

40 Years of Swiss Precision in Technical Ceramics

For 40 years now, Metoxit AG/CH has been producing highly complex oxide ceramic components for mechanical engineering applications, CAD/CAM disks and implants for the dental sector as well as ball heads and components for peripheral joints for orthopaedics. Working together with its customers, the company has developed specific solutions and innovative ceramic products for various industrial applications.



Fig. 1
BIO-HIP ball heads and socket inserts

Dental and other medical applications

The portfolio for dental applications comprises implants, CAD/CAM disks (opaque zirconia, high-translucent zirconia, pre-coloured blanks) and semi-finished parts. BIO-HIP ball heads and socket inserts made of alumina, Al 999-HIP, ZTA and zirconia TZP-A and ATZ-HIP for endoprostheses, but also complex components for peripheral joints are some of the company's other products for medical applications. Ziraldent® ceramic implants impress with primary stability, rapid osseointegration and impressive long-term stability. Furthermore, they exhibit inert and biocompatible behaviour. They can be used for patients who are unable to accept titanium.

Keywords
zirconia, alumina, ATZ, ZTA

Hybrid solutions (ceramic plus PEEK or titanium) are an alternative under economic aspects or for special surgery needs regarding elasticity of the implant. A core competence of Metoxit AG is the know-how in finishing and joining (gluing, brazing, mechanical joining) of these different materials.

CAD/CAM disks are manufactured according to ISO 6872:2015 class 5. The visual effect of the tooth is defined by the interplay of colour intensities, translucency, opalescence and fluorescence. Exactly these characteristics are reflected in the innovative dental products offered by Metoxit AG. To achieve the best aesthetic solution, opaque and high-translucent zirconia with supreme strength is available in a wide range of colour shades. At present, four types of TZP with different yttria content

are available. New special zirconia powders have now been developed by raw material suppliers, which inspired the development of graded materials (opaque to translucent) that also have to achieve excellent mechanical properties. This development is ongoing to further widen the material portfolio.

Industrial applications

The product range comprises customized, specially designed components qualifying for high-level certificates from the food and drug industry (FDA, ISO 9001 : 2015, Food Authenticity according European Regulation 1935/2004/EG and DIN 51032). TZ-HIP is a material derived from the know-how of the company's dental activities and is the preferred solution for applications requiring highest mechanical strength (bending strength up to 2000 MPa).

Examples of application are both in solutions for harsh working environments and decorative elements (e.g. for jewellery, automotive).

Pistons and valve seat rings are available for the high-pressure pump range for extreme pressures up to 6000 bar and impress with the highest surface quality ($R_a < 0,05 \mu\text{m}$), combining the extraordinary bending strength, compressive strength, edge chipping stability and stiffness of ceramics. Each sealing system requires individual ceramic materials (alumina, zirconia, ATZ,

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History

1978

Founding of Metoxit AG as a joint-venture of Alusuisse and Tonwerke Thayngen. Both companies each own 50 % of the new company.

1980s

New innovative products are created, such as hip joint balls made of high-purity alumina and zirconia.

The balls are subjected to Hot Isostatic Pressing (HIP), at that time an absolute novelty in the industry.

1985 – 1986

The AGZ acquires 50 % shares of Tonwerke Thayngen and Alusuisse and becomes the sole owner of Metoxit AG.

1990 – 1991

The FDA Food and Drug Administration issues a masterfile for aluminium and zirconia ball heads.

1993

Entry into the CAD/CAM technology, first blocks of zirconia are manufactured.

1997 – 2000

ISO certification and CE marking for medical devices.

2001 – 2002

Metoxit started with development of customised dental implants.

2004 – 2005

Metoxit enters series production of CAD/CAM disks as a pioneer.

2011

The own developed dental implant Ziraldent was launched into the market.

2018

Metoxit AG celebrates its 40th anniversary.

METOXIT
high tech ceramics

Swiss Precision in Ceramics

- Implants
- CAD/CAM Disks
- Orthopedic Products
- Technical Components
- Decorative Elements



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Fig. 2
Coloured ceramic elements

ZTA). Depending on technical needs, the most economical solution can be selected. Coloured ceramic elements (zirconia, TZP, ATZ) for the watch, jewellery and automotive industries are offered in a wide range of

colours. Individual colour shades are available on request. Either semi-finished (pre-sintered or sintered) or customized finished (grinded, polished, sand-blasted, coated) surfaces can be designed.



Fig. 3
Watch cases

Metoxit complies with the following standards: ISO 9001 : 2015, EN ISO 13485 : 2016 + ACI 2016, FDA Registration (FDA 510k), European Regulation 1935/2004/EG and DIN 51032. KS

EXPECT MORE from your structural ceramics

- Outstanding fracture toughness
- High strength and durability
- Increased wear resistance
- High shock absorption
- Low thermal conductivity
- Exceptional sinterability

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