Fascinating ZENOSTAR
Full contour. All ceramic.
Monolithic restorations – a concept of the future

The ZENOTEC material for permanent restorations

WIELAND’s developments support the work of the dental technician. The quality of any dental work, from the design of the occlusal surface to individual characterisation and staining depends above all on the expertise displayed by the dental technician in creating an aesthetic and functional restoration.

ZENOSTAR – new generation zirconia

WIELAND has developed a special zirconia for full contour restorations – the high-translucence material, ZENOSTAR Zr Translucent. These new blanks form the basis for all ZENOSTAR restorations. Four basic shades are available for reproducing the tooth shades: you have a choice of pure, light, medium and intense.

The added value of this material lies in the fact that these blanks can also be used as a framework material and in conjunction with Zenoflex dimension, 46 conventional tooth shades can be reproduced. Thanks to its special translucent properties and when the blanks are shaded and the appropriate body stains and stains are applied, this translucent material makes the new generation of ZENOSTAR restorations possible. With these materials, full contour and highly aesthetic restorations can be made quickly and easily.

The ZENOTEC material for temporary restorations

A further impressive material is ZENOTEC Pro Fix for full contour temporary restorations. It is easy to mill and polish and can then be inserted immediately. This material can, of course, be used to make durable temporary restorations, but also – as clinical studies have shown – for more permanent restorations, too. In addition, ZENOTEC Pro Fix is also suitable for making healing caps for implantology, for table tops and for raising the bite in cases of craniomandibular dysfunction.
Nowadays, health services and insurers generally opt for restorations made from non-precious metals. These take the form of all-cast crowns or partially veneered crowns, as well as fully or partially veneered bridges. All-cast crowns can be very stable and resistant to corrosion and are very durable. Until now, however, the stability of work made from non-precious metals has been achieved at the cost of aesthetics. Now, technological progress makes it possible to produce crowns and bridges from a white, aesthetically pleasing biocompatible material with a translucence comparable to that of natural dentition.

ZENOSTAR: monolithic full zirconia restorations – milled automatically. This leaves the finishing work and individualisation in the hands of the dental technician.

At a glance

> Zirconia
  - High-quality all-ceramic material
  - White; no discoloration at the edge of the gingiva
  - The ZENOTEC systems make this material easy for the lab to work with
  - High aesthetics
  - No veneering necessary
  - Translucent, tooth shades

> Non-precious metal
  - No precious metal, low-cost steel
  - Grey edges, metal oxides at the edge of the gingiva
  - Difficult to cast and process; brittle and risk of cavities
  - Low / no aesthetics
  - Veneering necessary for aesthetic reasons
  - Metallic colours
The zirconia material

Innovation
By constantly optimising the source materials and process parameters, WIELAND has succeeded in developing a zirconia to meet the highest aesthetic requirements and cater for virtually all indications known to dental technology. Using ZENOSTAR Zr Translucent as the framework material, highly aesthetic veneers can be obtained, as can extremely cost-effective monolithic crown and bridge restorations.

Reliable processes from manufacture to quality control
As a manufacturer, WIELAND uses only absolutely pure raw materials and primary products of the very best quality. In order to continually improve our products and to stay one step ahead in terms of innovation, our manufacturing operation is based on the results of our own research. WIELAND carries out individual measurements of each single blank to ensure that the restoration offers the best possible fit and that laboratory processes are absolutely reliable.

Material properties
WIELAND has set itself the task of uniting the outstanding material properties of the white ZENOTEC Zr Bridge (white) and the translucent zirconia ZENOTEC Zr Bridge (translucent) into a single material. The latest result of this R & D endeavour is:

ZENOSTAR Zr Translucent!
ZENOSTAR Zr Translucent combines the maximum degree of translucence1) with exceptional physical properties such as above-average flexural strength and improved hydrothermal ageing properties. These properties are already obtained at the low standard sintering temperature of 1450 °C, so that in future, ZENOTEC Zr Bridge and ZENOSTAR restorations can effectively be sintered together in a single sintering operation. Since the blanks are pre-compressed during manufacturing to the considerable extent that is necessary to achieve such excellent translucence, this produces an important added benefit, whereby the customer receives considerably more blank (material) than is the case with materials of standard quality. This is immediately evident from the lower magnification factor, which in turn means that there is less shrinkage during sintering.

Hydrothermal ageing – accelerated ageing test
One measure of the progress of hydrothermal ageing (accelerated ageing test carried out by placing the specimens in water at 140 °C) in zirconia is the increase in the monoclinic phase percentage, in particular the increase in transformation depth.

ZENOSTAR Zr Translucent possesses excellent hydrothermal ageing properties. These excellent values are achieved by improved raw material receipt and lowered sintering temperature.

<table>
<thead>
<tr>
<th>Product</th>
<th>Sintertemp.</th>
<th>after 24 h</th>
<th>Transformation depth*</th>
<th>after 72 h</th>
<th>Transformation depth*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZENOSTAR Zr Translucent</td>
<td>1450 °C</td>
<td>81%</td>
<td>9 µm</td>
<td>83%</td>
<td>36 µm</td>
</tr>
<tr>
<td>Zirconia (white)</td>
<td>1450 °C</td>
<td>61%</td>
<td>5 µm</td>
<td>76%</td>
<td>18 µm</td>
</tr>
<tr>
<td>Zirconia (translucent)</td>
<td>1600 °C</td>
<td>80%</td>
<td>28 µm</td>
<td>82%</td>
<td>91 µm</td>
</tr>
</tbody>
</table>

Source: TOSOH CORPORATION; *Values determined by manufacturer on the basis of own processed initial raw material.
ZENOSTAR – New generation zirconia

WIELAND’s developments support the work of the dental technician. The quality of any dental work, from the design of the occlusal surface to individual characterisation and staining depends above all on the expertise displayed by the dental technician in creating an aesthetic and functional restoration.

The new blanks form the basis for all ZENOSTAR restorations. Four basic shades are available for reproducing the tooth shades: you have a choice of pure, light, medium and intense. But the added value of this material lies in the fact that these blanks can also be used as a framework material and in conjunction with Zenoflex dimension, 46 conventional tooth shades can be reproduced.

Translucence: full contour, milled and professionally finished

Example: Molar

The following example illustrates the application on the basis of a molar made from a Medium shade blank.

When sintering is complete, the technician checks the fit on the die and checks the opposing teeth and interproximal contact areas. The dimensions of all contact areas should be reduced to allow for the subsequent glaze layer.
The occlusal surface is polished by hand using a Bison hair brush and WIELAND’s diamond polishing paste ZENOSTAR polish; this gives a smooth surface and ensures minimum abrasion against the opposing teeth after insertion*.

With ZENOSTAR Magic Glaze, a single crown is glazed in less than 10 seconds.

The layer is thin and even. The secret of success is to hold the work with tweezers and rotate it swiftly during spraying. ZENOSTAR Magic Glaze does not retract from the edges and does not form beads on polished surfaces.

The glaze forms the substrate for the stains. WIELAND ZENOSTAR body stains and ZENOSTAR stains will then diffuse in this glaze. Any surface bubbling from the first bake is filled in.

The ZENOSTAR Art Module contains ZENOSTAR body stains, ZENOSTAR stains, ZENOSTAR Magic Glaze and the One-layer materials, Zenoflex dimension One, Light and Intense. This enables all tooth shades to be reproduced quickly and with ease. In addition, aesthetic individualisation can be carried out by using the cut-back or One-layer technique.

*The study is currently being prepared for publication (Stawarczyk B, Özcan M [2010] “Abrasionsuntersuchungen mit verschiedenen Dentalwerkstoffen”, Dental Materials Unit, University of Zurich).
Using body stains, in this case body stain A, as the base shade and ZENOSTAR stains for characterisation, the required dental shade can often be obtained with a single stain bake. The second glaze can be carried out at the same time as applying the stains.

In the occlusal area, shown here before firing, the rule of thumb for ZENOSTAR restorations is: less stain = better aesthetics.

At a glance

- Actual working time: max. 30 minutes
- Translucent, pre-shaded blank in four colours
- Full contour after milling
- Trim off drops
- Carry out sintering
- Inspect, e.g. contact surfaces
- Polish the occlusal surface
- Check fit
- Glaze with ZENOSTAR Magic Glaze
- Finalise by staining and characterising with ZENOSTAR body stains and stains
- Carry out glaze bake
- Perform final inspection

Aesthetic results, easy, economical and professional.

The WIELAND ZENOSTAR concept

The alternative in translucent pre-shaded zirconia to non-precious restorations. For the exact specifications and information on materials and e.g. sinter and firing temperatures, please refer to the ZENOSTAR instructions for use.
Translucence: full contour, milled and professionally finished

Example: 3-unit bridge

The following example illustrates the application on the basis of a 3-unit bridge made from a medium shade blank.

Dental finishing for the ZENOSTAR technique. Only a minimum of correction work should be carried out to optimise the fit. A three-unit bridge can be prepared for glazing and staining in a very short time.

It is advisable to reduce the contact areas slightly in order to leave room for the glaze layer.

The occlusal surfaces of the 3-unit bridge should be polished by hand using a Bison hair brush and diamond polishing paste before the carrying out the first glaze bake.*

With ZENOSTAR Magic Glaze, the three-unit ZENOSTAR bridge is ready for the glaze bake in a matter of seconds.

*The study is currently being prepared for publication (Stawarczyk B, Ozcan M [2010] “Abrasionsuntersuchungen mit verschiedenen Dentalwerkstoffen”, Dental Materials Unit, University of Zurich).
ZENOSTAR Magic Glaze does not retract from the edge areas and does not form beads on the already polished occlusal surface. It should be applied to the fissures in the same thickness as to the raised surfaces. The natural anatomy of the tooth remains unaffected.

After firing, the surface is ready for staining. The warm shade already present can be darkened at the dentine area with a few brush strokes.

The monolithic ZENOSTAR bridge offers a genuine alternative to non-precious metal restorations. Using this material demands a certain degree of technical skill and a knowledge of the effects of shading.

With lighter shades, in this case shade A3, created with ZENOSTAR body stain shade A and ZENOSTAR stains orange and blue, carrying out the glaze and stain bake simultaneously is a popular technique and presents a time-saving alternative.

Here is the result.

**Only stained? Aesthetics à la ZENOSTAR**

For the exact specifications and information on materials and e.g. sinter and firing temperatures, please refer to the ZENOSTAR instructions for use.

---

**At a glance**

- Actual working time: max. 45 minutes
- Translucent, pre-shaded blank in four colours
- Full contour after milling
- Trim off drops, smooth the surface
- Carry out sintering
- Inspect, e.g. contact surfaces
- Polish the occlusal surface
- Check fit
- Glaze with ZENOSTAR Magic Glaze
- Finalise by staining and characterising with ZENOSTAR body stains and stains
- Carry out glaze bake
- Perform final inspection
Translucence: full contour, milled and professionally finished

Example: Shade infiltration before the sintering process

The technique of shade infiltration is recommended for reproducing the tooth shade out of one material. For this method the ZENOSTAR Zr Translucent pure blank is used. Thanks to shade infiltration prior to the sintering process, less stains are necessary for finishing the restoration.

**TIP:** without shade filtration the white ZENOSTAR Zr Translucent pure blank can be used for bleach shades.

The infiltration procedure differs from simple staining of the pre-shaded blanks in that the first layer of stain is applied before sintering. To do this, the drops should be trimmed off and if necessary, the surface should be smoothed using abrasive instruments suitable for use with white blanks and the occlusal surface should be given its final finish. This stage should not take longer than five minutes for a single crown.

With light tooth shades, the ZENOSTAR Color Zr liquid can be applied in next to no time. The cervical area is shaded and the recesses of the occlusal surface are dabbed with stain in order to obtain a warm shade after sintering. Then the drying and sintering process is carried out as described in the ZENOSTAR instructions for use.

With ZENOSTAR Magic Glaze, the 3-unit ZENOSTAR bridge is ready for the glaze bake in a matter of seconds.
Once the sintering process is complete, the shading is evident in the cervical area. The dentine area can be selectively darkened by staining. The incisal area already demonstrates a whitish translucence as is often encountered in the mouth.

The first bake in the ceramic furnace is carried out with ZENOSTAR Magic Glaze, which forms the basis for the diffusion of the stains subsequently applied.

To achieve a finer layer during staining, mix the stain more thoroughly.

Using ZENOSTAR body stains, in this case body stain A, the occlusal area of the dentine area is darkened. For the occlusal area, for example, the ZENOSTAR stains Orange, White and Maroon are available.

Dental expertise and aesthetic sensitivity make all the difference. Patients prefer restorations in tooth shades. To meet this requirement, monolithic ZENOSTAR crowns and ZENOSTAR bridges are the translucent alternative to non-precious metal restorations.
At a glance

> Actual working time: max. 35 minutes
> Translucent or pre-shaded blank in four shades
> Full contour after milling
> Trim off drops, smooth the surface
> Carry out stain infiltration as described in the instructions for use
> Carry out sintering
> Inspect, e.g. contact surfaces

> Polish the occlusal surface
> Check fit
> Glaze with ZENOSTAR Magic Glaze
> Finalise by staining and characterising with ZENOSTAR body stains and stains
> Carry out glaze bake
> Perform final inspection

The American Way of Dentistry

With this bridge, only the depth of the fissure is picked out using ZENOSTAR Orange stains. The bridge was made from a Light blank, milled to its full contours, sintered, checked and glazed.

The American bridge made in Germany with material competence by WIELAND.
In a study carried out at the University of Zurich by simulating mastication, the abrasion of the opposing teeth was compared with reference to natural dentition, a non-precious metal crown and the veneer over a zirconia framework. The test was carried on six test specimens each, which were subjected to a force of 50 Newtons for over 1.2 million cycles in an aqueous environment subject to changes of temperature. The 1.2 million cycles are equivalent to five years of intra-oral wear. This simulation showed that the polished ZENOSTAR crown demonstrated the least amount of abrasion in the material and also caused the least amount of wear on the opposing teeth. This study also confirmed that polishing is essential. It is therefore important to always ensure that the occlusal surface is smooth. This can be achieved by using ZENOSTAR polish brush and paste. In addition, ZENOSTAR Magic Glaze to apply a layer of glaze to a polished surface without and risk of the glaze retracting from the edges or forming beads.

*The study is currently being prepared for publication (Stawarczyk B, Özcan M [2010] “Abrasionsuntersuchungen mit verschiedenen Dentalwerkstoffen”, Dental Materials Unit, University of Zurich).
As a fast and efficient method of finishing the restoration, WIELAND has developed the Art Module consisting of a set of stains, glaze and One-layer ceramics ideally suited to the framework material. This enables full contour ZENOSTAR restorations to be simply stained or for amazing 3D effects to be obtained by applying several layers of stains and Magic Glaze. For anteriors, the Cut-Back technique or One-layer veneering process can be used to achieve a highly aesthetic appearance. The ZENOSTAR Art Module offers free rein for your creativity.

**Benefits of the ZENOSTAR Art Module**

- Economical, since a small number of source materials can be used for many applications such as staining, Cut-Back and One-layer veneering
- Very durable stains
- Easy to apply a good layer of glaze to the zirconia
- Robust in use
- Perfect handling, excellent firing properties
- ASM: anti-stress minerals make the Zenoflex dimension ceramic even more reliable
- Opalescence remains stable under firing
- Very simple build-up techniques for better aesthetics

**ZENOSTAR Brush**

The brush set comprises plastic and nylon brushes in a number of sizes. The sizes and qualities of the bristles are ideally suitable for the ZENOSTAR brush infiltration technique and ensure the best shade matching and reproducibility.

**ZENOSTAR Polish**

When making full contour zirconia restorations, the occlusal surfaces must be kept perfectly smooth. In all cases, polishing must be carried out prior to staining and glazing. For this purpose, WIELAND offers a special Bison hair brush and diamond polishing paste which can be used to ensure that the occlusal surfaces are perfectly conditioned in the lab for ZENOSTAR restorations.

**ZENOSTAR Color Zr – for the brush infiltration technique**

The stains are used for shading full contour ZENOSTAR restorations in ZENOTEC Zr Bridge (translucent) and ZENOSTAR Zr Translucent (pure). The solutions are applied to the framework by the brush infiltration technique prior to sintering and are available in all tooth shades. In addition, five effect shades are available for individual characterisation.
This set of instruments is designed to facilitate professional adjustment and polishing of ceramic restorations by the dentist. It consists of four diamond burs for adjustment and finishing and five diamond polishers for obtaining perfectly smooth occlusal surfaces. In addition, the Premium set includes a sterilisable stainless steel box in an exclusive design.

**Benefits:**

- Specially matched grain sizes give perfect results in a very short time.
- The diamond particles are evenly distributed to ensure precise and reproducible polishing quality.
- The diamond grain is permanently bonded in a special coating to give high rates of material removal and long bur life.
- The instruments feature excellent concentricity, giving a minimum of discomfort for the patient and vibration-free operation for the user.
- Stainless steel holder is unique in terms of design and functionality.
EXPECT THE DIFFERENCE! BY WIELAND.

As a major supplier of dental system solutions, WIELAND embodies both tradition and progress in matters of dental products and technology. Since our company was founded in 1871, we have stayed true to our corporate philosophy of combining tradition, innovation and quality with the best in customer care. Today, our core competencies and key strengths lie in the forward-looking integration of technologies and materials for dental prosthetics. This ensures that patients can trust in the quality of their restorations, and our partners in dental practices and laboratories can continue with confidence on the path to digitalisation and greater competitiveness.

WIELAND offers a wide range of products and services from CAD/CAM technologies and dental alloys to veneering ceramics and electroforming. Thanks to our worldwide presence and international network, WIELAND is never far away, and your contact person can always be located via the Internet.

www.wieland-dental.de

WIELAND Dental + Technik GmbH & Co. KG
Schwenninger Straße 13, 75179 Pforzheim, Germany
Fon +49 72 31/37 05-0, Fax +49 72 31/35 79 59