SHOFU DISK ZR Supra Lucent

Advanced product information

SHOFU

Introduction

Thank you very much for purchasing SHOFU DISK ZR Lucent Supra, our multilayer zirconia.

Before use, please read this advanced product information carefully so that you can create high-quality dental restorations and meet the aesthetic requirements of your patients. Kindly keep this document for future reference.

SHOFU DISK ZR Lucent Supra covers a wide range of indications, including even 14-unit bridges with two connected pontics in the anterior and posterior regions. Highlight reflection in the cervical area ensures a lifelike appearance without compromise.

Whether restorations are monolithic, partially or fully veneered, SHOFU DISK ZR Lucent Supra proves its worth in any case. And VINTAGE ZR porcelain or VINTAGE Art Universal stains allow you to achieve highly aesthetic results.

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1. Characteristics

1-1. Flexural strength

Thanks to a high flexural strength of more than 1,000 MPa across the entire disk height, this material covers a wide range of indications.

Enamel
Flexural strength **1,034 MPa**
Translucency 44 %

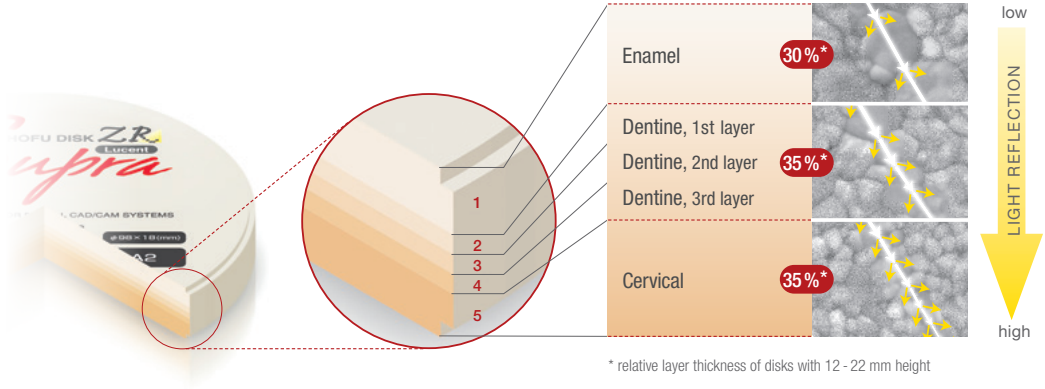
Dentine
Flexural strength **1,163 MPa**
Translucency 40 %

Cervical
Flexural strength **1,454 MPa**
Translucency 37 %

3-point flexural test (DIN-ISO 6872), translucency (JIS R3106:1998, shade A2)

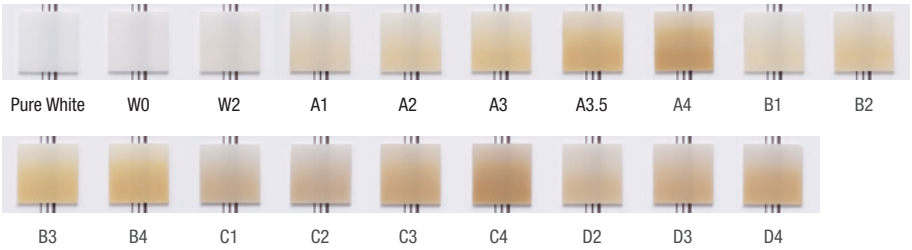
1-2. Layer composition

The larger the particles, the more light they transmit and the less they refract or reflect. The finer the particles, the more light they reflect and scatter.
A well-balanced combination of different particle sizes in different layers leads to intense light reflection in the high-strength cervical area, decreasing towards the incisal area. This makes your restorations appear much brighter, more brilliant and natural.



* relative layer thickness of disks with 12 - 22 mm height

1-3. Shade overview



The basic shades A1 - D4 correspond to the VITA Classical shades. VITA is a registered trademark of VITA Zahnfabrik, Bad Säckingen, Germany.

1-4. Specifications

Diameter	98 mm with groove	
Thicknesses	12 mm, 14 mm, 16 mm, 18 mm, 22 mm, 25 mm, 30 mm	
Flexural strength, sintered (DIN-ISO 6872:2015)	Enamel :	1,034 MPa
	Dentine:	1,163 MPa
	Cervical:	1,454 MPa
Vickers hardness, unsintered (HV 0.2) (DIN-ISO 6507:2005)	Enamel :	HV 45
	Cervical:	HV 65
Sintering temperature	1,450 °C	
Translucency (shade A2 / thickness 0.5 mm)	Enamel :	44%
	Dentine:	40%
	Cervical:	37%

1-5. Indications and contraindications

INDICATIONS

SHOFU DISK ZR Lucent Supra is a zirconium dioxide 3Y-TZP and 5Y-PSZ used for manufacturing fixed dental prostheses. The material is suitable for prostheses involving partially or fully covered substructure for four or more units and fully covered substructure for prostheses involving four or more units.

CONTRAINDICATIONS

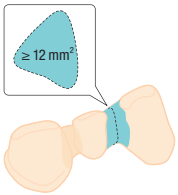
In the event that there is an insufficient occlusal clearance and/or vertical prep wall, thereby making the preparation contraindicated for an all-ceramic restoration, an alternative material must be chosen. Inlay bridges, endosseous implants and root posts are other contraindications.
This product is contraindicated for patients with a medical history of hypersensitivity (e.g., rash or skin inflammation) to this product, with poor oral hygiene, with bruxism, with insufficient dentine, and with hypoplasia or inappropriate preparation of the tooth to be crowned with a restoration.

2. CAD/CAM technique

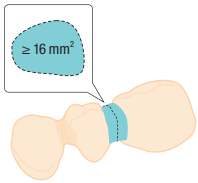
2-1. Framework design

Please be sure to use the following minimum wall thicknesses and connector cross-sectional areas, depending on the indications selected, for all restorations in the CAD process!

Indication	Anterior teeth		Posterior teeth	
	Material thickness	Connector cross-sectional area	Material thickness	Connector cross-sectional area
Crowns & bridges	≥ 0.8 mm	≥ 12 mm²	≥ 1.0 mm	≥ 16 mm²
Veneers	≥ 0.4 mm	≥ 12 mm²	–	–
Inlays & onlays	–	–	≥ 1.0 mm	≥ 16 mm²



Anterior teeth
≥ 12 mm²



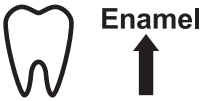
Posterior teeth
≥ 16 mm²

TIPS & HINTS

- Use a reduced anatomical design for frameworks to be veneered, so that the design of cusps and incisal edges ensures a uniform thickness of the veneering porcelain layer.
- Avoid sharp edges in your design!
  If necessary, block out pointed and sharp-edged parts on the stump and smooth sharp edges on the restoration, especially after reducing a full-contour design.

2-2. Inserting the disk into the holder

Touch SHOFU DISK ZR Lucent Supra only with clean hands and avoid any contamination. Insert the disk into the holder of your milling machine with the arrow pointing upwards. The upside is the occlusal/incisal side (see lateral imprint).

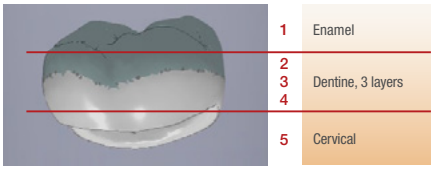


TIPS & HINTS

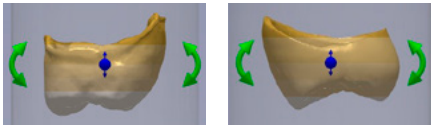
- If possible, leave the disk in the holder so that you can check the positioning of the disk in the CAM software. If the disk has to be removed from the holder, mark the position with a pen on the holder or a small notch on the disk before removal.

2-3. Nesting the multilayer disks

Position the restoration as centrally as possible to make optimal use of the continuous shade and translucency gradient in the disk.



If necessary, position the restoration more incisally or cervically along the Z-axis to achieve results that are slightly lighter or more intense in colour.

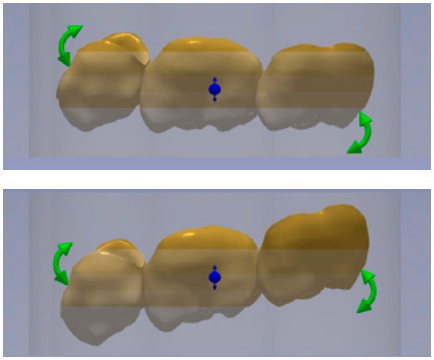


TIPS & HINTS

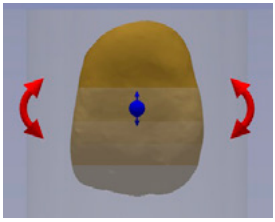
- Please keep in mind that the flexural strength decreases towards the incisal layer!

In general, the restoration height is the deciding factor for selecting the correct disk height.

Be sure to keep your restoration oriented along the horizontal axis to achieve a harmonious shade gradient.



Tilted position



Central position

2-4. Enlargement factor

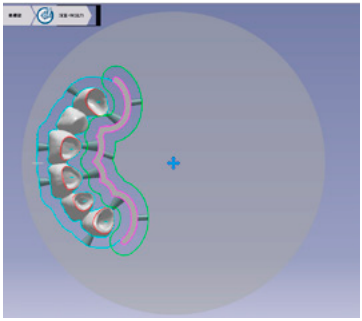
On your SHOFU DISK ZR Lucent Supra zirconia, an enlargement factor of 1.231 is indicated.
So, you select an oversizing value of 23.10 % in your CAD software. This value is based on the formula 1.231 x 100 = 123.10, i.e. the restoration should be milled 23.10 % oversized.
Should you need a shrinkage value in %, e.g. when using Zirkonzahn machines, calculate as follows: 100 / 1.231 = 81.23 (- 18.77 %).

2-5. Holding bars and sintering pins

HOLDING BARS

Single crowns: For each restoration, we recommend placing three holding bars at the level of the prosthetic equator.

For restorations with two or more units, it is advisable to place at least one bar each on the oral and vestibular sides of the terminal units. If needed, bars can also be used on other units.



TIPS & HINTS

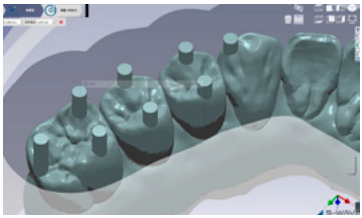
- Do not place holding bars in proximal contact areas!

SINTERING PINS

When sintering bridges or other larger restorations with a pronounced curvature, e.g. due to the Curve of Spee, sintering pins should be placed on the occlusal surfaces.

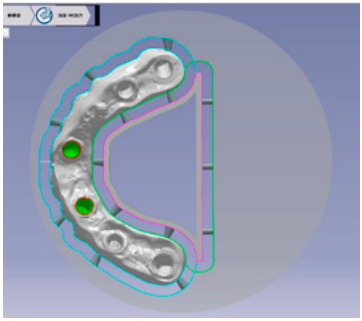
Place the restoration with sintering pins in the sintering tray.

Sintering pins compensate for height differences of the restoration and prevent distortion of the restoration during sintering.



SINTERING SUPPORT

To avoid distortion and, as a result, accuracy of fit problems, you should mill and sinter larger restorations with a sintering support.



3. Fabrication

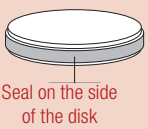
3-1. Milling

Select the multilayer zirconia processing parameters for your milling machine. The material requires a ‘soft’ milling strategy to avoid damage and chipping during the milling process.

SHOFU DISK ZR Lucent Supra is dry-milled only, i.e. without a coolant or compressed air.

TIPS & HINTS

- The following rule of thumb applies to multilayer zirconia: Reduced processing speed = better result!
- Avoid touching the disks with wet hands!
- Remove the seal from the part to be milled.
- The use of a coolant during the milling process can lead to colour changes and/or affect the translucency material.



3-2. Finishing before sintering

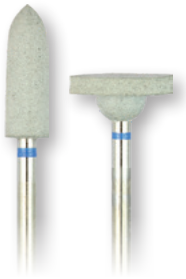
Separate the holding bars between the restoration and the zirconia disk in a vibration-free way, using suitable and clean milling cutters to prevent cracking and soiling.

SoftCut-E PB polishers are excellent instruments for removing holding bars and smoothing surfaces. If necessary, they can also be used to thin the margins.

Rework fissures with a clean round bur or a milling cutter.

During all reworking steps, please be sure not to fall below the minimum wall thicknesses and connector cross-sectional areas.

Before sintering, carefully remove the milling dust from all white bodies using compressed air (oil-free!) and/or a brush.



SoftCut-E PB
silicone polisher with
integrated polishing agents

TIPS & HINTS

- Use low speed and pressure when working with rotary instruments.

3-3. Colouring

SHOFU DISK ZR Lucent Supra is already pre-coloured. Further colouring of the zirconia is not necessary. The use of colouring liquids may impair the material properties.

Staining of the restoration, if desired, should only be done after sintering, with suitable stains such as VINTAGE Art Universal stains and glazes.

3-4. Sintering

We recommend strictly adhering to the sintering temperatures indicated. Different sintering temperatures may affect the shade, translucency and strength of a SHOFU DISK ZR Lucent Supra restoration.

If you do not use sintering pins or supports, please sinter inlays, onlays, veneers, crowns and bridges on sintering beads:

- Place inlays, onlays and posterior crowns on sintering beads with the occlusal surface facing down.
- Place veneers and anterior crowns on sintering beads with the labial surface facing down.
- If possible, sinter bridges with occlusal sintering pins. If not possible, place posterior bridges on sintering beads with the occlusal surfaces facing down, and anterior bridges with the incisal edges facing down (Fig. 1 and 2).

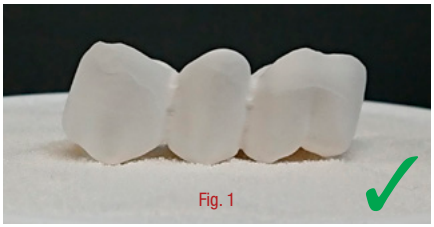


Fig. 1

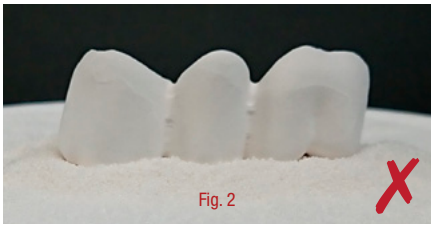


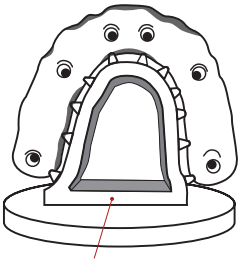
Fig. 2

TIPS & HINTS

- Only slightly cover the bottom of the sintering tray with sintering beads; the workpieces should not 'sink' into the beads. The use of too many sintering beads may also prevent uniform heat conduction.
- Provide long-span bridges with a sintering support and sinter upright (p. 12 - Fig. 3).
- We also recommend sintering long-span bridges in a separate sintering furnace/cycle rather than 'co-sintering' them in a sintering tray.
- Use a separate sintering tray for SHOFU DISK ZR Lucent Supra to avoid contamination by colouring liquids.

ADVISABLE BEFORE SINTERING

It is recommended to add the sintering support structures when sintering more than 4 units of bridge. In addition, it is highly recommended to place it vertical placement as shown on the right. Vertical placement allows the heat to be distributed more evenly than horizontal placement. This will help to achieve the correct shade as designed after sintering.



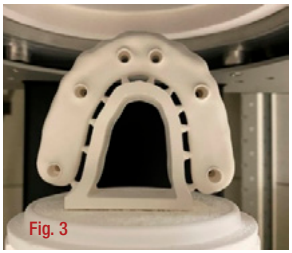
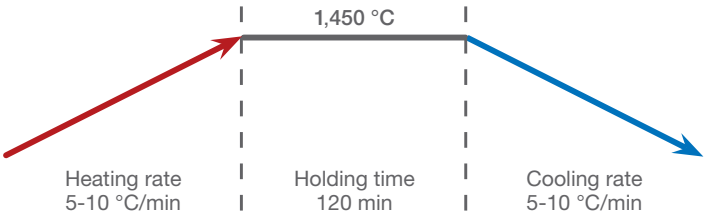


Fig. 3

SINTERING PROGRAM

Heat up by 5-10 °C/min from room temperature to 1,450 °C.
For bridges with 7 or more units, 5 °C/min is recommended.
Then hold at 1,450 °C for 120 min and finally cool down by 5-10 °C/min from 1,450°C to room temperature.



The furnace cooling conditions vary depending on the type of furnace, so the total sintering time varies (9 to 11 hours).

TIPS & HINTS

- For restorations with seven or more units in particular, reduce the heating and cooling rates to 5 °C/min to prevent cracking and ensure complete sintering.
- If different restoration sizes are to be sintered together and restorations with seven or more units are included, select the lower heating and cooling rates.
- Large bridges should be sintered upright and sintered in a separate sintering process without sintering trays with other restorations. The large bridge requires a lot of heat for sintering, as it is very solid. It is therefore recommended to sinter large bridges separately for good results.
- Wait until your restorations cool down completely before removing them from the furnace.
- Speed sintering with the SHOFU DISK ZR Lucent Supra is only suitable for 1 to 3-link units.

3-5. Visual inspection

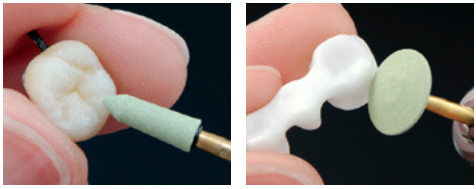
Check your restorations for the following defects before further processing:

- Shiny spots on the surface (sign of worn milling cutter)
- Discolouration
- Chipping (sign of incorrect milling technique and tool)
- Cracks
- Inaccurate fit

Do not further process defective restorations!

3-6. Finishing after sintering

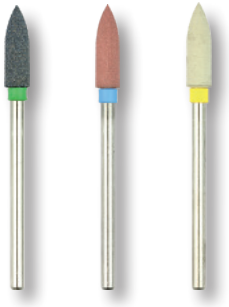
After sintering, you should only make minor adjustments to your zirconia restorations and rework them as little as possible. If corrections are necessary, you can use DuraGreen DIA stones or water-cooled, diamond-coated instruments, such as Robot Points FG. When contouring and correcting, be sure not to generate excessive heat.



Dura-Green DIA stones are excellent for corrections.
They run with low vibration and generate very little heat.

3. Fabrication

You can correct zirconia frameworks using Robot Points FG in a turbine with water cooling.



The ZiLMaster three-step polishing system with coarse, medium and fine silicone polishers is suitable for pre-polishing and polishing.

To protect the antagonists from abrasion and for material-related reasons, you should also polish ground surfaces (occlusal and proximal contact points and areas) to a high lustre and/or seal them by glaze firing after the try-in.

TIPS & HINTS

- Glazing does not replace polishing.
- Do not finish connectors after sintering to avoid instability.
- Limit grinding to the smallest possible areas.
- Finish the ceramic without applying high pressure and generating heat.

Using ZirGloss high-performance polishing paste, you can quickly achieve a high lustre on monolithic restorations.

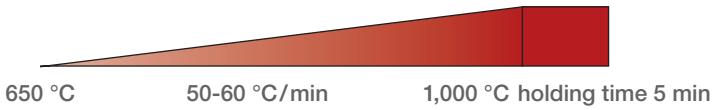
3-7. Regeneration / healing firing

Sandblast the surface to be veneered with alumina (approx. 50 µm) at a pressure of approx. 2 to 3 bar, then clean it with a steam cleaner or in an ultrasonic bath.

Regeneration/healing firing is recommended before the application of porcelains. This 'heals' damage from finishing the framework surface and makes frameworks 'stress-free'.

Starting temperature: 650 °C ➜ heating rate: 50-60 °C/min ➜ holding time: 5 min at 1,000°C.

For long-span frameworks, reduce the heating rate to 50 °C/min.

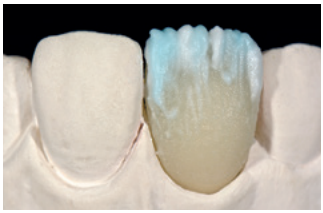


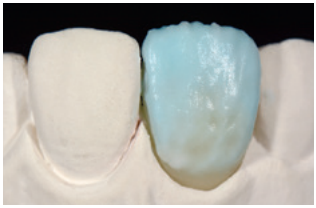
4. Characterisation with porcelains and/or stains

4-1. Individualisation with porcelains

Design a full-contour restoration in the CAD software and reduce it by approx. 0.5 to 1.0 mm in the software.

We recommend veneering anatomically reduced restorations with VINTAGE ZR translucent, enamel and effect materials. Veneering with dentine or cervical materials is not needed, as the shades are created by the continuous shade and translucency gradient in the disk.





TIPS & HINTS

- Ensure a cooling phase of at least 5 min when heating up for stain or porcelain firing and cooling down after stain or porcelain firing.
- The use of Opaque Liner for a stronger bond to the multilayer zirconia is not necessary.

4-2. Staining and glazing with VINTAGE Art Universal

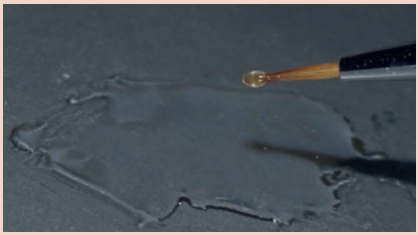
The sintered workpieces do not show their final shades until they are glaze-fired. VINTAGE Art Universal stains and glazes by SHOFU give monolithic zirconia restorations depth and a lifelike appearance without layering, i.e. only by staining.

This 3D effect is created by VINTAGE ART Universal YAMAMOTO LIQUID, the true colour mixing liquid. When mixing VINTAGE Art Universal stains and glazes with this liquid, only one thin layer creates the illusion of spatial depth, even on monolithic materials. Besides, it already shows the final shades during mixing and application – i.e. before firing. Two different glazes allow you to achieve a finish with or without fluorescence.

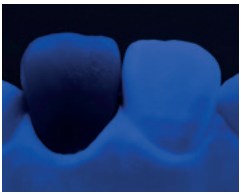
VINTAGE Art Universal YAMAMOTO LIQUID

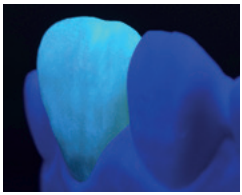
True colour mixing liquid with a similar refractive index as glass. The mixture with VINTAGE Art Universal stains and glazes shows its final colour and effect before firing.

Glaze powder mixed with
VINTAGE Art Universal LIQUID



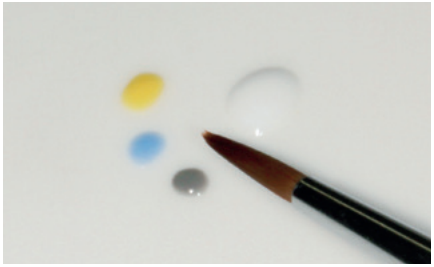
Glaze powder mixed with
VINTAGE Art Universal YAMAMOTO LIQUID





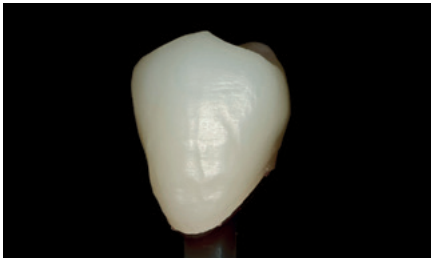
Zirconia or lithium disilicate restorations are non-fluorescent and do not show any reflections under short-wave light (left).

After applying VINTAGE Art Universal stains and glaze (GP-F), restorations show a fluorescence comparable to that of natural teeth (right).

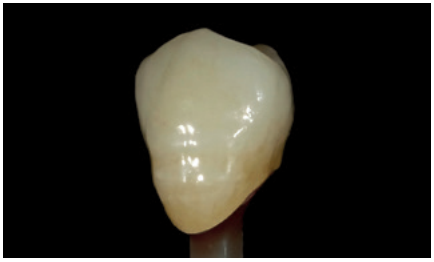


Mixing stains and glaze

Application of the mixture



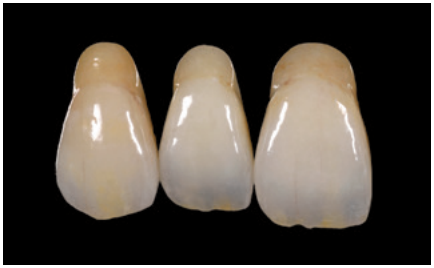
Monolithic zirconia before shade matching



After shade matching

VINTAGE Art Universal is also suitable for glazing, shade matching and characterisation of ceramic teeth after contouring.

Ceramic teeth after contouring



After shade matching

5. Insertion into the mouth

5-1. Preparation

Sandblast the intaglio surfaces of the restoration with alumina (50-100 µm) at a pressure of 2-3 bar for mechanical retention.

Clean the sandblasted intaglio surfaces with alcohol before cement application.

5-2. Cementation

It is advisable to use state-of-the-art self-etch adhesives, such as BeautiBond Xtreme.

The following SHOFU products are recommended for cementation:

Apply SHOFU Universal Primer to the entire intaglio surface of the restoration using a disposable brush, leave it undisturbed for 10 sec, and allow the solvent to evaporate.

Condition the prepared tooth with BeautiBond Xtreme all-in-one universal adhesive.

Then cement the restoration, e.g. with BeautiLink SA, following the instructions for use.

Trouble	Cause	Solution
Damage and chipping during milling	• Milling parameters not suitable for multilayer zirconia • Tool worn out • Spindle not running 'smoothly'	• Check parameters, reduce milling speed if necessary • Check milling tool, replace if necessary • Check spindle, contact machine manufacturer if necessary
After sintering, whitish residues/ stains remain on the restoration	• Milling dust was not sufficiently removed from the framework • Small quartz particles have come loose from the heating elements	• Thoroughly clean white bodies with a brush and oil-free compressed air before sintering • Use a ceramic hood/lid on the sintering tray to protect the works from contamination in the furnace
Zirconia is too translucent/bright, appears 'faded'	• Temperature during sintering too high • Incorrect nesting	• Check temperature and settings of the sintering program • Calibrate/maintain sintering furnace following the manufacturer's instructions • Check temperature sensor for soiling or signs of ageing • Check nesting of the restoration, place restoration a little more cervically and/or select different disk height if necessary
Colour is too dark/ not translucent enough	• Temperature during sintering too low • Incorrect loading of the furnace • Incorrect nesting	• Check temperature and settings of the sintering program. You may want to reduce the heating rate to ensure more uniform heating of the restoration • Calibrate/maintain sintering furnace following manufacturer's instructions • Check temperature sensor for soiling or signs of ageing • Check furnace load! Excessive loading may result in insufficient thermal energy. • Check nesting of the restoration, place restoration a little more incisally and/or select different disk height if necessary
Yellowish/greenish discolouration after sintering	Discolouration is caused by deposited molybdenum oxide from a furnace with heating elements made of molybdenum silicide.	• Carry out regeneration/cleaning firing following the sintering furnace manufacturer's instructions • Replace the heating elements of the sintering furnace following the manufacturer's instructions if necessary

Trouble	Cause	Solution
Zirconia shows soiling after sintering	• The zirconia was soiled during finishing • The inside of the furnace is dirty • Residues of colouring liquid remained in the sintering tray	• Replace all milling cutters used; use only suitable cutters, and use them exclusively for zirconia • Clean your workplace before you start finishing the white bodies • Use a lid on the sintering tray during sintering to protect the zirconia from falling particles in the furnace • Carry out regeneration/cleaning firing following the sintering furnace manufacturer's instructions • Use a separate sintering tray for SHOFU DISK ZR Lucent Supra to avoid contamination with colouring liquid

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