

SWITZERLAND

Metoxit: “Swiss-Made” Oxide Ceramic Components to Meet the Highest Standards

Metoxit AG in Thayingen/CH is established in dental and other medical applications as a supplier of biocompatible ceramic components. A second product segment serves a wide range of industrial applications, e.g. ceramic pistons and valves for very high pressures or aesthetic products for watches and jewellery. The company’s aim is to grow with both established and new activities. We met with CEO Dr Gian-Carlo Gullo (GCG) and he informed us about current technical and market-relevant developments.



Fig. 1
CEO Dr Gian-Carlo Gullo

CA: What goals have you set yourself with regard to the further development of your product range?

GCG: Our targets are oriented to concrete market needs. We have development partnerships that include not only institutes and universities but especially our powder suppliers. In many cases, it is, however, also important to involve the users of the components at a very early stage in projects in order to develop products in line with practical requirements.

For example, this year at the IDS 2019 in Cologne/DE, we successfully presented our new CAD/CAM disc with colour gradient and a hybrid implant. With a flowing colour shade that changes in its tonality, the dental disc replicates the natural colour gradient of a tooth, enabling natural-looking, aesthetically appealing dental restorations.

The hybrid implant ideally combines the advantages of ceramics and the material titanium thanks to a novel glass soldering technology that ensures a reliable, firm bond of the two time-tested dental materials. This implant was developed in an international research alliance, in which, besides experts from materials engineering, above all medical professionals were involved so as to ensure that a product with crucial advantages for the patient and the attending doctor could be developed (Fig. 2).

CA: The variety of materials at Metoxit is specifically oriented to needs like biocompatibility, colour gradient and translucency combined with high strength, that is the dental sector. How was this wide spectrum of materials developed?

GCG: We work with different powder suppliers, based on their products, we develop our special formulations, which we mix together here inhouse according to product specifications and use as a granulate ready for pressing.

CA: Besides new zirconia grades, have you concluded other material developments?

GCG: New is a calcium phosphate material for an interference screw for connecting torn ligaments to joints. The titanium screws used up to now have the disadvantage that a second surgical procedure is required to remove the titanium screw after the torn ligaments have healed.

The project was conducted primarily with the University of Bremen as the geometry of the screw also had to be changed. Calcium phosphate cannot sufficiently withstand torsion so that a form (Fig. 3) as well as screw-in method had to be developed.

Besides such new products, we also process all the classical oxide and mixed oxide materials in ceramics.

CA: Besides pressing, do you work with other shaping technologies?

GCG: On account of the high strengths that we demand and the commensurately high values near the theoretical densities of the materials, we use pressing systems generally in combination with HIP.

As the complexity of the moulds in pressing technology is limited, we have to rework components to a relatively large



Fig. 2
Hybrid implant



Fig. 3
Interference screw

degree in their green, pre-sintered and fired states. For this reason, we have initiated a CIM project with the aim of reaching very high densities with this technology. That will not only be important for products for medical applications, but also for other industrial sectors.

CA: How high is the share of sales for medical applications? What is the focus in respect of other industrial applications?

GCG: We started out in 1983 in medical sector with hip joint ball heads, and ten years later we went over to blanks for the dental sector. Since around 2000, we have been involved

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in the production of dental implants. So we have extensive experience in respect of the certifications necessary for this sector (e.g. ISO 6872:2015 class 5). Medical applications make up around 2/3 of our sales, that includes hybrid components that we fabricate by means of different joining methods with plastics like PEEK, or titanium.

In other applications – e.g. for pistons and valves – the demand for our materials comes when above-average material strength and/or precision are needed. Here, too we have the relevant high-level certification (FDA; ISO 9001:2005 food authenticity according European Regulations 1935/2004/EC and DIN 51032). Interesting are also applications in technical ceramics that also require pleasing aesthetics – watches, jewellery and decorative elements.

In our laboratory, we produce a wide spectrum of colours. Once colours have been agreed with the customer, they must be deliverable over ten years. Here, too, this requires the sort of documentation and quality control that is routine for us in medical applications.

As soon as we work with customers whose products are designed for contemporary taste/fashion, only very short development times can be tolerated as the products have to be launched on the market very quickly.

The medical market segment is one of the drivers for developments, but ultimately profits from the findings from material and technology development and on joining methods in all other application segments. There is generally cross-fertilization between sectors from new projects.

CA: Tell us please about the geographic orientation of your market activities today?

GCG: In the European market, we already have a broad base, our goal is to strengthen our presence on the Asiatic and American markets. To this end, we are in the process of setting up an extended network of our representatives. We can also imagine external growth with a partner who complements our portfolio.

CA: Thank you for talking to us.

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