BEGO Zirkon LT

Processing information for CAD/CAM-produced restorations

Partners in Progress

BEGO

BEGO Zirkon LT

The translucent zirconium dioxide for the highest aesthetic demands

The high-strength zirconium dioxide is suitable for single-tooth restorations as well as bridge frames with up to 16 units. The impressive strength of the material facilitates the production of bridge frames with up to two adjacent pontics.

The BEGO shade concept ensures high shade fidelity of the restorations produced at all times. The CAD/CAM products made of BEGO Zirkon LT are available in five different shades from precolored blanks.

Restorations made of BEGO Zirkon LT can be veneered with all standard veneering ceramics, which are suitable for zirconium dioxide. Please follow the instructions for use of the respective manufacturer.

Indications

- Frames for partially and fully veneered solutions with up to 16 units with a maximum of two pontics
- Fully anatomical crowns and bridges
- Dentine core crowns and bridges
- Telescopic primary crowns
- Two-piece customized abutments for the posterior and anterior regions
- Maryland bridges

Contraindications

- Tangential preparation
- Chamfer preparation with a circular rising preparation margin (“guttering effect”).
- All-ceramic restoration – if the minimal requirements in terms of the available space and the preparation shape are not satisfied clinically
- Ceramically veneered crowns and bridges for patients who suffer from bruxism

Shade chart

CAD/CAM restorations from BEGO Zirkon LT are available in 5 shades: LT01–LT05. The following BEGO chart is available for selecting the shades and the corresponding final result according to the VITA* classical shade system:

Shade overview BEGO Zirkon LT01–LT05

Shade allocation BEGO Zirkon LT01–LT05 in accordance to the VITA* classical color system

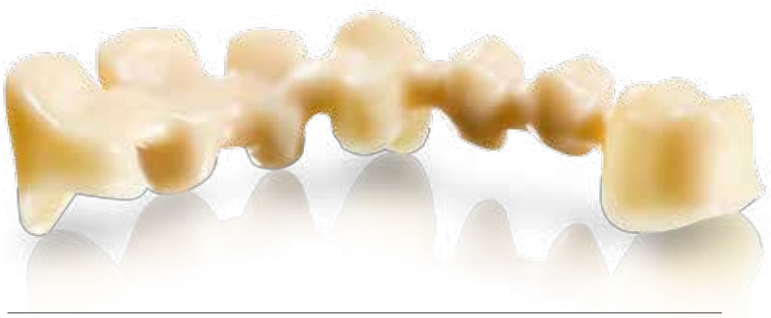
A1	A2	A3	A3,5	A4	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
LT01	LT02	LT04	LT03	LT03	LT01	LT02	LT04	LT03	LT01	LT05	LT05	LT03	LT05	LT05	LT02

* This symbol is a commercial designation/registered trademark of a company which is not part of the BEGO company group.

Wall thicknesses

In order to achieve the clinically necessary stability, a wall thickness of min. 0.5 mm is recommended for the objects. The wall thickness should be increased at critical points on the objects, e.g., at the transition between a connector and a terminal pontic. Terminal pontics should not be larger than the width of a pre-molar.

Wall thicknesses					
Restoration	**Single crown**	**Splinted crowns**	**3-unit bridges**	**4-unit bridge with 2 pontics**	**Bridge with terminal pontic**
Anterior region					
Wall thickness in mm	0.5	0.5	0.5	0.7	0.8
Posterior region					
Wall thickness in mm	0.5	0.5	0.5	0.7	0.9



Multi-unit bridge with two pontics made from BEGO Zirkon LT

Abutment design

During the waxing up of two-piece abutments, we recommend paying special attention to the minimum wall thickness all around the adhesive abutment. To check the data record, please use the thickness view or measure the wall thickness with the 2-D cross-section. Avoid sharp edges in the zirconium dioxide design. For further information on abutment design in the 3Shape Dental Designer*, please refer to the Scan and Design Centre guidelines.

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Connector design

The design of the connector is based on the size and indication of the restoration to be inserted. A distinction is made between anterior and posterior bridges. Connector stability is achieved more through height than width. The stability of the restoration can be increased up to eight-fold by doubling the height.

Connector cross section in mm² depending on the restoration				
Restorations made from BEGO Zirkon LT	**Splinted crowns**	**3-unit bridge**	**4-unit bridge with 2 pontics**	**Bridge with terminal pontic**
Frontzahnbereich	at least 7	at least 7	at least 9	at least 14
Anterior region	at least 9	at least 9	at least 11	at least 14

Finishing of objects

The final object made of BEGO Zirkon LT must not be overheated when finishing. Should finishing be necessary, this must not be done in the area around the connectors as this is the “weakest” point on the objects. Work should always be performed using the laboratory turbine or grinding stones which have been specially designated for zirconium dioxide.

When trimming, always cool the objects in water and apply as little pressure as possible in order to prevent damage through overheating (micro cracks, phase transformation). The water quantity should be set high enough so that the objects are “showered off” and the heat can be conveyed away properly thanks to the generous water supply.

Sand blasting

Sand blasting of the surface to be veneered is contraindicated as this can lead to undesired surface defects and a phase transformation which could weaken the structure of the objects in the long term and also change the CTE value. Complex stress distribution could develop in the areas along the interface to the veneering ceramic, this could lead to cracks and/or delayed crack formation following insertion of the restoration. However, sand blasting of the crown inner surfaces with aluminium oxide (Korox® 50, 50 µm at 1–2.5 bar) is generally allowed.

Cleaning the frames

We recommend cleaning the frames in an ultrasound bath or via steam cleaning prior to veneering.

Frame design/ceramic veneering

The frames or the abutments are anatomically reduced for the ceramic veneering; sharp edges must be avoided at all costs.

For the subsequent veneering, a special veneering ceramic with a CTE of approx. 10×10^{-6} K^{-1} (25–500°C) is used. When veneering abutments directly, please employ protective measures when applying the veneering ceramic or stain, in order to secure the implant-abutment interface. Incorrect use of the veneering ceramic or stain can have a detrimental effect on the fit and/or stability of the connection. If the layer thicknesses of the veneering ceramic are too great, internal tension may be created (risk of chipping) due to the individual sintering processes.

Note:
Please follow the instructions provided by the manufacturer of the veneering ceramic!

Preparation

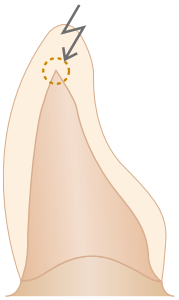
In order to ensure the successful production of a zirconium dioxide restorations, the following points must be taken into account prior to preparation:

- The preparation boundaries must be clearly visible
- A chamfer or step preparation is recommended with an axial convergence angle of 4–6° with conventional cementing
- As of a convergence angle of 15°, adhesive cementing is recommended since the mechanical retention with conventional cementing is no longer sufficient
- In terms of the preparation depth, the minimum layer thicknesses for the frame and veneering must be observed!

As a rule, anatomically reduced preparation is recommended. Special care must be taken to ensure that no sharp angles or edges are created in order to avoid stress peaks in the frame material. These should be broken off before taking the impression using a suitable instrument, e.g., a flexible plastic diamond wheel.

Step preparation

Chamfer preparation



Avoidance of sharp edges

Cementing

There are many factors which can influence the decision about which type of cementing to employ, for example the cost and time factors, the geometry of the tooth stump and certain biological or mechanical complications. For this reason, it is not possible to formulate a clear recommendation for the fixation at this point.

- **Conventional**
  In principle, all-ceramic restorations made from zirconium dioxide can be cemented in the conventional manner using zinc phosphate or glass ionomer cements. The use of conventional cements requires adequate preparation of the abutment tooth. Experience has shown that conventional zinc phosphate cements have lower removal forces than glass ionomer cements and, due to their opacity, block natural light scattering in the ceramic.

- **Adhesive**
  In the case of limited stump retention, adhesive fixation of the restoration is advantageous.

Information on cementing two-piece abutments
Do not use any attachment adhesives for cementing, as this is not approved for this purpose based on the indications. For the adhesion, please use a luting composite for indirect restorations, e.g., Multilink Implant, Panavia 2.0 and follow the instructions for use closely.

Removal/trepanation of a zirconium dioxide restoration

Even though zirconium dioxide restorations conduct considerably less heat than metal-based restorations, endodontic treatment following the prosthetic restoration may be necessary.

In order to protect the restoration and, above all, the remaining dental hard substance below, the method below should be followed for trepanation of a zirconium dioxide restoration:

1. Removal of the veneering ceramic on the area to be trepanned
2. Perforation of the zirconium dioxide frame with a coarse-grain, spherical diamond with maximum water cooling and at a speed of 120,000 rpm
3. Circular application of the instrument when drilling through the frame at an angle of 45°

In order to remove a permanently cemented zirconium dioxide restoration (irrespective of the cement used), the following proce-dure is recommended:

1. Removal of the veneering ceramic from vestibular
2. Separation of the zirconium dioxide frame using a cylindrical diamond instrument with maximum water cooling and at a speed of 120,000 rpm
3. Approximal removal of the veneering ceramic in order to be able to break up the separated frame, if necessary

Note

- Restorations are custom products in accordance with Directive 93/42/EEC.
- Because of their different designs, ceramic furnaces may differ in their firing conditions. It is imperative to take this fact into consideration and it is the user's responsibility to seek clarification on this point. **The firing temperatures given are only guidelines!**
- The ceramic powder must not be put back into the container once it has been mixed or has come into contact with fluid or humidity! It is imperative to ensure that damp brushes or instruments do not come into contact with the powder in the crucible. Great care must be taken to ensure that instruments and accessories, such as brushes or spatulas, are completely clean! Any contamination introduced will impair the quality of the firing result.
- Our recommendations for use, whether given verbally, in writing, or by practical instruction, are based upon our own experience and trials and can therefore only be regarded as guidelines. Our products are subject to continuous development. We thus reserve the right to make modifications in design, appearance and materials without notice.
- Please report any occurrences when using BEGO Zirkon LT restorations to BEGO Medical GmbH and the responsible bodies.

Precautionary measures

No findings concerning the safety and efficacy of treatments on children or pregnant/breastfeeding mothers are available.

Side effects

No side effects of BEGO Zirkon LT are known. However, we cannot completely exclude the possibility of personal reactions to individual components in isolated cases. In this case, BEGO Zirkon LT should not be used.

Safety instructions

The restorations made from BEGO Zirkon LT are manufactured and tested in accordance with the highest quality standards. All the information and instructions must be followed to pass this quality on to the patient. Please read all the processing information carefully. Improper use and failure to observe the information can have a detrimental effect on the quality and reduce the service life of the restoration.

Warning: Milling and grinding dust that arises during the processing can irritate the eyes, the mucosae and the skin.

Use

Only to be used by dental staff	**Rx only**

Composition and physical data

Chemical composition of the ceramic

$ZrO_2 + HfO_2 + Y_2O_3$	≥ 99,5	% by weight
Yttrium oxide (Y_2O_3)	5,2	% by weight
Aluminium oxide (Al_2O_3)	0,25	% by weight
Silicon dioxide (SiO_2)	≤ 0,02	% by weight

Physical material data

Density	6,08	g/cm^3
strength biaxial	> 1100	MPa
Vickers hardness (HV 1)	1250	MPa
Translucency	35	%
Coefficient of thermal expansion (RT – 600 °C)	10×10^{-6}	K^{-1}
Grain size	≤ 0,4	µm

Chemical solubility

Acetic acid 4 % solution in water quality 3 as per ISO 6872	≤ 50	$µg/cm^2$

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