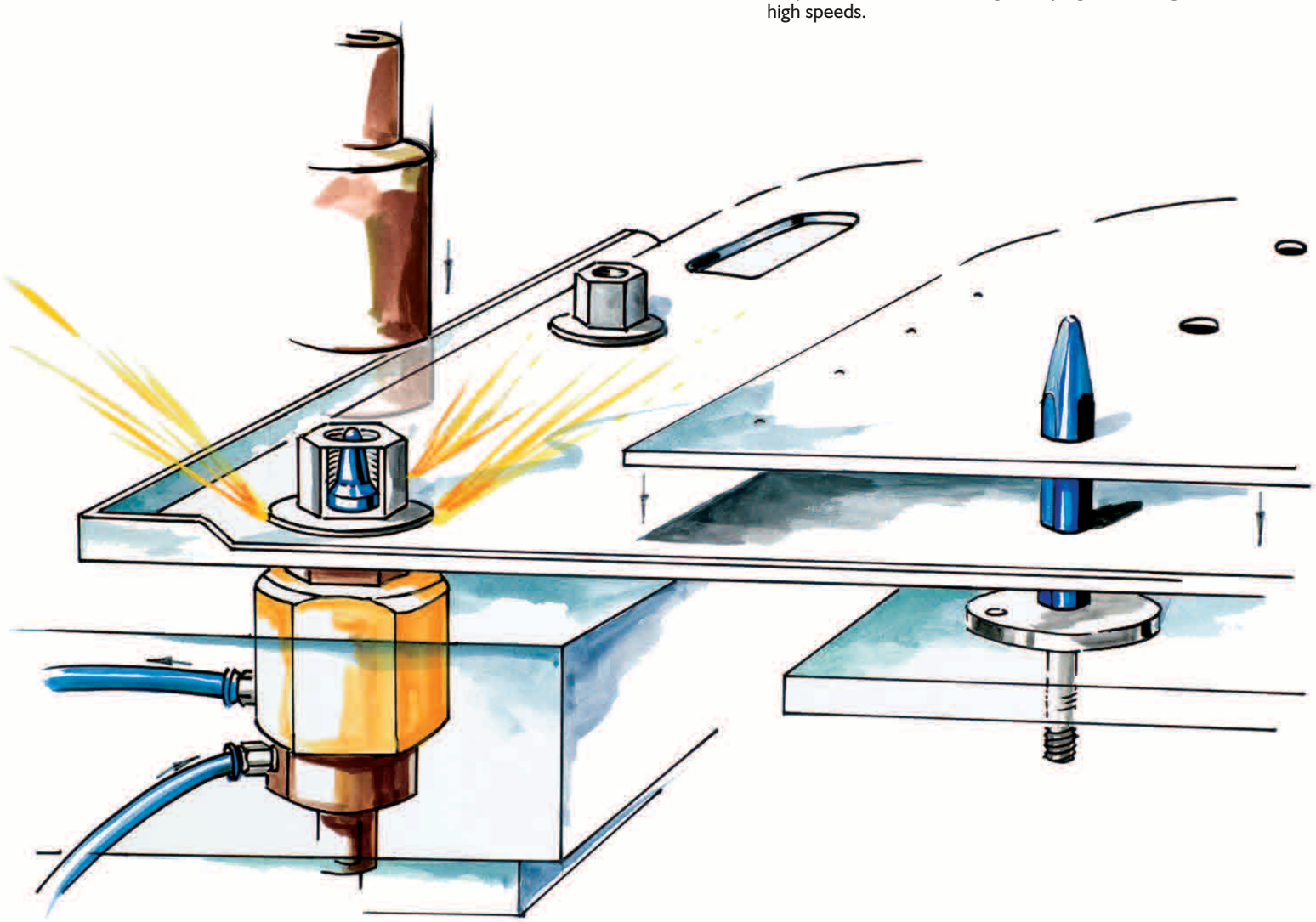
Welding

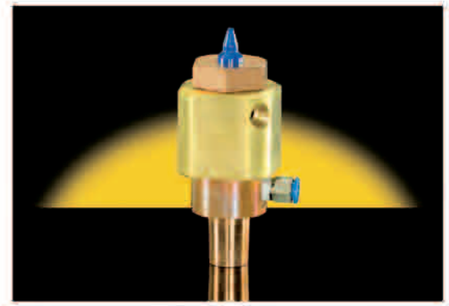
Automotive engineering
Automotive supply industry
> Welding
> Jig-making
> Body-shell work

Outstanding materials developed for formidable operating conditions
> In automotive engineering and its supply industry
the use of our high-performance ceramics is synonymous for the solution of all technological requirements: hardness, precision, wear and temperature resistance, impact strength, abrasion resistance, anti-adhesive effect on spatter, fitting accuracy and a high service life with tolerances around 0.05 mm.

> In the manufacture of car engines
parts subject to extremely heavy loads, such as valves, rotors for turbochargers or rocker arms for camshafts are made of ceramic.

> In the metal-working industry
high-performance ceramics are used because of their extreme hardness for processes, such as milling, stamping and drilling of hard materials at high speeds.





> Individual solutions and proven standards

DOCERAM®
ADVANCED CERAMIC SOLUTIONS

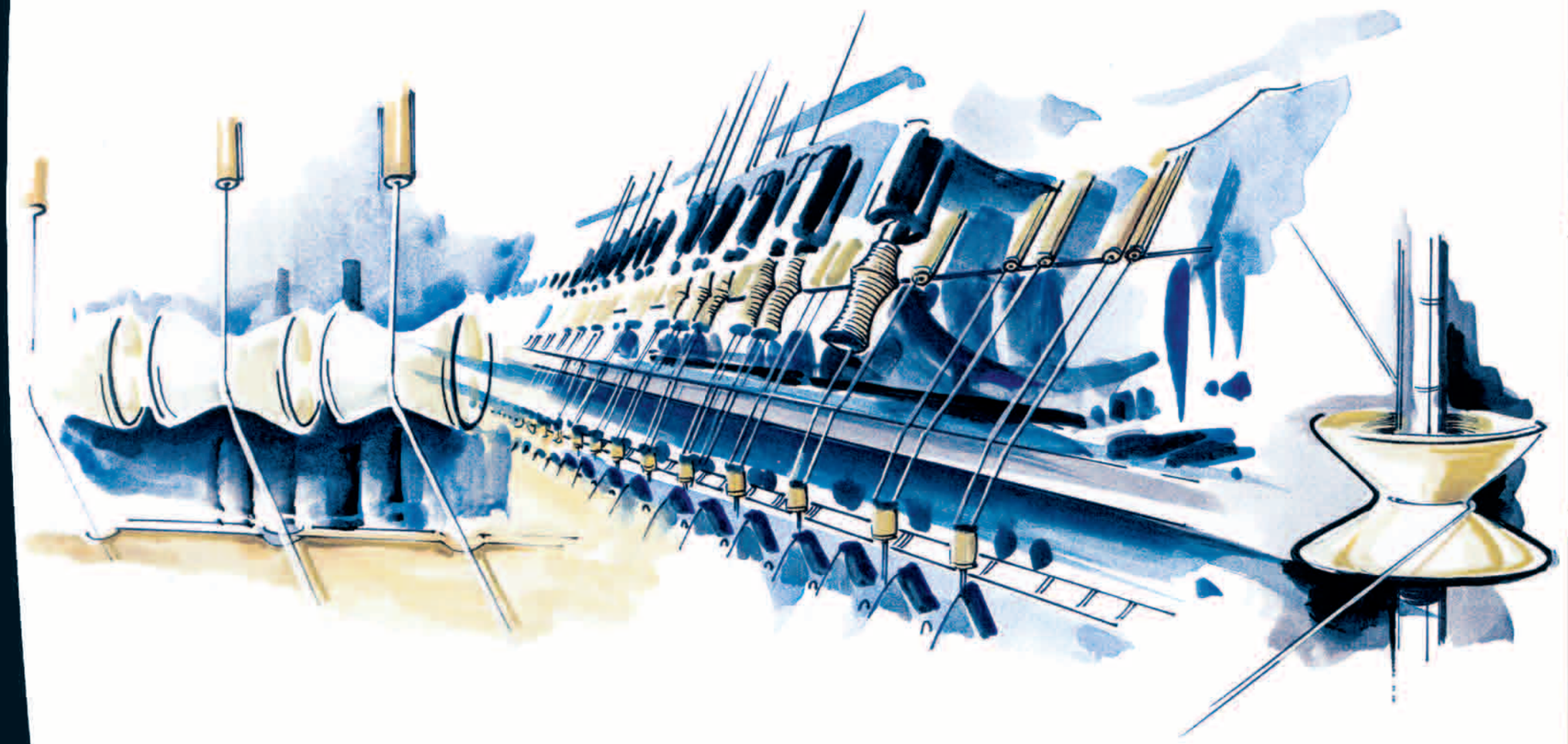
Textile technology

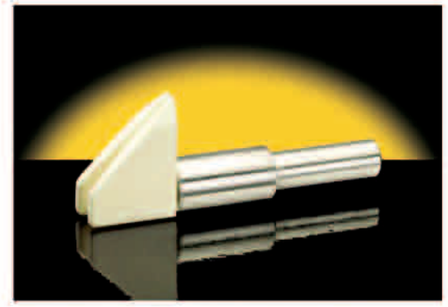
Ceramic materials of the highest quality guarantee a reproducible constant quality.

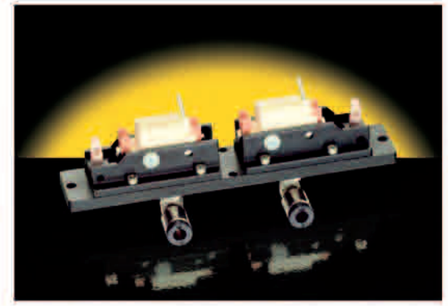
- **Precise thread guides**
- **Thread sparing**
- **High production speeds**
- **Long service lives and process cycles**

> **In the textile industry**
thread guides with specially developed low friction surfaces and air nozzles make it possible to manufacture increasingly finer yarns at continually increasing speeds.

A certain unique criterion is achieved by specialising in the manufacture and installation of high-quality machine components and systems for manufacturing synthetic fibres.







> **Excellent guiding properties and extremely high production speeds**

DOCERAM GmbH
Medical ceramics

> Medical dental products
Abutments
CAD/CAM blanks

> Medical implants

Certified materials
> Nacera Z

according to Appendix II of the 93/42/EEC directive on medical products

Quality management system according to DIN EN ISO 13485 for medical products

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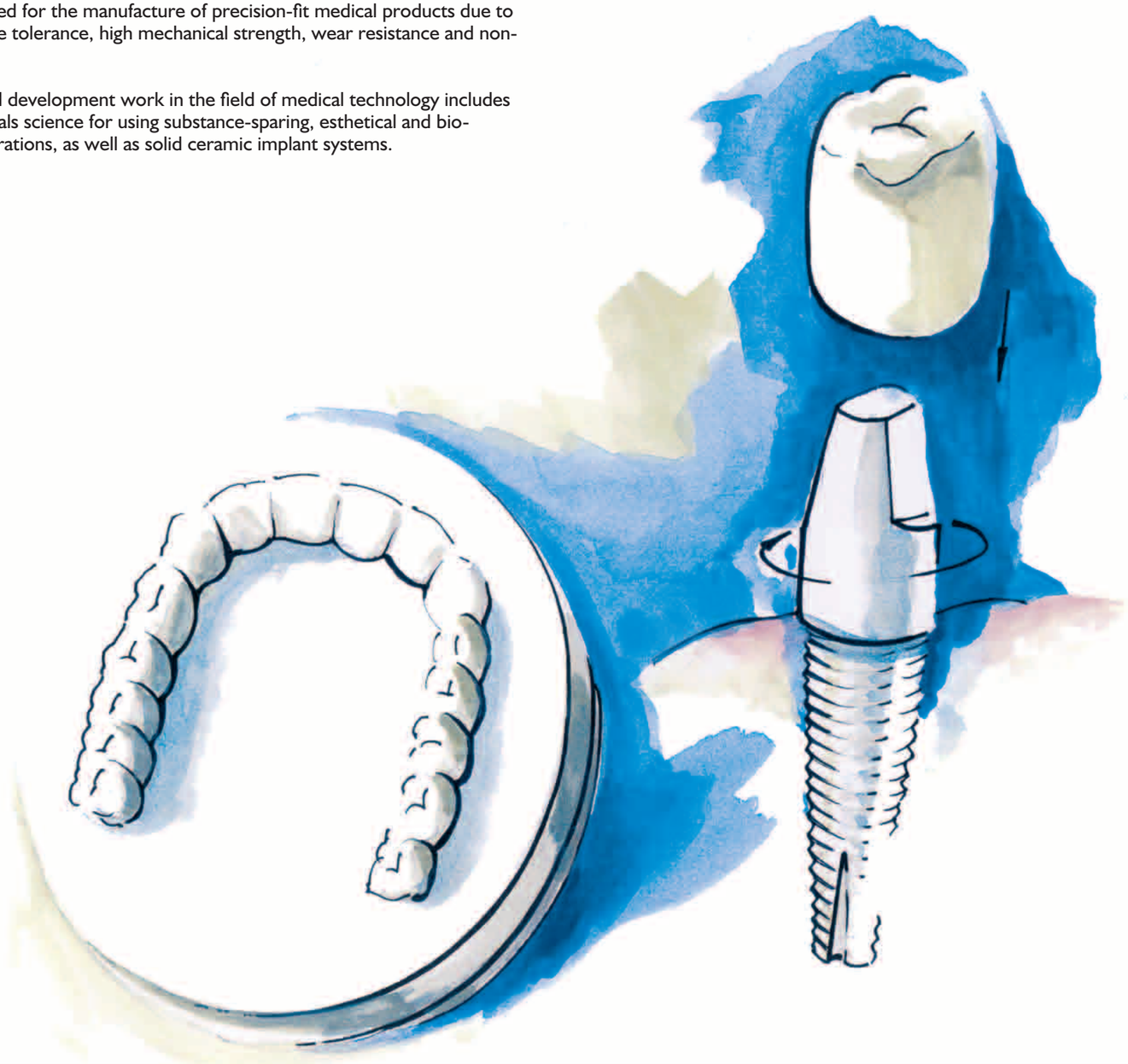
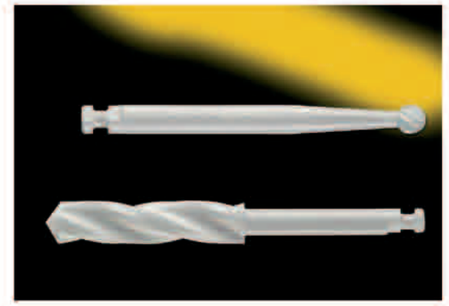
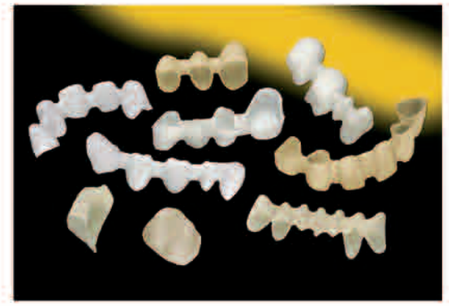
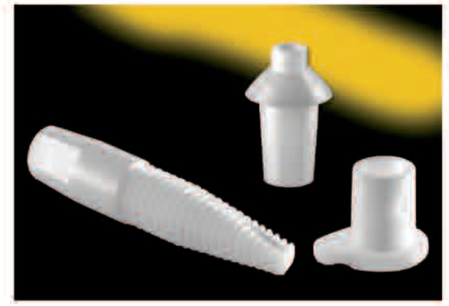
> In the medical field
our ceramic is used for the manufacture of precision-fit medical products due to its excellent tissue tolerance, high mechanical strength, wear resistance and non-corrosiveness.

Our research and development work in the field of medical technology includes aspects of materials science for using substance-sparing, esthetical and bio-compatible restorations, as well as solid ceramic implant systems.









> 100% validated quality in the field of medical technology

Your visions - our realisation
In your company too, innovative high-performance ceramic will soon be used due to its multifunctional aspects.

Our development engineers and application technicians are well prepared for you.

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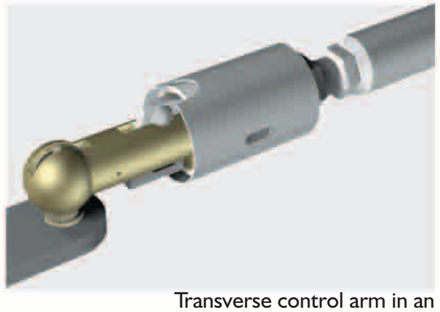
ADVANCED CERAMIC SOLUTIONS

Excellent material properties
for suitable to ceramic designs
and use in process-compliant applications

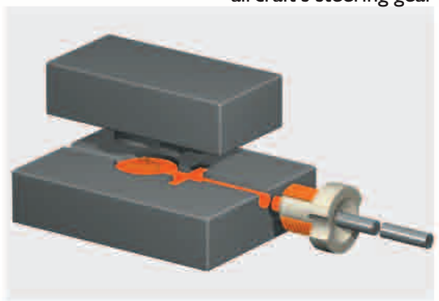
Benefits of high-performance ceramics
> Extremely high abrasion resistance
> Shape stability at highest temperatures
> Anti-adhesive effect
> Electrical insulation
> Extremely high application temperature
> Very high temperature strength
> Maintenance-free

Material	Cerazur	Volcera	Z1000	Natera
> Properties	High strength and impact resistant	Thermal shock resistant, extremely wear resistant	Incomparable cost-effective brand quality	Superheated steam resistant
> Application	Centring and locating	Centring and MIG/MAG welding	Standard applications	Dental technology
> Colour	Blue	Grey	White	White
> Density	6 g/cm³	3,2 g/cm³	6 g/cm³	6,04 g/cm³
> Bending strength	1.300 Mpa	750 Mpa	1.000 Mpa	1.200 Mpa
> Compressive strength	3.000 Mpa	3.000 Mpa	3.000 Mpa	3.200 Mpa
> Impact resistance	12 MPa $m^{1/2}$	6,7 MPa $m^{1/2}$	8 MPa $m^{1/2}$	8 MPa $m^{1/2}$
> Knoop hardness	16.500 N/mm²	19.000 N/mm²	18.000 N/mm²	18.000 N/mm²
> Thermal conductivity	< 2W/mK	22 W/mK	< 2W/mK	< 2W/mK
> Thermal shock resistance	Δ T = 350° C	Δ T = 750° C	Δ T = 270° C	Δ T = 270° C
> Maximum application temperature	1.000°C	1.300°C	1.000°C	1.000°C

The values mentioned above were acquired from test objects and are typical for the material. The product properties, however, can vary from these depending on component design and the shaping process used.

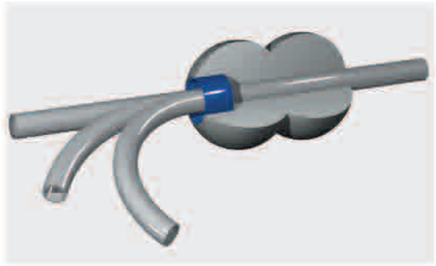


Transverse control arm in an aircraft's steering gear



Guide bush for induction heating

Vacuum lug nozzle with chip disc

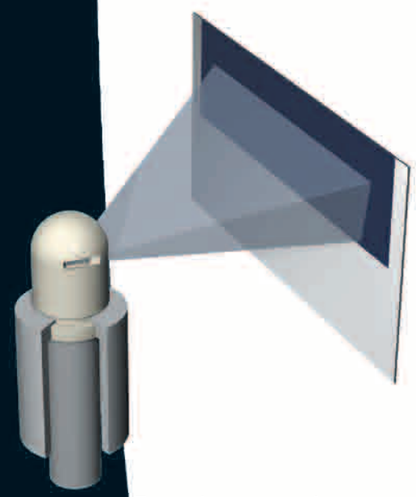


CNC pipe bending tool

Piston studs

Laser nozzle

Protective housing for measuring sensor technology



Enamel spray nozzle

Pump piston

> **Innovative ceramic solutions for a limitless variety of applications**

A group without limit
Together, all our companies stand for the all-embracing idea: to create fully developed and highly profitable overall solutions that permanently and effectively secure your as well as our existence in a highly competitive global market!

Higher-level projects in the MOESCHTER GOUP's subsidiaries DOTHERM, DOCERAM and STS Friction are guarantors for

> Technology transfer, which includes several materials
> Overall product manufacturing know-how
> Highly qualitative modules made of highly different materials
> Fully developed solutions from our all-encompassing approach to applications
> Integrated exchange of knowledge within the group
> Faster realisation of innovative visions
> Capability of selecting optimum manufacturing facilities

Ultra-modern manufacturing facilities
in Germany and Asia guarantee cost-effective processes and market-driven areas of specialisation.

> Engineering and the key aspects of prototyping and mass production are carried out in Germany, while large-volume/mass production takes place in Yixing, China.

> Our second manufacturing sector, which has also been established, is specialized on highly precision grinding work done on high-performance ceramics.

> The permanently resident German management ensures adherence to maximum demands and relevant quality standards in our Chinese facilities.

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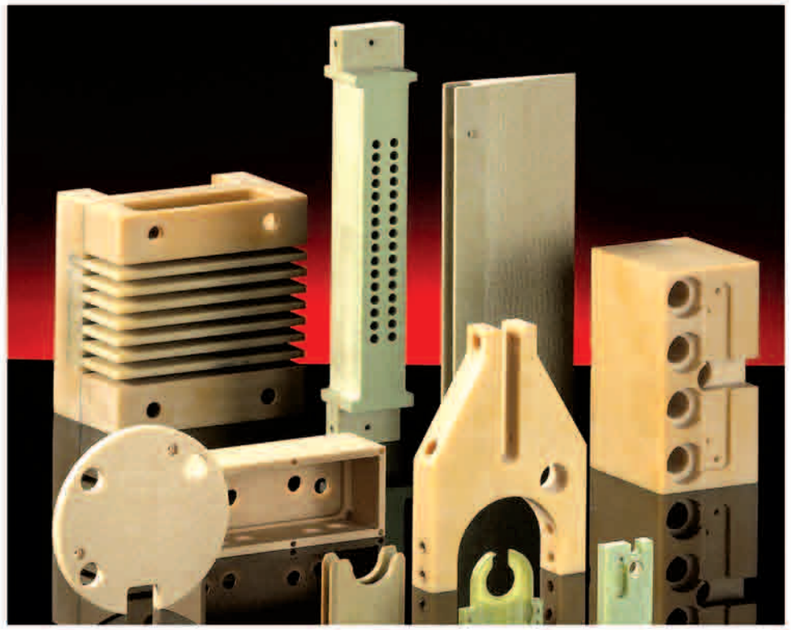
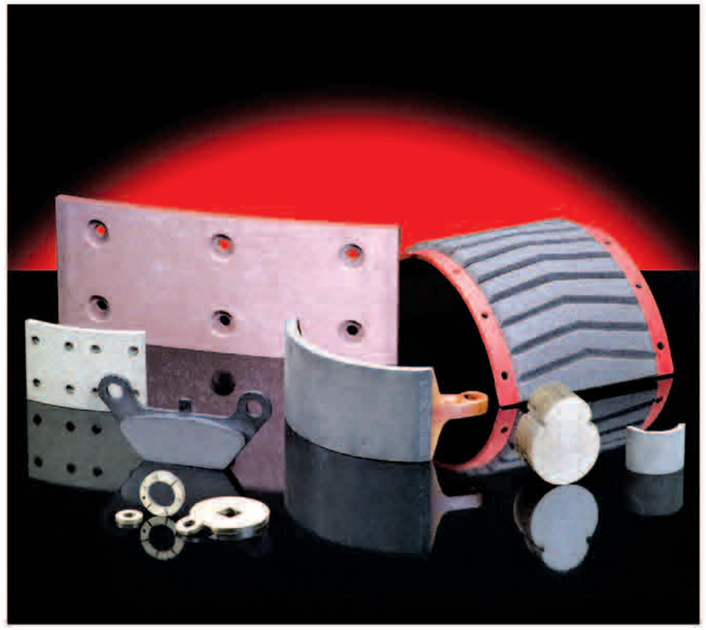
Innovative manufacturing technology

High-end production lines

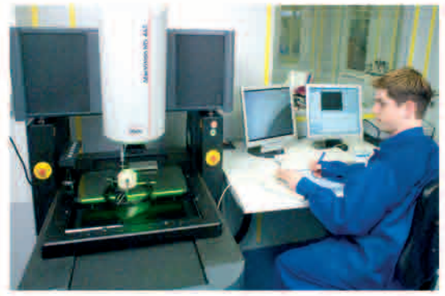


DOTHERM, high-temperature insulation technology



STS Friction, friction pad technology

Quality management



at a top technical level

> MOESCHTER GROUP's joint projects with DOTHERM and STS Friction

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> DOCERAM GmbH
Medical Ceramics

> Yixing DOCERAM
Engineered Ceramics Co., Ltd.
Yixing, China

Ceramic offers virtually opportunities that,
together with our uncompromising urge to innovate,
make your visions a reality!

„Realising visions together!“