

Coatings for advanced dental technology

High precision is required for producing dental prostheses. The coating experts at Balzers, a surface technology brand of the Switzerland-based Oerlikon Group, not only develop coatings for microtools that allow productive machining of highly abrasive materials in dental technology. Precision components, such as abutments, also obtain high-quality wear protection – with aesthetics included.



High-performance dental ceramics such as zirconium oxide place tough requirements on the microtool. These materials can be machined reliably and productively with the diamond coatings BALDIA COMPACT and BALDIA COMPACT DC, which have been specially developed for highly abrasive materials. (Image: Shutterstock)

The machining of high-performance materials for dental technology poses a big challenge for the tool industry. Machining, in which microtools with a diameter of 0.1 to 1 millimetre machine materials with tightest manufacturing tolerances, is exceptionally demanding. Today, dental laboratories are equipped with highly productive, automated production systems. The arising tool wear and associated production costs can be significantly reduced by applying advanced coatings.

oxide, BALDIA COMPACT withstands abrasive wear thanks to its extremely high hardness, which considerably extends the service life of these tools. The combination of higher wear resistance and low friction reduces heat input, thus enabling dental laboratories to achieve high surface quality even at higher cutting speeds. The end result is that the surface finish of high-quality dental ceramics is improved appreciably, so that patients benefit from optimum dental care.

BALINIT TISAFLEX: optimum machining quality for dental prostheses made from titanium, noble metals and non-ferrous alloys

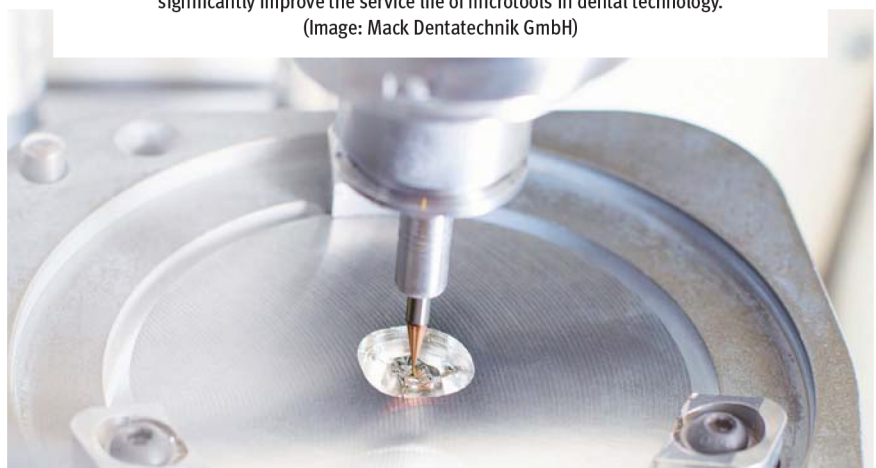
In addition to ceramics, also titanium, noble metals and alloys from non-ferrous metals, such as chromium,

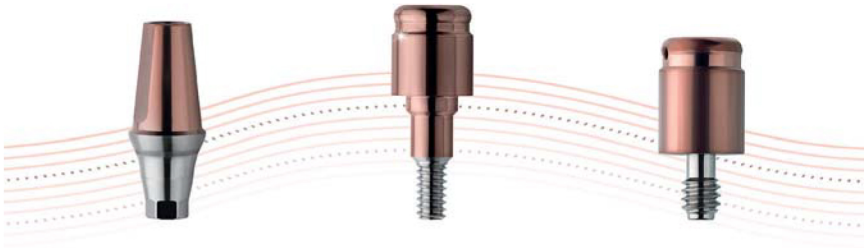
BALDIA COMPACT and BALDIA COMPACT DC for high-strength dental ceramics

The diamond coatings BALDIA COMPACT and BALDIA COMPACT DC have been developed especially for the machining of compacted and sintered powder materials as well as dental ceramics. The latter achieves even tightest tolerances, both in terms of tool diameter and coating thickness, in order to ensure the highest production accuracies while maintaining a constant tool lifetime. When it comes to microtools in particular, these properties are crucial when machining these highly abrasive materials. For the reliable machining of high-performance dental ceramics, such as zirconium

Non-ferrous alloys are difficult to machine and quickly take the microtools of dental labs to the limits of their performance capability. Specifically developed coatings from Oerlikon offer exceptional wear protection, outstanding thermal stability and oxidation resistance to significantly improve the service life of microtools in dental technology.

(Image: Mack Dentatechnik GmbH)





Aesthetics and function combined: specially developed for dental abutments and instruments, the rosé-coloured BALIMED TICANA PVD coating offers not only an aesthetic appearance, but also functional properties. (Image: Oerlikon Balzers)

cobalt and molybdenum, are used in dental technology. As these materials are difficult to machine, they also quickly take the microtools of dental laboratories to the limits of their performance capability. These materials tend to form built-up edges, which promote adhesive wear, thus requiring premature tool replacement. The BALINIT TISAFLEX coating developed by Oerlikon offers exceptional wear protection for this application. This high-end coating also boasts outstanding thermal stability and oxidation resistance. The multi-layer structure counteracts the wear mechanisms and enables a longer service life, which has been proven in tests both in the company's own laboratory and by manufacturers.

Dental laboratories have to provide short lead times, which demands meticulous production planning. Today, they use highly efficient and automated production systems to reduce time and costs and to optimize the production process for high-end dental prostheses. This coating is particularly suitable for machining cobalt-chromium alloy, which is frequently used in dental technology, as it protects the substrate from high temperatures and against adhesive wear.

Advanced coatings for abutments in gingival rosé

Oerlikon offers its customers in dental technology not only coatings for microtools for machining materials. For almost thirty years, the experts at Balzers have been collaborating with clinics and laboratories on coating the surfaces of surgical and dental instruments to provide wear-resistance and antimicrobial properties. The PVD coatings of its BALIMED series, especially developed for medical and dental applications, meet the most stringent requirements and offer significant benefits for patients' well-being.

Functionalising surfaces with bio-compatible, wear-resistant coatings

has become an indispensable part of modern dental technology. Treatment with implants is also subject to strict quality requirements and biocompatibility regulations. BALIMED TICANA is an innovative coating from Oerlikon, which even exceeds these strict requirements. It is applied to abutments, the intermediate piece between the artificial root and the

crown of a tooth. It has the same colour as human gums and is therefore discreet and aesthetic. Abutments are usually made from titanium, aluminium oxide ceramic or zirconium oxide ceramic.

BALIMED TICANA excels not only in terms of aesthetics, but also due to numerous functional properties that have been thoroughly tested. For example, its corrosion-resistance protects against the influence of oral hygiene products and saliva. In tests, BALIMED TICANA was submerged in a 25% sodium chloride (NaCl) solution, with its colour being completely retained even after over one month. Minimal abrasion and low wear allow for the implant to be fixed with stability, thus ensuring a long service life.

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