

ZENOSTAR®

The Zirconia System



Instructions for Use Zenostar MT / T / MO

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zenostar.de

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ZENOSTAR®

The Zenostar system comprises materials that are suitable for the fabrication of a universal range of restorations made of zirconium oxide. An accurately coordinated portfolio of materials and leading-edge CAD/CAM manufacturing processes enable efficient working procedures and reproducible esthetic results.

In addition to zirconia discs in several shades and degrees of translucent, the Zenostar range also includes a coordinated range of additional components for the further individualization of restorations.

Zenostar offers a versatile range of processing options, providing maximum flexibility and reliability.



Product information

Material

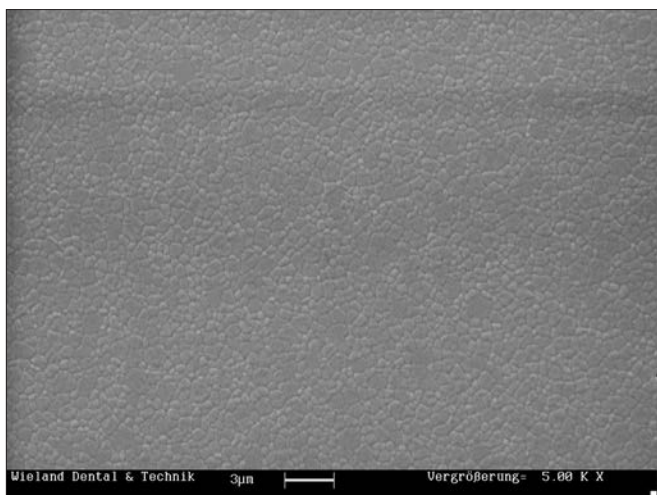
Zenostar discs are partly sintered, yttria stabilized zirconia milling discs for use in the CAD/CAM technique. The discs are available in both pre-shaded and non-shaded versions. When sintered to full density, the material forms a polycrystallized oxide ceramic material. Depending on the yttria content, it forms tetragonal and cubic phase components (Zenostar MT > 6.5 . ≤ 8% yttria) and/or predominantly tetragonal phase components (Zenostar T/MO > 4.5 - ≤ 6.0% yttria).

Zenostar MT (Medium Translucent) is the esthetic solution for full-contour anterior restorations. With its higher yttria content and the resulting better light optical properties, Zenostar MT is suitable for the fabrication of lifelike single-tooth restorations and bridge reconstructions with up to 3 units.

In their sintered state, Zenostar T (Translucent) and Zenostar MO (Medium Opacity) have flexural strength of more than 900 MPa and their fracture toughness exceeds that of glass-infiltrated ceramics by a factor of more than two. Given these excellent mechanical properties, the material can be used to fabricate multi-unit bridges without any problems. Zenostar MO is an esthetic framework material that is exclusively processed in the veneering technique. Zenostar T is suitable for both full-contour restorations, primarily for the posterior region, as well as framework constructions. Also, a combination of full-contour structures with veneered sections (e.g. by means of the cut-back technique) is possible.

All Zenostar discs can be processed very easily in their partly sintered "chalk-like" state using a suitable milling machine. Milling is carried out with an enlargement of the restoration of approximately 20-25%. Given the controlled manufacturing process of the disc, combined with an optimized sintering process in a high-temperature furnace from Ivoclar Vivadent or the Wieland Dental Zenotec range, the shrinkage of the slightly enlarged milled restorations can be precisely controlled so that excellent accuracy of fit can be achieved. The zirconium materials attain their final material-specific properties only during the sintering process, during which a structure forms that is densified to more than 99%. This structure features properties that make Zenostar particularly suitable for the fabrication of high-quality restorations.

Zenostar discs are compatible with many Ivoclar Vivadent products. For instance, IPS e.max ZirPress can be pressed onto the high-strength Zenostar T/MO frameworks and/or the frameworks can be veneered using IPS e.max Ceram. Furthermore, all types of Zenostar restorations can be further individualized with the IPS Ivocolor universal stains system.



Micrograph of ZrO₂ structure

Zenostar MT

CTE (100-500°C) [10 ⁻⁶ /K]	10.4 ± 0.5
Flexural strength [MPa] ^{1.) 2.)}	≥ 550
Chemical solubility [µg/cm ²] ^{1.)}	< 100
Type / Class	Type II / Class 4

Zenostar T / Zenostar MO

CTE (100-500°C) [10 ⁻⁶ /K]	10.5 ± 0.5
Flexural strength [MPa] ^{1.) 2.)}	≥ 900
Chemical solubility [µg/cm ²] ^{1.)}	<100
Type / Class	Type II / Class 5

1.) In accordance with ISO 6872:2015

2.) Typical flexural strength values are:

Zenostar MT 700 ± 100 MPa, Zenostar T 1200 ± 200 MPa,
Zenostar MO 1150 ± 150 MPa

Safety first

Please read the Instructions carefully before you remove the zirconium oxide milling disc from the packaging. The Instructions contain important information on working with the Zenostar milling discs and serve the interest of your safety and the safety of your patients.

Processing Zenostar milling discs produces dust which may lead to the irritation of the eyes and skin and damage the lungs. Always ensure that the extraction system on your milling device and workstation is in good working order. Wear goggles, gloves and a face mask (particle class FFP2).

General handling instructions

Zenostar milling discs are supplied in a partly sintered state. In this state, the material is easy to process but does not yet possess the properties that it will feature as a finished dental restoration. It is therefore necessary to handle the discs with care.

Please check the goods immediately after receipt for:

- damage to the packaging
- damage to the product (the product must not show any nicks, cracks or irregular shading)
- the CE mark and the name of the manufacturer Wieland Dental on the packaging

Ideally store Zenostar:

- in the original packaging
- in a dry place

When handling make sure that the Zenostar milling discs:

- are not subjected to knocks or vibrations
- are not touched with wet hands
- do not come into contact with liquids that are not approved for this product (such as tap water, adhesives or inks)
- are not contaminated with particles from other materials (e.g. glass-ceramic dust, metal milling dust)

If any of the conditions outlined in these Instructions are not met, the Zenostar milling discs must not be used for the manufacture of dental restorations.

Area of application

Indications

Zenostar are milling discs for the fabrication of single-tooth and multi-unit restorations. Depending on the indication and material, the fabrication of frameworks and monolithic (full-contour) restorations is also possible.

Translucent level	Indications							
	Crown frameworks	Interlocked crown frameworks	Multi-unit bridge frameworks	Primary telescope crowns	Full-contour crowns	Full contour, interlocked crowns	Full-contour 3-unit bridges	Full-contour 4-to multi-unit bridges
Zenostar MT					✓	✓	✓*	
Zenostar T	✓	✓	✓	✓	✓	✓	✓	✓**
Zenostar MO	✓	✓	✓	✓				

*Zenostar MT are milling discs for the fabrication of max. 3-unit bridges in the laboratory.

**In Canada, bridge indications are limited to no more than 6 units with no more than 2 adjacent pontics.

Contraindications Zenostar MT

- Bridge reconstructions consisting of more than 3 units
- Very deep subgingival preparations
- Patients with severely reduced residual dentition
- Bruxism
- Cantilever bridges
- Any other use not listed in the indications
- Temporary insertion

Contraindications Zenostar T/MO

- More than two connected pontics
- Very deep subgingival preparation
- Patients with severely reduced residual dentition
- Veneered Zenostar T/MO restorations are not suitable for patients suffering from bruxism.
- Two or more unsupported cantilever units
- Any other use not listed in the indications
- Temporary insertion

Additional limitations of use

Failure to observe the following restrictions may compromise the results achieved with Zenostar:

- failure to observe the necessary minimum connector and minimum framework thicknesses
- milling of the discs in non-compatible CAD/CAM units (only suitable for dry machining)
- sintering in a non-compatible high-temperature furnace

Composition

	Zenostar MT	Zenostar T / Zenostar MO
Zirconium oxide (ZrO ₂ + HfO ₂ + Y ₂ O ₃)	≥ 99.0%	≥ 99.0%
Yttrium oxide (Y ₂ O ₃)	> 6.5 - ≤ 8.0%	> 4.5 - ≤ 6.0%
Hafnium oxide (HfO ₂)	≤ 5.0%	≤ 5.0%
Aluminium oxide (Al ₂ O ₃)	≤ 1.0%	≤ 1.0%
Type / Class (ISO 6872:2015)	Type II / Class 4	Type II / Class 5

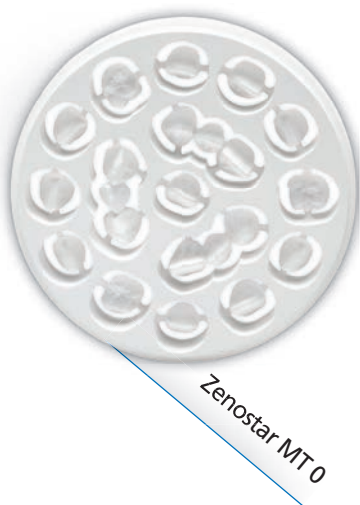
Zenostar shade and disc concept

The Zenostar milling discs are compatible with all the coordinated additional components from the Wieland Dental range and the Ivoclar Vivadent range. The shades are matched to the IPS e.max range to expand the modular system concept.

Zenostar MT

Zenostar MT (Medium Translucent) demonstrate higher light transmission than Zenostar T (Translucent) and are therefore excellently suitable for the fabrication of monolithic anterior restorations. For the individual shade design, users can choose from the 16 tooth shades of the Zenostar MT Color Liquids and some selected Impulse Liquids (intensive shades).

Available thicknesses [mm]: 14, 18

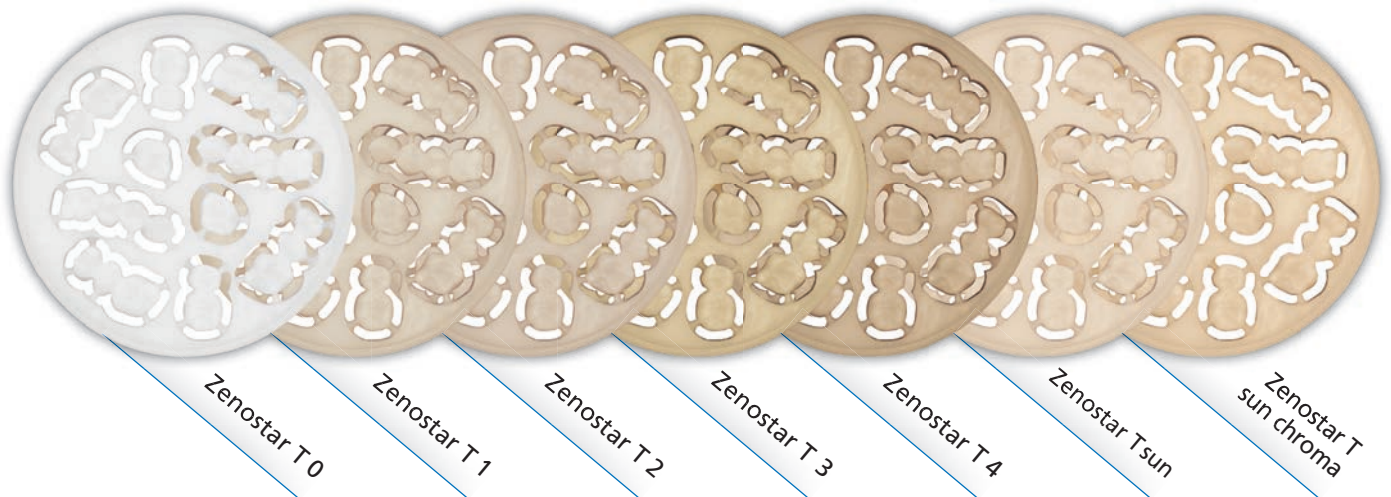


Zenostar MT Color Liquids

Zenostar T

Zenostar T (Translucent) discs are suitable for the fabrication of monolithic restorations due to their light transmission, which is higher than that of Zenostar MO. As a result, they feature higher esthetics. The discs are supplied in pre-shaded basic shades, allowing easy reproduction of all the 16 tooth shades and additional 4 bleach shades.

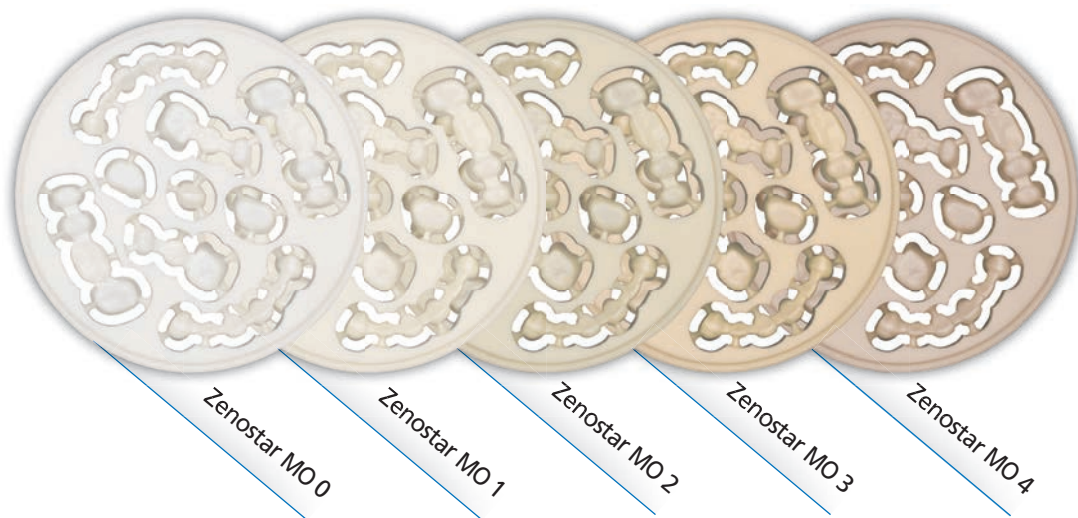
Available thicknesses [mm]: 10, 12, 14, 16, 18, 20, 25



Zenostar MO

Zenostar MO (Medium Opacity) discs are particularly suitable for esthetic frameworks. The combination of high strength and raised opacity allows the fabrication of highly esthetic restorations on discoloured preparations and metal components even if the material is used in only a thin layer.

Available thicknesses [mm]: 10, 14, 18, 20, 25



Note

The complete Zenostar delivery program can be found at www.wieland-dental.de.

Further information on additional components, e.g. customization accessories or cementation materials, can be found at www.ivoclarvivadent.com.

Working steps before the milling process

Shade determination – tooth shade, shade of the prepared tooth

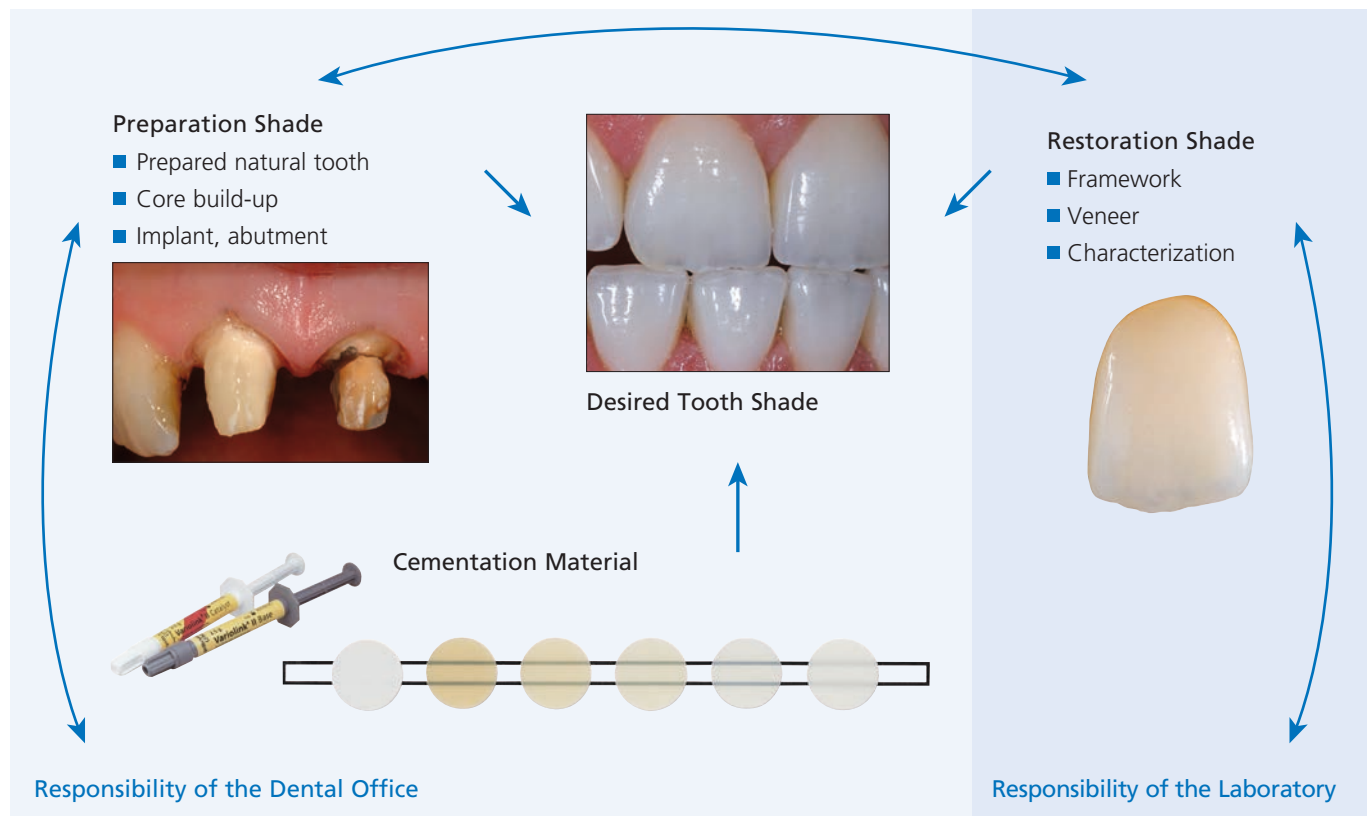
Harmonious integration into the oral cavity of the patient is the prerequisite for a natural all-ceramic restoration. To achieve this, the following guidelines and notes must be observed by both the dentist and the laboratory.

The overall esthetic result of an all-ceramic restoration is influenced by the following factors:

- **shade of the prepared tooth**
(e.g. natural preparation, non-vital preparation, core build-up or abutment)
- **shade of the restoration material**
(e.g. framework shade, translucent/opacity, brightness value, veneering and/or characterization)
- **shade of the cementation material**

The optical effect of the preparation shade must not be underestimated in the fabrication of highly esthetic restorations. This is especially important if severely discoloured preparations or non-tooth-shaded build-ups are present.

The desired esthetic properties can be more easily achieved if the clinician determines the shade of the prepared tooth structure.



Shade selection and shade matching

Determining the shade of the natural tooth

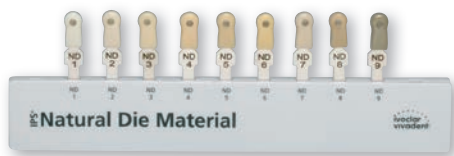
After tooth cleaning, the shade of the non-prepared tooth and/or the adjacent teeth is determined with the help of a shade guide. Individual characteristics should be considered when assessing the tooth shade. If a crown preparation is planned, for example, the cervical shade should also be determined. In order to achieve the best possible true-to-nature results, shade selection should be carried out at daylight. Furthermore, the patient should not wear clothes of intensive colours or lipstick.



Shade selection using an A-D shade guide

Selecting the shade of the prepared tooth

After the tooth has been prepared, the shade of the tooth preparation should be determined with the help of an IPS Natural Die Material shade guide to ensure that the desired tooth shade can be reliably reproduced. This enables the technician to fabricate a model die similar to the preparation of the patient, on the basis of which the correct shade and brightness values of the all-ceramic restoration may be selected.



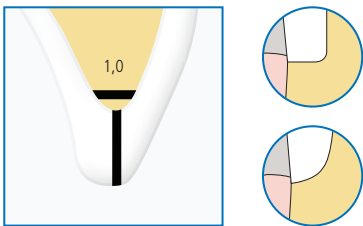
Selecting the shade of the prepared tooth

Preparation guidelines

Before commencing the design process, make sure that the preparation is suitable for the placement of a ceramic restoration. Successful results can only be achieved with Zenostar if the relevant guidelines and layer thicknesses are strictly observed.

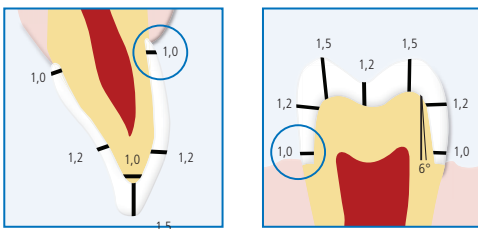
Basically, the following preparation guidelines apply:

- no angles or sharp edges,
- a shoulder preparation with rounded inner edges or a chamfer is ideal,
- the indicated dimensions reflect the minimum thicknesses for Zenostar restorations,
- the edges of the prepared tooth should have a diameter of at least 1 mm (milling tool geometry) to permit optimum milling in the CAD/CAM unit.



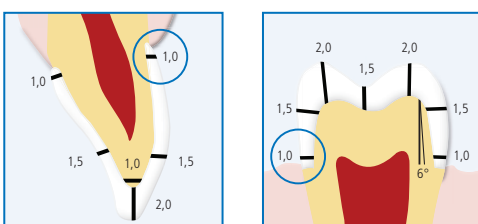
Preparation guidelines for single crowns – 3-unit bridges

- Evenly reduce the anatomical shape and observe the stipulated minimum wall thicknesses. Ideally, a shoulder with rounded inner edges or a chamfer is prepared; the width of the shoulder or chamfer should be 1 mm.
- The incisal or occlusal aspect of the crown should be reduced by at least 1.5 mm.
- The labial and/or lingual aspect of anterior and posterior crowns should be reduced by at least 1.2 mm.
- If a conventional or self-adhesive cementation method is used, retentive surfaces must be created.
- Preparation angle: 6-8° for conventional cementation; >6° for adhesive cementation



Preparation guidelines for multi-unit bridges

- Evenly reduce the anatomical shape and observe the stipulated minimum wall thicknesses. Ideally, a shoulder with rounded inner edges or a chamfer is prepared; the width of the shoulder or chamfer should be 1 mm.
- The incisal or occlusal aspect of the crown should be reduced by at least 2 mm.
- The labial and/or lingual aspect of anterior and posterior crowns should be reduced by at least 1.5 mm.
- If a conventional or self-adhesive cementation method is used, retentive surfaces must be created.
- Preparation angle: 6-8° for conventional cementation; >6° for adhesive cementation



Model and die preparation

If using a model with detachable segments as the basis, use scannable stone to create it. Observe the instructions of the CAD/CAM unit manufacturer.



A model with detachable segments is used as the basis

Important for die preparation:

The incisal/occlusal edges of the prepared dies should be at least as wide as the diameter of the grinding tool.
If the incisal/occlusal edges of the prepared die are thinner or sharper than the diameter of the grinding tool, the edges have to be blocked out accordingly.
Observe the instructions of the CAD/CAM unit manufacturer.

Design criteria for Zenostar restorations

In addition to high-quality materials, professional preparation and processing are equally important to attain high-quality restorations that are capable of giving long-term satisfaction to patients. The design is key to the success of durable, esthetic and clinically successful all-ceramic restorations. The following basic principles should be observed:

Framework design

When designing a framework, the aim should be to achieve an anatomical design that supports the veneering ceramic in the area of the cusps so that these can be veneered with a uniform layer of 1 – 2 mm. Observe the instructions for use of the specific veneering ceramic that you are using.

Minimum layer thicknesses and dimensions of connectors

The following minimum wall thicknesses and connector dimensions should be observed to ensure clinical success when working with Zenostar discs:

Wall thickness/connector cross section

Anterior region	Zenostar MT (sintered)		Zenostar T/MO (sintered)		Design type
	Minimum wall thickness in mm	Connector cross section in mm ²	Minimum wall thickness in mm	Connector cross section in mm ²	
Crowns	1.2	-	0.4	-	Supporting the tooth shape and/or gingiva (incisal, occlusal, and/or basal)
Interlocked crowns	1.2	12	0.6	7	
3-unit bridges	1.2	12	0.6	7	
4-unit and more-unit bridges with two pontics*	-	-	0.6	9	
Cantilever bridges with a single pontic	-	-	0.7	12	

Posterior region	Zenostar MT (sintered)		Zenostar T/MO (sintered)		Design type
	Minimum wall thickness in mm	Connector cross section in mm ²	Minimum wall thickness in mm	Connector cross section in mm ²	
Crowns	1.5	-	0.6	-	Supporting the tooth shape and/or gingiva (incisal, occlusal, and/or basal)
Interlocked crowns	1.5	16	0.6	9	
3-unit bridges	1.5	16	0.6	9	
4-unit and more-unit bridges with two pontics*	-	-	0.7	12	
Cantilever bridges with a single pontic	-	-	0.7	12	

Design parameters for frameworks veneered using the IPS e.max CAD Veneering Solutions

	Minimum wall thickness in mm	Connector cross section in mm ²
Crowns	0.5	-
Interlocked crowns	0.5	7
3-unit bridges	0.5	9
4-unit and more-unit bridges with two pontics*	0.5	12

The IPS e.max CAD Veneering Solutions is approved only for use in conjunction with Zenostar MO.

*In Canada, bridge indications are limited to no more than 6 units with no more than 2 adjacent pontics.

Connector design

- When designing the connectors, attempt to create the largest possible cross section.
- In terms of stability, the height of the connector is more important than the width. Doubling the width will lead to a twofold increase in stability while doubling the height will result in an increase in stability of up to four times.
- The mechanical stress on the construction increases the further apart the abutment teeth are positioned from each other and the higher the masticatory forces acting on the construction are. As a consequence, bridges made from Zenostar MT with more than one pontic and bridges made from Zenostar T/MO with more than two pontics are not permissible.



Notes on CAD/CAM processing

Zenostar discs are exclusively suitable for processing in the CAD/CAM machines of the Wieland Zenotec System and by Authorized Milling Partners of Ivoclar Vivadent AG in conjunction with the milling template designed for this purpose. If other CAD/CAM systems are used, the quality of the resulting restoration cannot be guaranteed, particularly not in terms of accuracy of fit, milling precision, marginal quality and surface quality.



For Zenostar T/MO bridges with more than 5 units, a sinter support structure should be attached to the object to be milled already during the CAM process. The type of construction depends on the sintering furnace and the sintering program used. If multi-unit bridges are not supported by an appropriate sinter support structure, they may involve the risk of becoming deformed during final hard sintering.

Sinter support structures are categorized into sinter drops, sinter frames and sinter "tongues".

Please refer to the Zenostar Design Guidelines for detailed information.

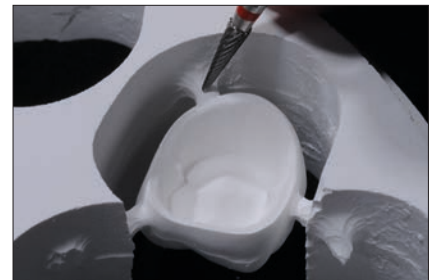
Working steps after the milling process

Finishing

Selecting the correct grinding instruments for adjusting and finishing Zenostar restorations is of essential importance. This is true for both sintered and non-sintered objects. If unsuitable grinding instruments are used, for instance chipping of the edges and/or localized overheating may occur.

When separating the milling discs, generally observe the following points:

- Non-sintered zirconia restorations are susceptible to damage and fractures. Keep this fact in mind during all further processing steps.
- Any adjustments involving the use of milling equipment should be performed while the material is still in its non-sintered state.
- Any contact with liquids (e.g. water and/or oil coolant and/or contact media (such as occlusion sprays) must be avoided. Only use suitable grinding instruments, low speed and light pressure to prevent chipping and broken-off pieces, particularly at the margins.
- Do not use fine rubber polishers for finishing restorations that will be customized with an infiltration solution. Fine rubber polishers densify the surface structure and may result in an uneven shading of the restoration.
- Carefully separate the milled objects from the disc using a separating disc or a suitable grinding instrument. Smooth out the attachment point of the holding pins using suitable grinding instruments.
- Rough tungsten carbide burs and/or rough grinding instruments are suitable to only a limited extent because they may cause vibrations during finishing and this may result in chipping. Therefore, it is advisable to use only fine tungsten carbide burs and/or fine grinding instruments.
- Do not "post-separate" bridge constructions with separating discs. This may result in predetermined breaking points on the connectors and undermine the stability of the all-ceramic restoration.
- Make sure that the minimum wall thicknesses are maintained after adjusting and finishing the restoration.
- In the non-sintered state, the marginal areas must be given special attention. Too thinly ground margins are unsuitable for sintering, since the marginal area is rounded out during the sintering process and will become too short.
- Thoroughly clean the restoration after finishing. To remove any milling dust, carefully clean the restoration with oil-free compressed air and/or a soft brush.
- Make sure to completely remove all traces of milling residue (e.g. milling dust) from the restoration prior to sintering. Milling dust sticking to the restoration may become fused to the restoration and compromise the accuracy of fit.
- Do not use steam or an ultrasonic bath to clean non-sintered restorations.
- Do not blast the restoration with corundum or glass polishing beads.



Separating the restoration with cross-cut tungsten carbide burs or other suitable grinding instrument



Smoothing out the attachment point of the holding pin



Re-contouring the fissures (optional)

Stain infiltration and drying

If Zenostar restorations are infiltrated with colouring liquids such as Zenostar MT Color or Zenostar Color Zr prior to being sintered, they need to dry before they can undergo further processing. It is essential to observe the following notes when using colouring liquids.

- The restoration must be free of all traces of dust and milling residue.
- The colouring liquids must not be contaminated.
- If cloudy, the colouring liquids must no longer be used. Contaminated liquids change colour or spoil more quickly.
- Do not decant or store colouring liquids in metal containers.
- Use a metal-free clean brush to apply Zenostar Color Zr Liquids/colouring solutions to the restoration.
- Before they are sintered, the restorations must be sufficiently dry. If not, damage to the furnace and/or restoration may ensue.
- Restorations may be dried either using an infrared light or a drying cabinet.
- The drying time depends on the temperature and the size of the restoration. With lower temperatures, drying takes longer. Large restorations also take longer to dry.
- Drying temperatures higher than 140°C (284°F) may lead to defects. Refer to the table below for recommended drying times.



Drying times for Zenostar in relation to restoration size and drying temperature

	Temperature -70°C (-158°F)	Temperature -140°C (-284°F)
Single tooth restorations	≥15 min.	5-10 min.
Restorations with 2-4 units	≥40 min.	≥25 min.
Restorations with 5 units and more	≥50 min.	≥25 min.

For more detailed information about the processing of Zenostar discs with the respective colouring liquids, please refer to the following pages: ■ page 26 for Zenostar MT with Zenostar MT Color ■ page 33 for Zenostar T with Zenostar Color Zr

Sintering

Sintering is one of the most important processes in the manufacture of zirconia restorations for dental use. The sintering process uses high temperatures to turn the porous "white body" into a densely sintered restoration. The material acquires its final properties such as high strength and light transmitting capabilities only at this stage. To achieve ideal mechanical and optical properties, the sintering process must be carried out using the specified sintering temperatures and times. The properties of the sintered restoration will be adversely affected if the sintering temperatures are too high or too low or if the sintering times are too long or too short.

The Programat S1 sintering furnace from Ivoclar Vivadent and all the furnaces of the Zenotec range are specifically designed for sintering Zenostar restorations. The furnaces feature various programs optimally geared towards the optical and mechanical properties of zirconia materials and thereby ensure that the best possible results are achieved.

It is essential to observe the following notes when sintering zirconia restorations:

- Restorations infiltrated with colouring liquid must be completely dry before they are sintered to prevent damage to the furnace and/or object.
- Generally, sintering beads are not recommended neither for the Ivoclar Vivadent Programat S1 sintering furnace nor the furnaces of the Zenotec range.
- Restorations must not touch each other during sintering.
- Selecting the correct program is essential.
- Always keep sintering auxiliaries clean and free of dust to avoid impurities in the sintered restorations.
- Remove the entire RFID label before sintering to avoid stains in the restorations and contamination of the sintering auxiliaries and furnace.

The sintering programs of the recommended sintering furnaces are shown below. Refer to the operating instructions of the specific furnace you are using for detailed information.

Please note:

It is essential to use the appropriate sinter support structure for the appropriate furnace. Detailed information on the use of sinter support structures can be obtained from the Zenostar Design Guidelines.

Ivoclar Vivadent Programat S1 sintering programs

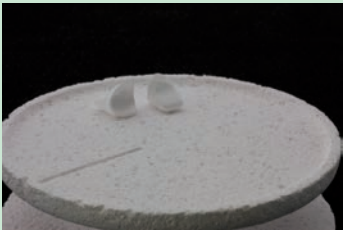
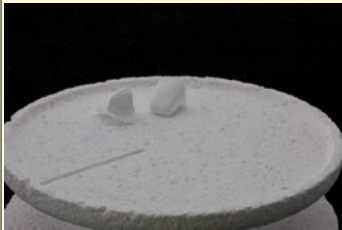
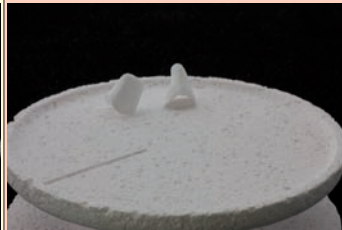
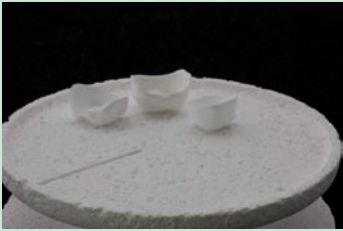
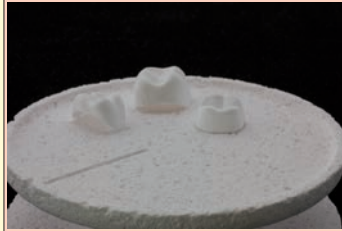

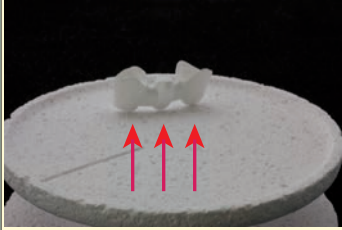
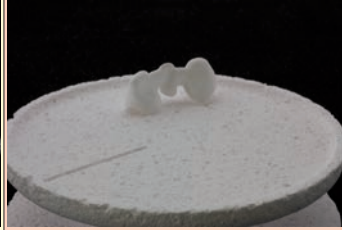
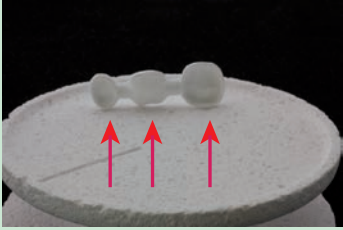
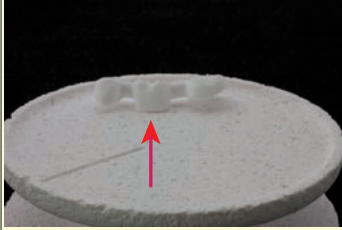
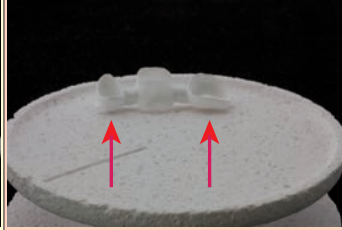
Prior to sintering, allow moist restorations to dry for a sufficiently long time depending on their size (see Table on page 17).



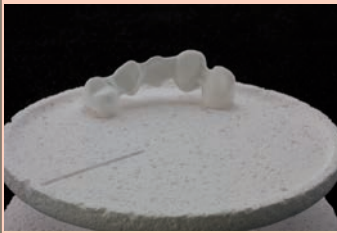
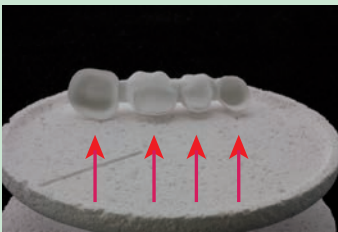
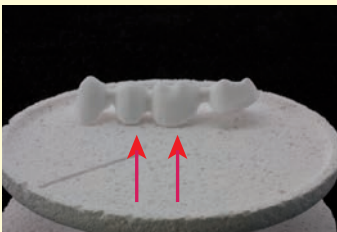
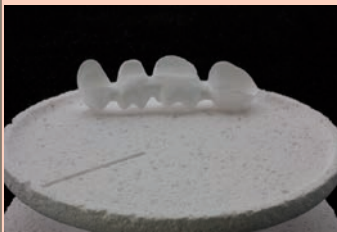
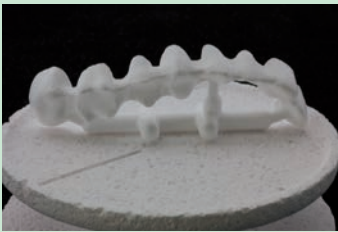
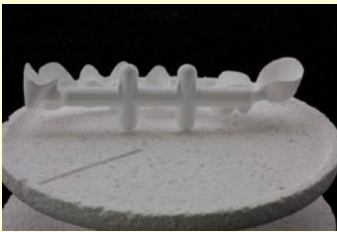
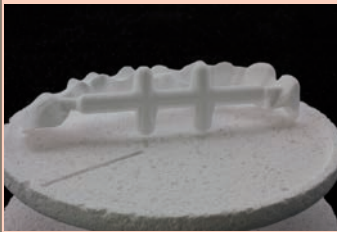
Restorations that are sintered while still being moist may become damaged during the sintering process due to the high heating rate.

For the sintering process in the Programat S1, the following points should be observed:

- Do not use ZrO₂ sintering beads in the Programat S1.
- The sinter tray can be completely filled with restorations. Make sure that the restorations do not touch each other.
- Simultaneous sintering of single-tooth restorations, bridges and constructions with a sinter support structure is possible.
- Selecting the correct program is essential.
- Provide even support for the restorations to ensure deformation-free sintering results.
- Bridge constructions should not exclusively be supported by the abutment crowns on either side. Preferably provide support to the pontics. The abutment crowns do not necessarily have to be supported by/be in contact with the sinter tray.
- Bridge constructions in particular are best arranged in concentric circles on the sinter tray. Important!:
Do not place any restorations over the separation (groove) on the sinter tray.
- Place the loaded sinter tray in its intended position in the centre of the sintering chamber of the Programat S1 using a sinter tray fork.



	correct	ok	wrong
Single-tooth restorations - anterior region	 <p>Place the restorations on their labial surface.</p>	 <p>Place the restorations on their lingual surface.</p>	 <p>Do not place the restorations on their marginal edge (crown margin).</p>
Single-tooth restorations - posterior region	 <p>Place the restorations on their occlusal surface.</p>		 <p>Do not place the restorations on their marginal edge (crown margin).</p>
3-unit anterior restorations	 <p>Place the restorations on their labial surface and provide support to the pontic. If the restoration "tilts", use an alternative positioning.</p>	 <p>Position on the incisal edges. The pontic must also rest on the sinter tray.</p>	 <p>Restorations should not solely rest on their marginal edges.</p>
3-unit posterior restorations	 <p>Place the restorations on the buccal or lingual surfaces depending on their curvature. Abutment crowns do not necessarily have to be in contact with the sinter tray. The pontic must be supported.</p>	 <p>Restorations should not solely rest on their marginal edges (crown margins). The pontic should be supported on the basal side.</p>	 <p>If the restoration does not rest on the pontic, do not place it on its occlusal surface.</p>

<p>Anterior restorations with 4 units and more</p>	 <p>Place the restorations on their incisal surface. Make sure the pontics are supported.</p>	 <p>Depending on the curvature, the framework can be placed on its labial surfaces. All the pontics must come into contact with the sinter tray. Abutment crowns do not necessarily have to be in contact with the sinter tray.</p>	 <p>Restorations should not solely rest on their marginal edges.</p>
<p>Posterior restorations with 4 units and more</p>	 <p>Depending on the curvature, the restoration can be placed on its buccal surfaces. All the pontics must come into contact with the sinter tray. Abutment crowns do not necessarily have to rest on the sinter tray.</p>	 <p>Restorations should not solely rest on their marginal edges (crown margins). The pontics should be supported on the basal side.</p>	 <p>If the restoration does not rest on the pontics, do not place it on its occlusal surface.</p>
<p>Restorations with sinter support structure</p>	 <p>Place the restoration on the sinter tray with the sinter support structures resting on the tray.</p>	 <p>The restoration can also be placed on the sinter support structure / incisal or occlusal surfaces of the pontics. The sinter support structure should face the centre of the sinter tray.</p>	 <p>Restorations should not rest on the crown margins.</p>

The following programs of the Programat S1 and the Programat S1 1600 are recommended for sintering Zenostar restorations. These programs are available as of V 3.0.

Zenostar MT:

Program No.	Name	Description	Duration
7	Zenostar T Standard	Program for the conventional sintering of full-contour Zenostar T single-tooth restorations and bridge restorations as well as Zenostar T single-tooth frameworks and bridge frameworks and infiltrated dry Zenostar T restorations	9 h 50 min

Zenostar T:

Program No.	Name	Description	Duration
5	Zenostar T Crown	Program for the fast sintering of full-contour Zenostar T single-tooth restorations and Zenostar T single-tooth frameworks with an elevated level of translucent	2 h 55 min
6	Zenostar T Bridge (up to 14 units)	Program for the fast sintering of full-contour Zenostar T single-tooth restorations or bridge restorations as well as Zenostar T single-tooth frameworks and bridge frameworks with an elevated level of translucent	4 h 30 min
7	Zenostar T Standard	Program for the conventional sintering of full-contour Zenostar T single-tooth restorations and bridge restorations as well as Zenostar T single-tooth frameworks and bridge frameworks and infiltrated dry Zenostar T restorations	9 h 50 min

Zenostar MO:

Program No.	Name	Description	Duration
8	Zenostar MO Crown	Program for the fast sintering of single-tooth frameworks	75 min
9	Zenostar MO Bridge (up to 4 units)	Program for the fast sintering of single-tooth frameworks and bridge frameworks with up to 4 units	90 min
10	Zenostar MO Bridge (up to 14 units)	Program for the fast sintering of single-tooth frameworks and bridge frameworks with up to 14 units	2 h 45 min
11	Zenostar MO Standard	Program for the sintering of single-tooth frameworks and bridge frameworks using the conventional parameters of the Ivoclar Vivadent Sintramat	7 h 20 min

Zenotec sintering programs

For the sintering process in the Zenotec high-temperature furnaces, the following points should be observed:

- If a standard program is used, it is recommended to sinter the restorations on a sintering support base plate under a high-purity Al₂O₃ cover. This arrangement helps prevent deformation and discolouration from occurring in the restoration. All standard sintering programs are matched to this configuration.
- If a fast sintering program is used, only the sintering support base plate - without the cover - must be used. Fast sintering is only suitable for single-tooth restorations.
- Check sintering auxiliaries regularly to make sure that they are clean and work properly.

→ Zenotec Fire P1

Standard program 1450°C/2h (2642°F/2h) for Zenostar MT/T/MO:

	Temperature 1 [°C] / [°F]	Temperature 2 [°C] / [°F]	Heating rate: [°C/h] / [°F/h]	Holding time [h]
Heating phase	20/68	900/1652	600/1112	-
Holding phase	900/1652	900/1652	-	0.5
Heating phase	900/1652	1450/2642	200/392	-
Holding phase	1450/2642	1450/2642	-	2
Cooling phase	1450/2642	900/1652	600/1112	-
Cooling phase	900/1652	300/572	500/932	-

- switch off -

Zenotec Fire P1 fast sintering program:

Only suitable for Zenostar T/MO single-tooth restorations!

	Temperature 1 [°C] / [°F]	Temperature 2 [°C] / [°F]	Heating rate: [°C/h] / [°F/h]	Holding time [h]
Heating phase	20/68	1520/2768	1500/2732	-
Holding phase	1520/2768	1520/2768	-	0.5
Cooling phase	1520/2768	300/572	800/1472	-

- switch off -



→ Zenotec Fire Cube

Standard program for Zenostar MT/T/MO 1500°C/2h (2732°F/2h):

	Temperature 1 [°C] / [°F]	Temperature 2 [°C] / [°F]	Heating rate: [°C/h] / [°F/h]	Holding time [h]
Heating phase	20/68	900/1652	600/1112	-
Holding phase	900/1652	900/1652	-	0.5
Heating phase	900/1652	1500/2732	200/392	-
Holding phase	1500/2732	1500/2732	-	2
Cooling phase	1500/2732	900/1652	600/1112	-
Cooling phase	900/1652	300/572	500/932	-

- switch off -

Quick sintering program:

Only suitable for Zenostar TIMO single-tooth restorations!

	Temperature 1 [°C] / [°F]	Temperature 2 [°C] / [°F]	Heating rate: [°C/h] / [°F/h]	Holding time [h]
Heating phase	20/68	1500/2732	1500/2732	-
Holding phase	1500/2732	1500/2732	-	0.5
Cooling phase	1500/2732	300/572	800/1472	-

- switch off -



Processing after sintering

After sintering, the restorations can be adjusted using suitable instruments. If diamond grinding instruments are used for adjustment, the restoration must be cooled with water. As an alternative, other grinding instruments may be used in conjunction with a dental-lab handpiece. Please observe the recommendation of the manufacturer regarding grinding instruments.

Use the following procedure for adjusting densely sintered, cooled Zenostar restorations:

- Adjustments of sintered Zenostar restorations should be kept to a minimum.
- The restoration should only be mechanically adjusted if absolutely necessary.
- Place the Zenostar restoration on the model, check fit and make slight adjustments, if necessary.
- Check marginal areas and slightly finish, if necessary.
- Use only low pressure for finishing.
- When finishing frameworks, avoid the design of sharp edges, aim for rounded ones.
- Do not use a separating disc to separate interdental areas.
- Make sure that the minimum layer thickness of the restoration is maintained after adjustment.
- Use only immaculate grinding instruments.
- Check the restoration for defects and fractures before and after further processing.
- Sintered milling dust on the restoration must be removed before veneering.
- Before veneering, clean the frameworks with running water or the steam jet, and dry.

Processing options

Zenostar MT – monolithic restorations fabricated in the Brush Infiltration Technique

For Zenostar MT 0, shading is achieved in the brush infiltration technique. The milled MT 0 Zenostar restorations are infiltrated with the Zenostar MT Color Liquids before sintering. In addition to the liquids in 16 tooth shades, users may also choose the intensive shades known as “Impulse”. They are used for further shade characterizations, which is particularly important in the anterior region. The Impulse Liquids are available in five shades: three for incisal areas (blue, violet, grey) and two for interdental areas/fissures (orange, brown).



Brush infiltration

The brush infiltration of Zenostar MT 0 is performed similar to that of Zenostar T. Please observe the corresponding shade chart on page 52. In this process, Zenostar VisualiZr shade indicator may be added to the liquids for better visualization. To facilitate the handling, the Zenostar MT Color Liquids are available in bottles with a dropper cap. This results in the following mixing ratio:

Mixing ratio:

2 drops of Zenostar VisualiZr shade indicator with 50 drops or 2 g Zenostar MT Color Liquid



Dosing of Zenostar MT Color



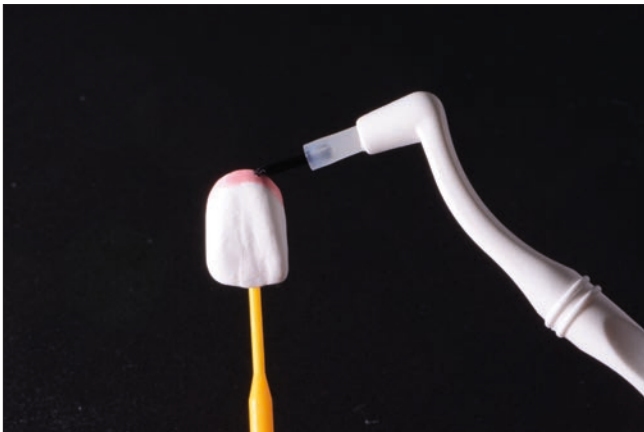
Dosing of Zenostar VisualiZr Color

Please observe the following instructions for brush-staining:

- The restoration must be free of dust and milling residue.
- Exclusively use plastic brushes for brush-staining.
- The stained restorations must be fully dried before they are sintered. Please observe the notes on page 17.
- Store the colouring liquids in tightly sealed containers when not in use.
- Do not use Zenostar VisualiZr undiluted.
- Zenostar VisualiZr Indicator Solutions are not permanently colour stable once they have been mixed with Zenostar MT Color Liquid. Hence, the mixed solutions should be used within 4 hours.
- Store the mixed solution in a sealed container after use.

Additional useful information regarding brush infiltration is also available in the chapter “Zenostar T – monolithic restorations fabricated in the Brush Infiltration and Staining Technique” on page 33.

The images below depict the brush infiltration of a monolithic anterior crown. The exact number of brush strokes can be found in the table “Zenostar MT – monolithic restorations by means of brush infiltration” on page 52. The terms used for the exact areas, such as inside, occlusal, etc. are also shown in the images below.



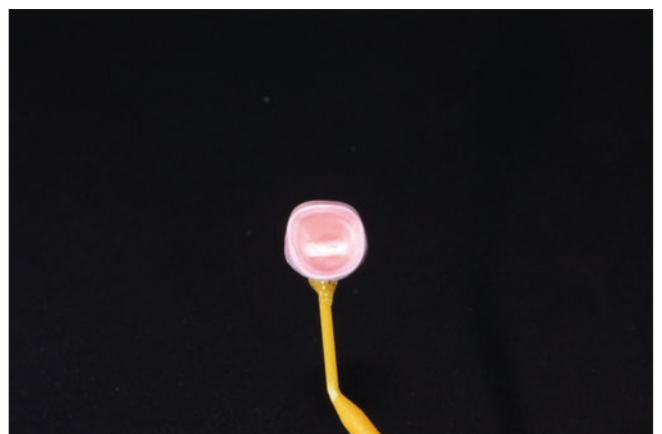
Staining the cervical area, outside



Staining the cervical area, inside



Staining the body area, outside



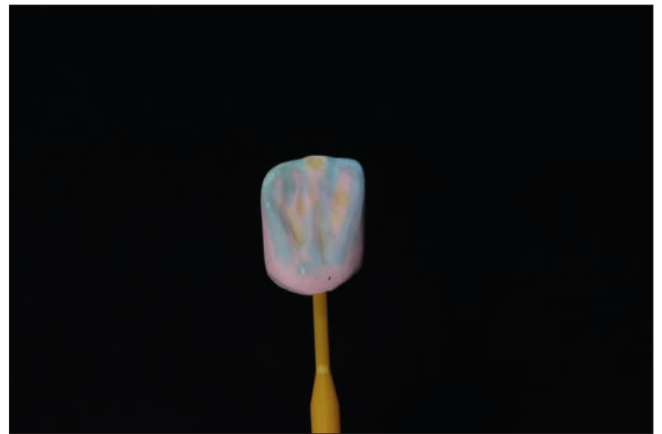
Staining the body area, inside



Individual staining of the incisal area, outside



Individual staining of the interdental area, outside



Completely infiltrated restoration. Labial and palatal view.

The stained restorations must be fully dried before they are sintered; otherwise the restorations and/or the sintering furnace may be damaged. The restorations can be dried either using an infrared lamp or a drying cabinet. The drying time depends on the temperature and the size of the restoration. With lower temperatures, drying takes longer. Large restorations also take longer to dry. Drying temperatures higher than 140°C/284°F may lead to defects, as the resulting steam cannot escape quickly enough. Refer to the table on the page 17 for recommended drying times. The specifications for the sintering procedure can be found on page 18.

Finishing

After sintering, the monolithic restorations can be refined and finished with suitable instruments. Please refer to page 25 for further notes on finishing. In the fabrication of monolithic restorations, appropriate polishing of the surfaces, particularly in the occlusal region, is very important. This helps to protect the opposing teeth. Failure to observe these guidelines may result in increased wear (also see Zenostar T – Monolithic restorations fabricated in the Staining Technique, p. 30).

Stain and Characterization firing

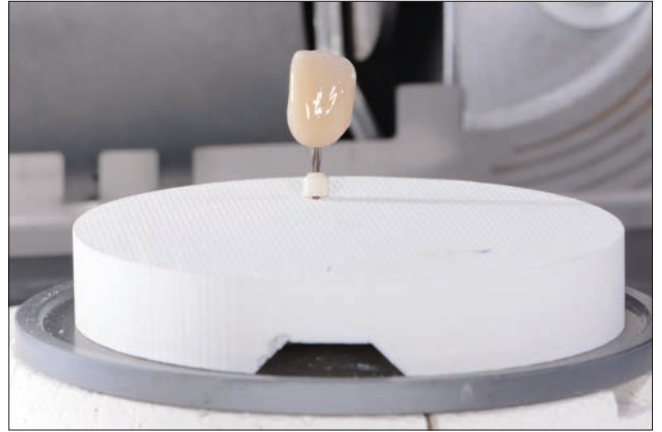
The restorations are stained and glazed in the same way as restorations fabricated in the Staining Technique. Please observe the notes on page 31.

Firing parameters for the Stain and Characterization firing

The firing parameters for the IPS Ivocolor and IPS e.max Ceram stains, as well as the Zenostar Art Module can be found under "Firing Parameters" on pages 60 and 61.



Even application of the Glaze on the surface



Firing the restoration in the ceramic furnace

Firing parameters for the Glaze firing

The firing parameters for the IPS Ivocolor and IPS e.max Ceram stains, as well as the Zenostar Art Module can be found under "Firing Parameters" on pages 60 and 61.



Final restoration

Zenostar T - Monolithic restorations fabricated in the Staining Technique

In this chapter, all the important steps involved in the manufacture of monolithic zirconium oxide restorations are described and illustrated. In the Staining Technique, the milled full-contour restorations are completed by applying stains and glaze materials. With the pre-shaded Zenostar T discs, very esthetic results can be achieved with little effort.

The Zenostar T shades T0, T1, T2, T3 and T4 have been especially developed for reproducing the 16 A-D + 4 Bleach shades. The Zenostar T discs in the shades T sun and T sun chroma are characterized by a warm, reddish basic shade. They can be used as alternative basic shades to obtain more individualized A and B shades.

Prior to milling, the disc shade is selected based on the respective tooth shade by means of the shade chart. The combination tables for IPS e.max Stains and the Zenostar Art Module can be found on the pages 48 and 49.

Finishing

Following sintering, the restoration may be refined with suitable instruments. Cooling of the restoration with water is mandatory when using diamond grinding instruments. Please refer to page 27 for further notes on finishing. It is essential to polish the surfaces of monolithic restorations. Good polishing, particularly in the occlusal region, protects the opposing teeth from undesired wear.

The functional status of the dynamic occlusion has to be verified at least twice a year and, if necessary, adjusted. When doing this, make sure that the surface of the ground occlusal surfaces is carefully polished after functional adjustment by grinding, and that the original condition is restored. Using the Zenostar Polishing Set is recommended.

The optimized "Zenostar Polish" polishing paste enables smooth, high gloss surfaces to be achieved in an easy manner.



Zenstar Polish polishing paste



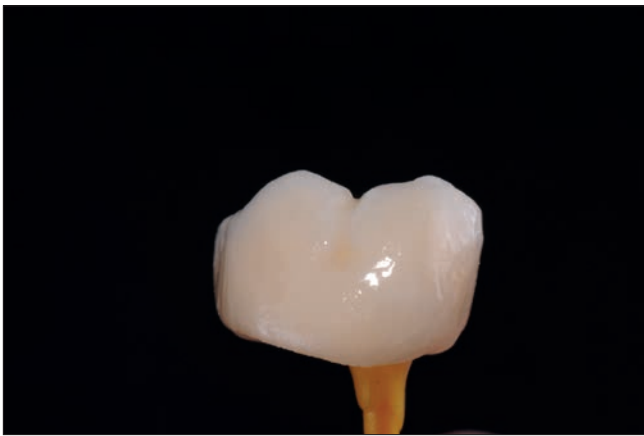
Occlusal polishing of the monolithic Zenostar restoration

Stain and Characterization firing

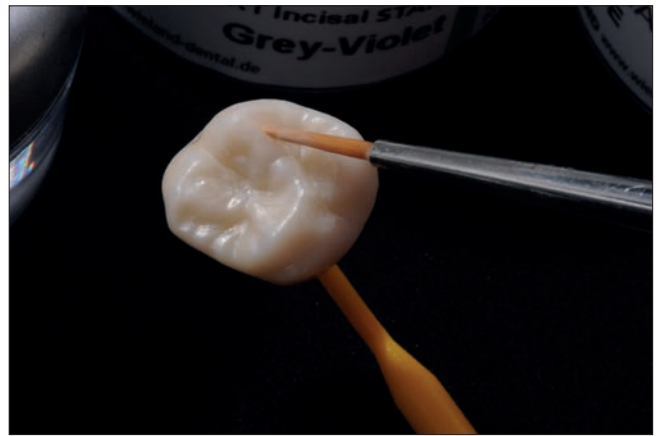
The most important staining and characterization steps are described below. Please observe the manufacturer's directions regarding the Stains. Before the Stain and Characterization firing, the restoration must be free of dirt and grease. Clean the object with a steam cleaner to remove any dirt and grease residue. Any contamination of the object after cleaning should be avoided.

The following steps must be observed:

- To improve the wetting behaviour, the surface of the restoration may be wetted with a small quantity of Stain liquid.
- More intensive shades are achieved by repeated staining and firing, rather than by applying thicker layers.
- To imitate the incisal area and achieve translucent in the incisal third or the occlusal third, so-called Incisal Stains may be used.
- The cusps and fissures may be customized with Effect shades such as brown or orange.
- Conduct the Stain and Glaze firing using the stipulated firing parameters.



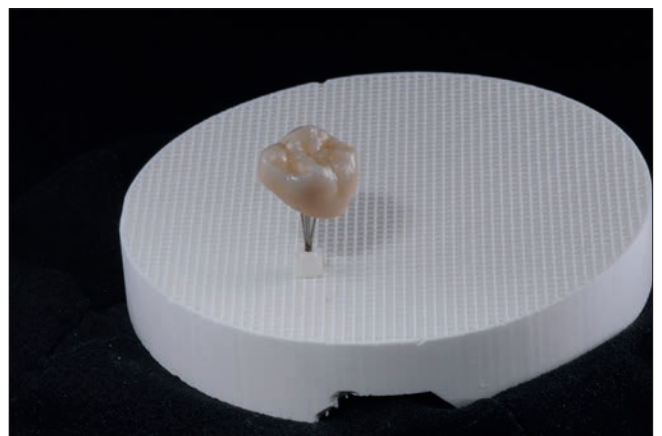
Coat the surfaces with a small amount of Stain liquid to enhance the wettability of the surface.



Apply Incisal Stains to imitate the appearance of the incisal edge.



The cusps and fissures may be customized by using Effect shades.



Fire the stained crown on a honey-combed tray using the stipulated firing parameters.

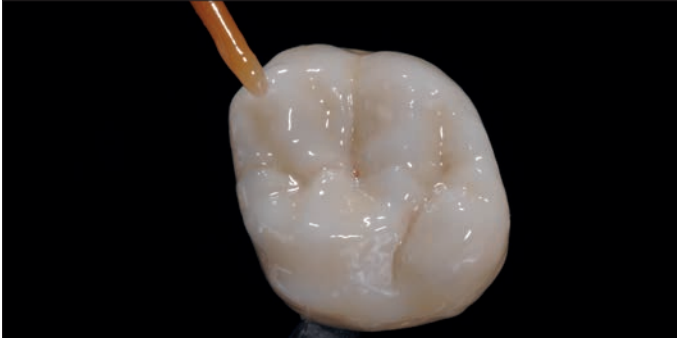
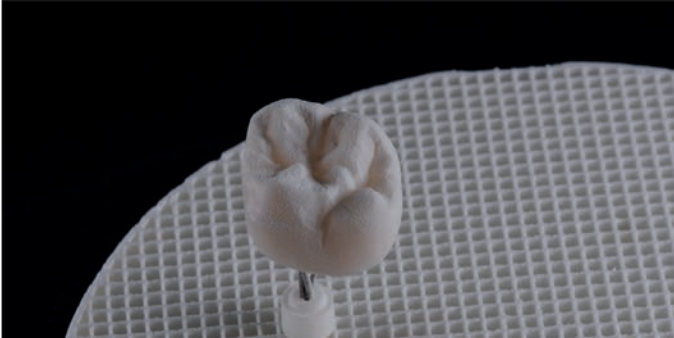
Firing parameters for the Stain and Characterization firing

The firing parameters for the IPS e.max Ceram Stains and the Zenostar Art Module materials can be found in the section "Firing parameters" on the pages 60 and 61.

Glaze firing

Glaze firing is conducted with powder, paste or spray glaze. The procedure indicated below is recommended. Please observe the manufacturer's directions.

- Apply the glazing material in an even layer on the restoration in the usual manner.
- If the IPS e.max Ceram Glaze Spray accidentally reaches the inner aspects of the restoration, remove it with a dry short-hair brush before firing.
- Glaze firing must be conducted using the stipulated firing parameters and with the firing equipment belonging to the furnace.
- After completion of the firing process, remove the restoration from the furnace. Allow the objects to cool to room temperature in a place protected from draft.
- Hot objects must not be touched with metal tongs.

Glaze firing with Powder/Paste Glaze	Glaze firing with Glaze Spray
	
<p>Apply the Glaze evenly on the surface.</p>	<p>Evenly spray on the Glaze Spray. If the Glaze Spray accidentally reaches the inner aspects of the crowns, remove it with a dry brush and subsequently conduct the Glaze firing using the stipulated firing parameters.</p>

Firing parameters for the Glaze firing

The firing parameters for IPS e.max Ceram Stains and for Zenostar Art Module materials can be found under "Firing parameters" on the pages 60 and 61.

Note

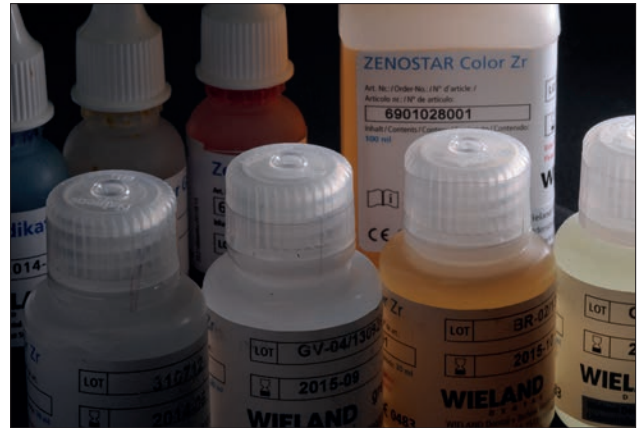
If the gloss is unsatisfactory after the first Glaze firing, further Glaze firing cycles may be carried out using the same firing parameters.



Completed Zenostar restorations fabricated in the Staining Technique

Zenostar T – Monolithic restorations fabricated in the Brush Infiltration and Staining Technique

In the Brush Infiltration Technique, the milled, non-sintered Zenostar T restorations are brush-stained with Zenostar Color Zr colouring liquids. After sintering, the restorations can be completed with stains and glazes. In this way, highly esthetic restorations with a gradual shade transition similar to that of natural teeth can be fabricated with little extra effort.



Zenostar infiltration liquids

Brush-staining

For the Brush Infiltration Technique, Zenostar Color Zr Liquids in all the 16 A-D shades as well as 5 Effect shades (grey-violet, white, ivory, brown, orange) are available. In order to simplify the infiltration procedure, Zenostar VisualiZr Indicator Solutions are offered. They are available in 3 shades (red, blue, yellow) and can be added to the nearly colourless Zenostar Color Zr Liquids to make infiltration of the restoration with colouring liquid visible. The exact mixing ratio is as follows:

Mixing ratio:

2 drops of VisualiZr Indicator Solution per 2 ml of Zenostar Color Zr Liquid

We recommend adhering to the veneering ceramic shade scheme, i.e. using red for the body of the restoration, blue for the incisal portion and yellow for areas such as fissures. Should the shade range not be sufficient, the colours can be mixed. Blue and yellow mix to a deep green, for example.



Dispensing of Zenostar Color Zr

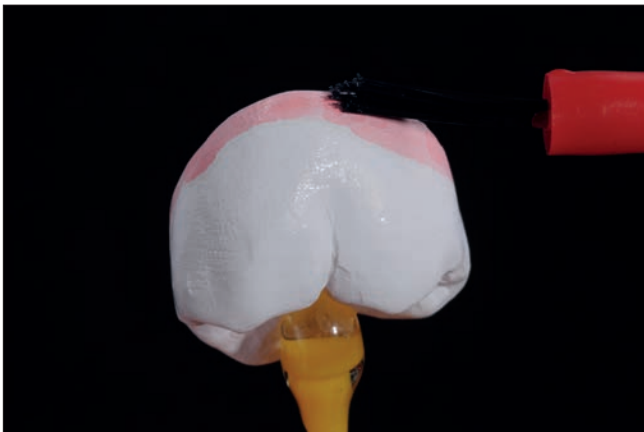


Dispensing of Zenostar VisualiZr

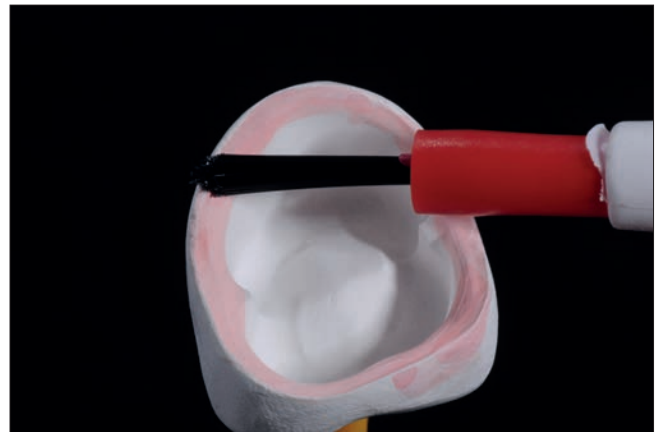
Please observe the following instructions for brush-staining:

- The restoration must be free of dust and milling residue.
- Exclusively use plastic brushes for brush-staining.
- The stained restorations must be fully dried before they are sintered. Please observe the notes on page 17.
- Store the colouring liquids in tightly sealed containers when not in use.
- Do not use Zenostar VisualiZr undiluted.
- Zenostar VisualiZr Indicator Solutions are not permanently colour stable once they have been mixed with Zenostar Color Zr Liquid. Hence, the mixed solutions should be used within 4 hours.
- Store the mixed solution in a sealed container after use.

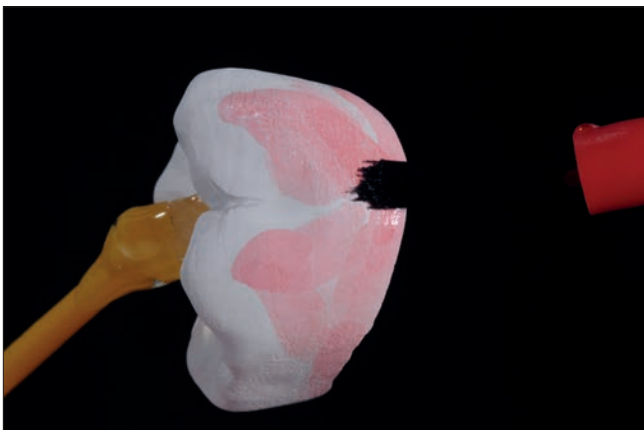
A colour map is available for brush-staining. With the help of this colour map, all the 16 A-D tooth shades can be reproduced quickly and easily. The map can be found on the pages 50/51. The terms used to indicate the location, e.g. inside, occlusal, etc., are schematically depicted in the Figures below.



Staining of the "outer" cervical area



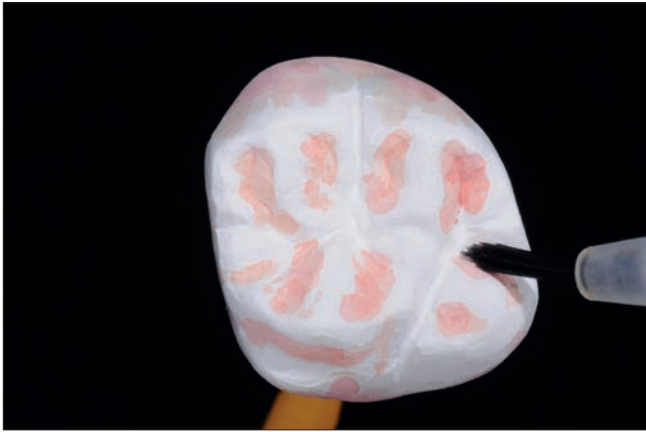
Staining of the "inner" cervical area



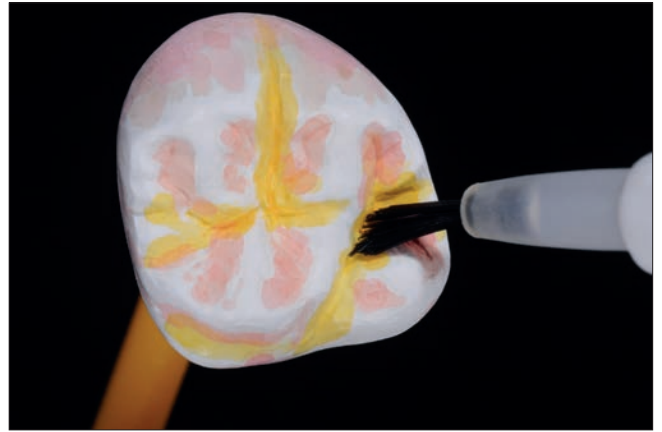
Staining of the "outer" body zone



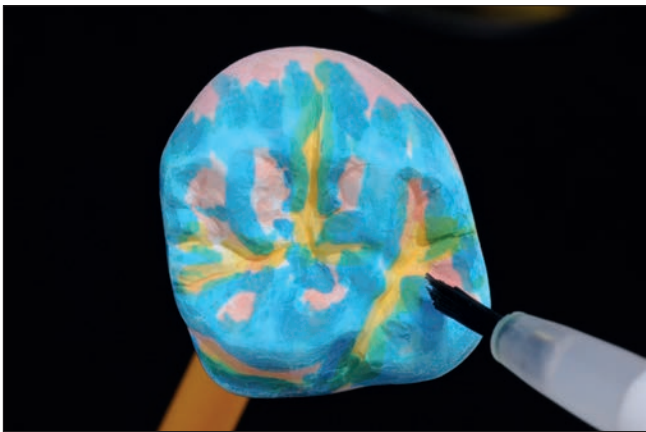
Staining of the "inner" body zone



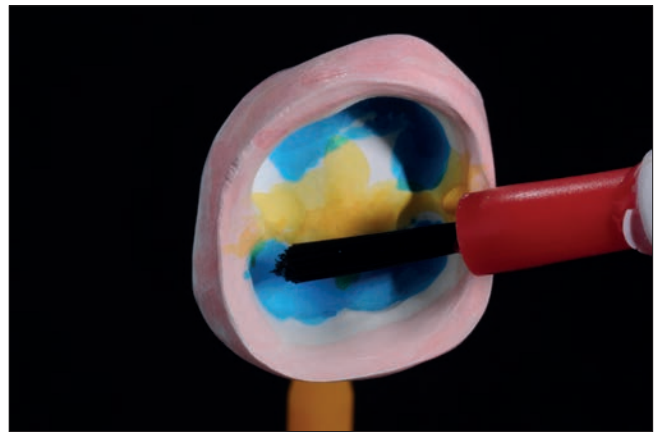
Staining of the "outer" occlusal area using body shades



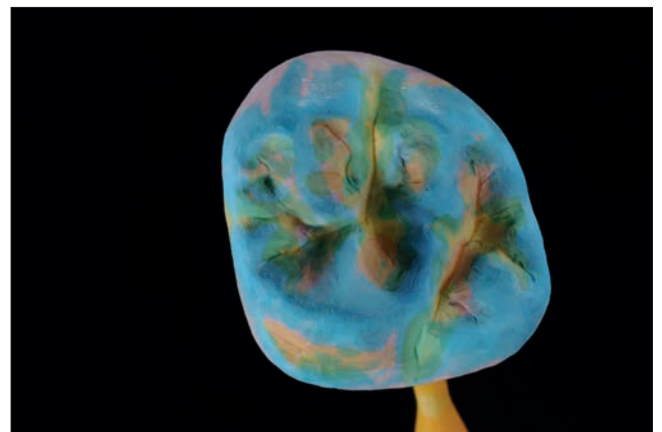
Customization of the "outer" fissures



Individual staining of the "outer" incisal area



Individual staining of the "inner" incisal area



Restoration after completion of the infiltration procedure

The stained restorations must be fully dried before they are sintered; otherwise the restorations and/or the sintering furnace may be damaged. The restorations can be dried either using an infrared lamp or a drying cabinet. The drying time depends on the temperature and the size of the restoration. With lower temperatures, drying takes longer. Large restorations also take longer to dry. Drying temperatures higher than 140°C/284°F may lead to defects, as the resulting steam cannot escape quickly enough. Refer to the table on the page 17 for recommended drying times. The specifications for the sintering procedure can be found on page 18.

Finishing

After sintering, the monolithic restorations can be refined and finished with suitable instruments. Please refer to page 25 for further notes on finishing. In the fabrication of monolithic restorations, appropriate polishing of the surfaces, particularly in the occlusal region, is very important. This helps to protect the opposing teeth. Failure to observe these guidelines may result in increased wear (also see Zenostar T – Monolithic restorations fabricated in the Staining Technique, page 30).

Stain and Characterization firing

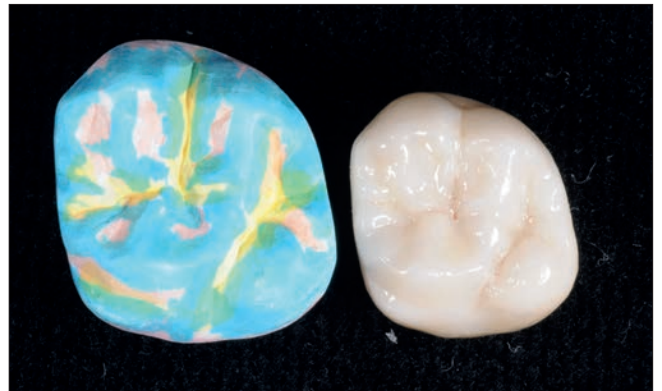
The restorations are stained and glazed in the same way as restorations fabricated in the Staining Technique. Please observe the notes on page 31.

Firing parameters for the Stain and Characterization firing

The firing parameters for the IPS e.max Ceram Stains and the Zenostar Art Module materials can be found under "Firing parameters" on the pages 60 and 61.

Glaze firing

For glaze firing, the same procedure is used as for monolithic restorations fabricated in the Staining Technique. Please observe the notes on the pages 60 and 61.



Completed restoration

Zenostar T - Partial veneering

For the partial veneer, the incisal and occlusal area of a reduced Zenostar T framework are built-up with Incisal materials. The limited application of layering material permits achieving highly esthetic results in an efficient manner.

Finishing

- Adjustment by grinding of the sintered Zenostar T restorations should be kept to a minimum.
- Overheating must be avoided. If possible, the restoration should be finished with suitable finishers under water cooling, using low speed and limited pressure.
- Do not 'post-separate' the framework connectors. This may result in undesired predetermined breaking points, which will subsequently compromise the stability of the all-ceramic restoration.
- Zirconium oxide surfaces must be polished. Particularly the occlusal surfaces should be polished well, as insufficient polishing may lead to increased wear.

Please observe the additional notes on finishing on page 25.

Veneering

The following paragraphs will explain the most important veneering steps if a partial veneering procedure is used. We recommend using the following system for veneering as its components are optimally matched to Zenostar T as far as the shade and mechanical properties are concerned:

- IPS e.max Ceram – Ivoclar Vivadent



For detailed information on the veneering system and its processing, please refer to the Instructions for Use of the veneering ceramic.

Liner and Wash firing

With regard to the liner firing, please observe the Instructions for Use of the respective veneering ceramic system.

Incisal firing

Veneering materials are used to complete the anatomical shape and achieve an individual esthetic appearance. The materials are mixed with the respective build-up liquids according to the manufacturer's directions. If required, a second Incisal firing procedure can be conducted using the same firing parameters. Please observe the directions of the veneering ceramic manufacturer.



Restoration prior to applying the material



Build-up with Incisal material



Object to be fired on the honey-combed firing tray



The bridge after firing

Preparing for Stain and Glaze firing

Before the Stain and Glaze firing, the restoration has to be prepared as follows:

- Finish the restoration using diamonds and give it a true-to-nature shape and surface texture, such as growth lines and convex/concave areas.
- Areas which should exhibit a higher gloss after Glaze firing can be smoothed out and pre-polished using silicone discs.

Stain and Characterization firing

For the Stain and Characterization firing, please observe the instructions of the manufacturer of the respective veneering ceramic system as well as the notes on the pages 60 and 61.

Glaze firing

For the Glaze firing, please observe the instructions of the manufacturer of the respective ceramic system as well as the notes on pages 61 and 62.



Final restoration after Stain and Glaze firing

Zenostar T/MO – Layering Technique

The following paragraphs will explain the most important steps in the veneering of Zenostar T and Zenostar MO. For more detailed information on the veneering ceramic and its processing, please refer to the respective Instructions for Use. The system indicated below is recommended for veneering. Its components are optimally matched to Zenostar as far as the shade and physical properties are concerned:

- IPS e.max Ceram – Ivoclar Vivadent

For the assignment of the suitable framework shade (MO 0 - MO 5), please refer to the Table on page 57.

Finishing

- Adjustment by grinding of the sintered Zenostar T restorations should be kept to a minimum.
- Overheating must be avoided. If possible, the procedure should always be performed under water cooling, using low speed and limited pressure.
- Do not 'post-separate' the framework connectors. This may result in undesired predetermined breaking points, which will subsequently compromise the stability of the all-ceramic restoration.

Please refer to page 25 for further notes on finishing.

Firing process for zirconium oxide-supported restorations

The following paragraphs will explain the most important steps in the veneering of Zenostar T and Zenostar MO.

- In order to ensure an even thickness of the veneer, the zirconium oxide framework must be designed in such a way that it provides adequate support at the cusp area.
- Since zirconium oxide is a poor heat conductor compared to other framework materials, a low temperature increase rate needs to be selected. This ensures an even heat distribution within the framework and along the bonding interface between the veneer and the framework. In addition to achieving an optimum bond, homogeneous sintering of the veneering material is ensured.
- During cooling of the restorations after firing, stress occurs as a result of the different cooling speed at the outside and within the material. By means of long-term cooling, particularly after the "final" firing cycle, thermally induced stress can be reduced and the risk of delamination minimized.

Notes on cooling after completion of the firing program

In order to ensure controlled cooling of the restoration after firing, please observe the following notes:

- Wait for the acoustic signal or optical indication of the furnace at the end of the firing cycle before removing the firing tray with the fired objects.
- Do not touch hot objects with metal tongs.
- Allow the objects to cool to room temperature in a place protected from draft.
- Do not blast or quench the objects.

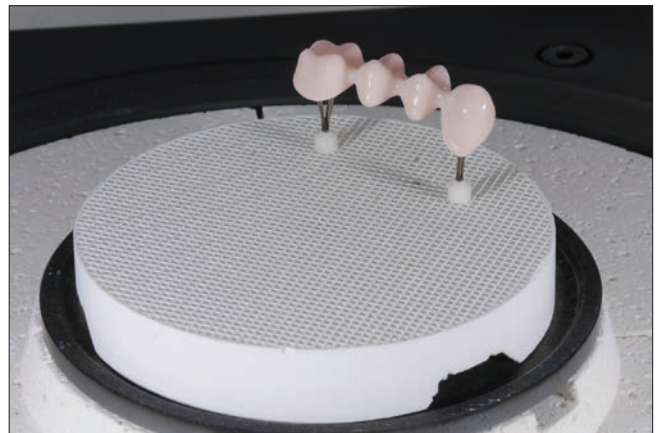
Liner firing

For the Liner firing, please observe the instructions of the manufacturer of the veneering ceramic system.

Wash firing (Foundation)

Due to the low heat conductivity of zirconium oxide, a Wash firing procedure is required. The Wash firing ensures controlled sintering of the ceramic onto the framework surface and enables a homogeneous bond to the framework/liner. Proceed as follows:

- Mix the respective Dentin material with the recommended liquid.
- Apply the Wash in a thin coat on the entire framework or the fired liner layer.
- Position the restoration on the firing tray and fire it according to the stipulated firing parameters.



Fire the Wash with Dentin or Deep Dentin using the stipulated firing parameters

Dentin and Incisal firing

Please refer to the Instructions for Use of the veneering ceramic system you are using for detailed information. In order to achieve highly esthetic restorations, please observe the following procedure:

- Before layering, apply IPS Model Sealer or a customary plaster sealer on the model and allow it to dry. After that, isolate the corresponding areas using IPS Ceramic Separating Liquid or a comparable ceramic separating liquid.
- Place the framework on the model and make sure it is correctly positioned.
- Mix the required veneering materials with the respective liquids.
- Then layer the materials according to the layering diagram and the guidelines of the manufacturer of the veneering ceramic. Observe the necessary layer thickness. We recommend using IPS e.max Ceram Deep Dentin for the veneering of Zenostar T to ensure that the brightness value of the restoration is maintained.
- Carefully remove the restoration from the model and supplement the contact points.
- Do not apply excessive suction and prevent the restoration from drying out.
- Before firing, all the interdental areas must be separated down to the framework using a scalpel.
- Position the restoration on the firing tray and fire it using the stipulated firing parameters.



Isolate the model and place the Zenostar MO framework in the correct position.



Build up the tooth shape using Dentin materials.



Complete the layering procedure with Incisal and Transpa materials. Completely separate the interdental areas prior to firing.



Preparing for Stain and Glaze firing

Before the Stain and Glaze firing, the restoration has to be prepared as follows:

- Finish the restoration using diamonds and give it a true-to-nature shape and surface texture, such as growth lines and convex/concave areas.
- Areas which should exhibit a higher gloss after the Glaze firing can be smoothed out and pre-polished using silicone discs.

Stain and Characterization firing

For the Stain and Characterization firing, please observe the instructions of the manufacturer of the respective veneering ceramic system as well as the notes on the pages 60 and 61.

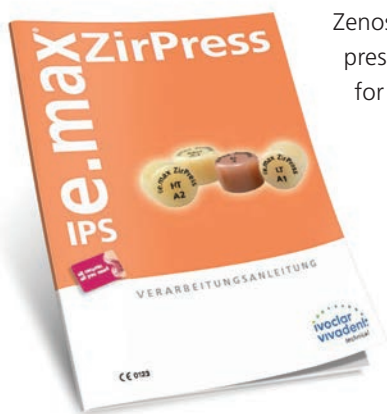
Glaze firing

For the Glaze firing, please observe the instructions of the manufacturer of the respective veneering ceramic system as well as the notes on page 61



Completely veneered and individually characterized Zenostar MO restoration

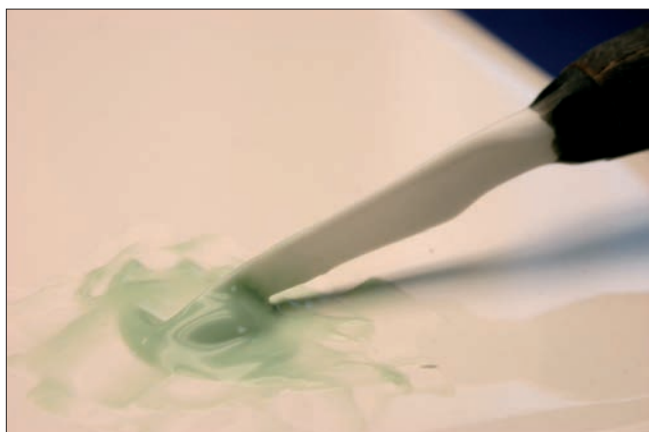
Zenostar MO – Press-On Technique with IPS e.max ZirPress



Zenostar MO can be overpressed with IPS e.max ZirPress. For further information on the fluorapatite press ceramic and possible processing techniques, please refer to the IPS e.max ZirPress Instructions for Use.



Preparing the framework for overpressing



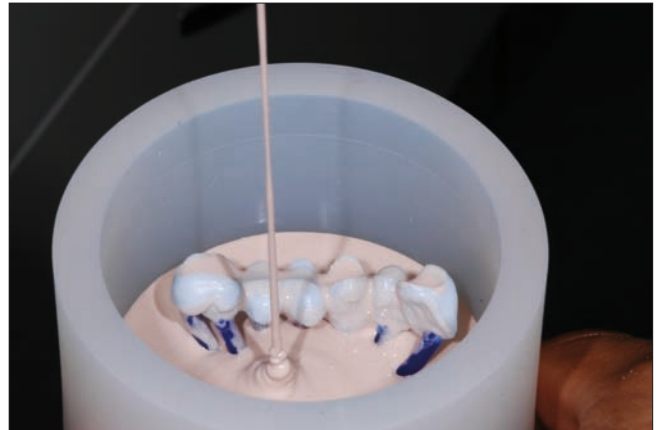
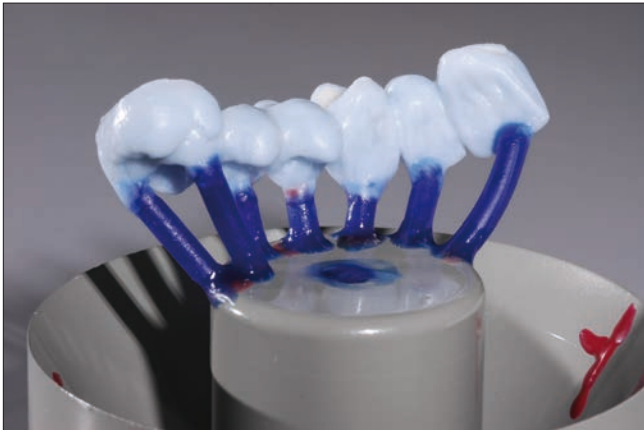
Application of IPS e.max ZirLiner

Design of the full-contour wax-up



Create a full-contour wax-up on the framework. Observe the thickness of the wax.

Sprueing, investing, pressing

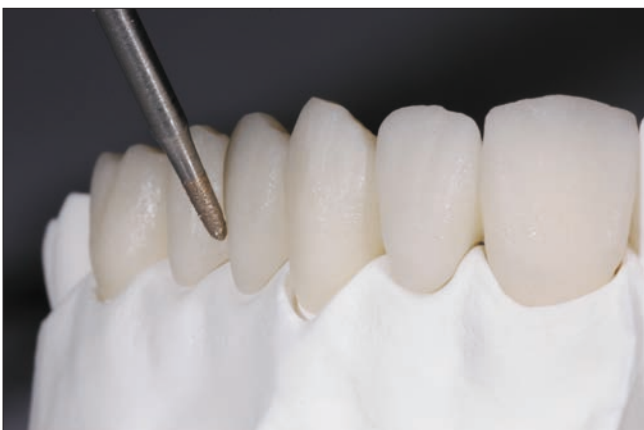


On the IPS e.max investment ring base, attach the sprues in the direction of flow of the ceramic and to the thickest part of the restorations.

Pressing and divesting



Finishing and characterization





Glaze firing with IPS e.max Ceram Glaze Paste or Powder



Glaze firing with IPS e.max Ceram Glaze Spray



Apply the Glaze evenly on the surface and fire it using the stipulated firing parameters.



Evenly spray on the Glaze Spray. If the Glaze Spray accidentally reaches the inner aspects of the restoration, remove it with a dry brush and subsequently conduct the Glaze firing using the stipulated firing parameters.



Completed IPS e.max ZirPress restoration fabricated in the Staining Technique.



View of the restoration on a mirror – IPS e.max ZirPress HT pressed to precision

Note

Please refer to the IPS e.max ZirPress Instructions for Use for detailed information on the processing procedure.

Seating and aftercare

Cleaning

The universal cleaning paste Ivoclean effectively cleans the bonding surfaces of prosthetic restorations after intraoral try-in and thus creates optimum pre-requisites for the luting procedure.



Possibilities for cementation

Esthetic cementation options are decisive to ensure that an all-ceramic restoration harmoniously blends into the oral environment. Depending of the indication, Zenostar restorations can be seated using either an adhesive, self-adhesive or conventional luting protocol.

The restorations can be conventionally cemented using phosphate cement or glass ionomer cement. We recommend using Multilink®Automix for adhesive cementation, SpeedCEM® for self-adhesive cementation and Vivaglass®CEM PL for conventional cementation.

The range of available products may vary from country to country.

Short definition of the different luting procedures:

■ Adhesive cementation

With adhesive cementation, adhesion is achieved by means of a chemical and/or micromechanical bond between the luting material and the restoration, and between the luting material and the preparation. Given the chemical and/or micromechanical bond, retentive preparation is not required. Depending on the cementation material, special adhesive systems are used to establish a micromechanical bond to the dentin and/or enamel. Adhesive cementation results in an enhanced "(overall) strength" of the seated all-ceramic restoration.

■ Self-adhesive cementation

The luting material features self-adhesive properties to the tooth, which is why pre-treatment of the tooth surface with adhesives is not required. Hence, the adhesion of the restoration is partially achieved by a micromechanical and a chemical bond. In order to achieve sufficient bonding strength, retentive preparation is recommended.

■ Conventional cementation

With conventional cementation, the bond is almost entirely created by static friction between the luting material and the restoration, as well as between the luting material and the preparation. To achieve the necessary static friction, retentive preparation with a preparation angle of approximately 4-6° is required.

Indication-related cementation options

	Adhesive cementation	Self-adhesive cementation	Conventional cementation
Anterior and posterior crowns	✓	✓	✓
Bridges with/without pressed-on margin	✓	✓	✓

Preparing for cementation

Conditioning of the restoration and preparation depends on the cementation protocol used, as well as on the luting material. The following paragraphs describe the basic working steps to prepare for cementation. Please refer to the Instructions for Use of the corresponding cementation material regarding the detailed processing procedure.

Conditioning of the restoration

Conditioning of the ceramic surface in preparation for cementation is decisive for establishing a sound bond between the cementation material and the all-ceramic restoration. The following procedure should be used in conjunction with Zenostar restorations:

- Blast the surface of Zenostar restorations with corundum at a maximum pressure of 1 bar (15 psi) before cementation.
- Thoroughly clean the Zenostar restoration with water and air-dry it.
- Saliva can easily be removed from the restoration by means of Ivoclean (Ivoclar Vivadent).
- If you use an adhesive cementation protocol, condition the bonding surface with Monobond® Plus.

Material	Zenostar MT/T/MO	
Indication	Crowns and bridges with/without pressed-on margin	
Luting protocol	adhesive	self-adhesive/conventional
Cleaning after try-in	Ivoclean	
Blasting	Cleaning with corundum at a maximum pressure of 1 bar (15 psi)	
Conditioning/silanization	60 s with Monobond® Plus	-
Luting system	Multilink® Automix	SpeedCEM, Vivaglass® CEM PL

Conditioning of the preparation

Once the temporary restoration has been removed, thoroughly clean the preparation. Before it is conditioned, the restoration is tried-in and the occlusion and articulation are checked. If adjustments of the restoration are required, the restoration must be polished extraorally in these areas before final seating. Any saliva can easily be removed from the restoration by means of Ivoclean (Ivoclar Vivadent). Conditioning of the preparation depends on the cementation method used and is carried out according to the respective Instructions for Use.

Care notes

Just like natural teeth, high-quality Zenostar restorations need regular professional care. This is beneficial for both the health of the gingiva and teeth, as well as the overall appearance. The pumice-free Proxylt pink polishing paste is used to care for the surfaces without causing any wear. The low RDA* value of 7 (*Relative Dentin Abrasion) is a reliable confirmation that a low-abrasion cleaning paste is used. Scientific investigations and long-term clinical experience have proved the gentle effect compared to other pastes.



Using Proxylt

General Information

Frequently asked questions

Do Zenostar restorations have to be pre-treated prior to sintering?

It is important to clean the restoration before sintering and remove any adhering milling dust. However, the restoration must not be cleaned in an ultrasonic bath or with a steam cleaner and it must not be blasted with corundum or glass polishing beads. If the restoration has come into contact with liquids, it must be dried before it is sintered.

Can moist frameworks be sintered?

The restorations **must** be fully dried before they are sintered. Moist frameworks must not be sintered. The drying time depends on the temperature and the size of the restoration. When drying the objects, a temperature of 140 °C (284 °F) must not be exceeded. If moist frameworks are sintered, the risk of cracking is considerably increased.

What needs to be observed when multi-unit restorations are sintered?

The sinter support structure to be used is dependent on the furnace model. More details on suitable sinter support structures can be found in the Design and Production Guidelines. Sintering on so-called sinter beads is not recommended.

When is Regeneration firing required in conjunction with Zenostar restorations?

The need for a Regeneration firing procedure depends on the grinding instruments used for finishing the sintered Zenostar restorations. Please observe the recommendation regarding the grinding instruments. Basic rule: The finer the grinding instrument, the lower the risk of damaging the zirconium oxide restoration. We recommend conducting a Regeneration firing procedure after diamond grinders with a grit size higher than 100 micron have been used. To remove the sinter support structures in multi-unit bridges, the recommended grinding instruments must be used.

Why is it advisable to use Zenostar VisualiZr in combination with Zenostar Color Zr Liquids?

Zenostar VisualiZr helps to identify if and with which shade a framework was stained. Zenostar Color Zr Liquids are nearly colourless and thus difficult to recognize on non-sintered zirconium oxide. For productivity-oriented laboratories in particular, this increases the process reliability and helps to check the procedures. Handle the colouring liquids with care in order to avoid contamination of the skin, clothes or laboratory equipment.

Can furnaces from other manufacturers also be used to sinter Zenostar restorations?

The Programat® S1 sintering furnace and the furnaces of the Zenotec system have been tested with and approved for Zenostar. Other high-temperature furnaces are thus suitable for sintering the restorations only to a limited extent. Please contact Customer Services if you intend to use a furnace that is not a product of Ivoclar Vivadent or Wieland.

May Zenostar restorations be blasted with corundum prior to veneering?

Do not blast the restorations with corundum, as this may damage the ceramic surface and even initiate flaws within the bond between the framework and the layering ceramic. In order to achieve a sound bond, the surface must be cleaned. Therefore, the restorations should be cleaned under running water or with a steam cleaner. After cleaning, contamination of the restoration surface (with e.g. skin oils, saliva) should be avoided.

Is it mandatory to polish the surfaces of monolithic restorations before the crowns are seated?

Yes, polishing of the surface, particularly in the occlusal areas, is a must. Failure to adhere to these guidelines may lead to damage to the opposing teeth.

Can Zenostar restorations be conventionally cemented?

Zenostar restorations can be seated using an adhesive, self-adhesive or conventional luting protocol. For conventional cementation, however, an appropriately retentive preparation design must be observed. If this is not possible, an adhesive luting or self-adhesive luting protocol should be preferred, e.g. with Multilink Automix or SpeedCEM. Vivaglass® CEM PL is available for conventional cementation. All the luting materials indicated are products of Ivoclar Vivadent. We advise against the use of conventional phosphate cements, since they negatively affect the light transmission through the all-ceramic and therefore compromise the esthetic appearance of all-ceramic restorations. Inlay-retained bridges fabricated in the press-on technique must be adhesively cemented.

Why should operators always use Deep Dentin when veneering Zenostar T frameworks with IPS e.max Ceram?

Zenostar T features a higher translucent than Zenostar MO. If the veneer is more than one millimetre thick, the brightness value may drop if only Dentin materials are used. Consequently, it is recommended to apply IPS e.max Ceram Deep Dentin underneath the Dentin material. For more detailed information, please refer to the IPS e.max Ceram Instructions for Use.

Can restorations made of Zenostar MT be veneered?

Yes, this is possible, provided the CTE of the veneering ceramic system matches the CTE of Zenostar MT. However, veneering is not mandatory. The high translucent of the materials and the resulting esthetics impart a lifelike appearance to the monolithic restorations.

How is Zenostar MT sintered?

Dense sintering of Zenostar MT is performed in the Programat S1 sintering furnace from Ivoclar Vivadent, as well as in the furnaces of the Zenotec System using the the standard Zenostar (T) program. The existing quick sintering programs for Zenostar T/MO must not be used for Zenostar MT. Sintering is currently only possible with the standard program.

Can Zenostar MT restorations with more than three units be fabricated?

No, this is not possible. With a flexural strength of ≥ 550 MPa, Zenostar MT is only suitable for bridges with a maximum of three units.

Does the surface of Zenostar MT restorations also have to be polished before glazing?

Yes, all monolithic restorations require polishing, particularly their occlusal surfaces.

Can mixed Zenostar VisualiZr be used for several days?

No, this is not possible. Mixed Zenostar VisualiZr (Zenostar MT Color/Zenostar Color Zr + VisualiZr) is not permanently colour stable and should be freshly mixed for every infiltration procedure. As soon as the identification colour loses its effect, it will also compromise the final shade of the restoration. The mixed solutions should be used within 4 hours.

Combination tables

Monolithic Zenostar MT restorations – Brush Infiltration

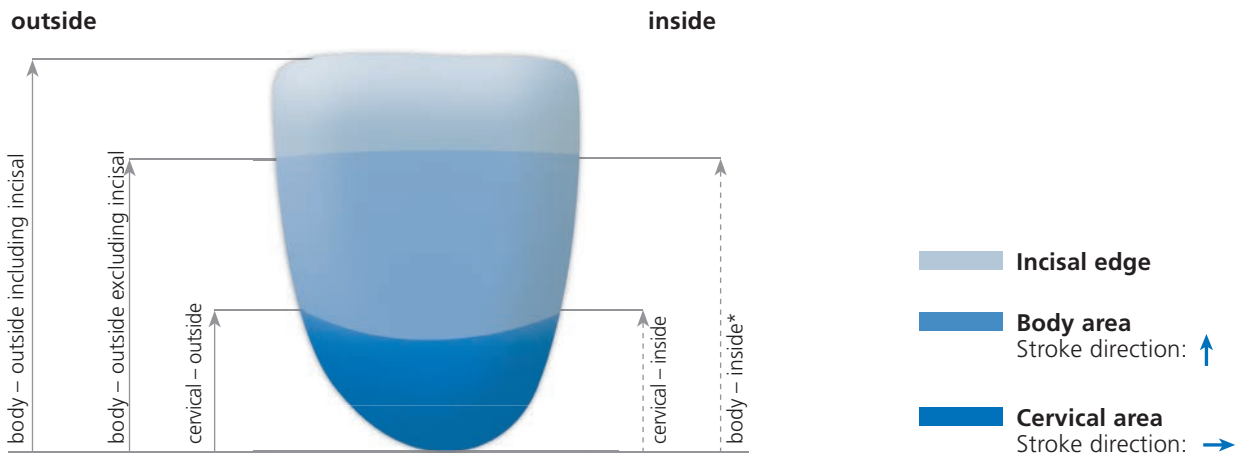


Tooth shade	Zenostar Disc	Zenostar MT Color	Number of brush strokes		Zenostar MT Color Impulse	Stains
			cervikal	body		
A1	MT0	A1	1 x outside 1 x inside Stroke direction: →	1 x inside* 1 x outside including incisal 1 x outside excluding incisal Stroke direction: ↑	Individual use Fissures/interdental: brown, orange Incisal/cusp areas: blue, violet, grey	Individual use IPS Ivocolor IPS e.max Ceram Zenostar Art Module
A2	MT0	A2				
A3	MT0	A3				
A 3.5	MT0	A3,5				
A4	MT0	A4				
B1	MT0	B1				
B2	MT0	B2				
B3	MT0	B3				
B4	MT0	B4				
C1	MT0	C1				
C2	MT0	C2				
C3	MT0	C3				
C4	MT0	C4				
D2	MT0	D2				
D3	MT0	D3				
D4	MT0	D4				

Note

For further individualization of the incisal area, Zenostar MT Color Impulse Liquids can be used before sintering. Make sure that the material is only applied selectively in the intended areas. Excessive application of the Impulse Liquids blue, grey and violet may result in a deviating (brighter) shade effect.

Schematic diagram of an anterior tooth infiltration with A-D shades



*"body – inside" when using the Impulse shades in the incisal area

Combination tables

Monolithic Zenostar T Restorations - Staining Technique



Zenostar Art Modul Stains

Tooth shade	Zenostar disc	Zenostar Art Stain	Zenostar Art Incisal Stains (individual use)
A1	T1	A1/A2/A3	grey - violet/transpa - blue
A2	T1	A1/A2/A3	
A3	T2	A1/A2/A3	
A 3.5	T4	A3,5	
A4	T4	A4	
B1	T1	B1/B2	
B2	T1	B1/B2	
B3	T3	B3/B4	
B4	T3	B3/B4	
C1	T1	C1/C2	
C2	T2	C1/C2	
C3	T2	C3/C4	
C4	T4	C3/C4	
D2	T2	D2/D3	
D3	T2	D2/D3	
D4	T2	D4	
BL1	T0	BL1/BL2	
BL2	T0	BL1/BL2	
BL3	T0	BL3/BL4	
BL4	T1	BL3/BL4	

Tooth shade	Zenostar disc	Zenostar Art Stain	Zenostar Incisal Stains (individual use)
A1	T sun	A1/A2/A3	grey - violet/transpa - blue
A2	T sun	A1/A2/A3	
A3	T sun	A1/A2/A3	
A3,5	T sun chroma	A3,5	
A4	T sun chroma	A4	
B2	T sun	B1/B2	
B3	T sun	B3/B4	
B4	T sun chroma	B3/B4	
D2	T sun	D2/D3	
D3	T sun	D2/D3	



IPS e.max Ceram Shades

Tooth shade	Zenostar disc	IPS e.max Ceram Stains	IPS e.max Ceram Incisal Stains (individual use)
A1	T1	Shade 3	Shade Incisal 1/ Shade Incisal 2
A2	T2	Shade 1	
A3	T2	Shade 2	
A 3.5	T4	Shade 1	
A4	T4	Shade 4	
B1	T1	Shade 3	
B2	T1	Shade 2	
B3	T3	Shade 2	
B4	T3	Shade 2	
C1	T1	Shade 3	
C2	T2	Shade 3	
C3	T2	Shade 3	
C4	T4	Shade 3	
D2	T2	Shade 4	
D3	T2	Shade 4	
D4	T2	Shade 2	
BL1	T0	Shade 0	
BL2	T0	Shade 0	
BL3	T1	Shade 0	
BL4	T1	Shade 1	

IPS e.max Ceram Shades

Tooth shade	Zenostar disc	IPS e.max Ceram Stains	IPS e.max Ceram Incisal Stains (individual use)
A1	T sun	Shade 1	Shade Incisal 1/ Shade Incisal 2
A2	T sun	Shade 1	
A3	T sun	Shade 1	
A3,5	T sun chroma	Shade 1	
A4	T sun chroma	Shade 4	
B2	T sun	Shade 2	
B3	T sun	Shade 2	
B4	T sun chroma	Shade 2	
D2	T sun	Shade 4	
D3	T sun	Shade 4	

Monolithic Zenostar T Restorations - Brush Infiltration



Zenostar T0-T4

Tooth shade	Zenostar disc	Zenostar Color Zr	Number of brush strokes		Zenostar Color Modifier (individual use)	Stains (individual use)
			cervikal	body		
A1	T1	A1	1x outside 1x inside	1x outside	Fissures: brown, orange Incisal/cusp areas: ivory, grey-violet, white	See combination tables "Monolithic restorations fabricated in the Staining Technique"
A2	T1	A2	1x outside 1x inside	2x outside		
A3	T2	A3	1x outside 1x inside	2x outside		
A 3.5	T4	A 3.5	1x inside	1x outside		
A4	T4	A4	1x outside 1x inside	2x outside		
B1	T1	B1	1x outside 1x inside	1x outside		
B2	T1	B2	1x outside 1x inside	2x outside		
B3	T3	B3	1x outside 1x inside	1x outside		
B4	T3	B4	1x outside 1x inside	1x outside		
C1	T1	C1	1x outside 1x inside	3x outside		
C2	T2	C2	1x outside 1x inside	1x outside		
C3	T2	C3	1x outside	1x outside		
C4	T4	C4	1x outside	2x outside		
D2	T2	D2	1x outside 1x inside	1x outside		
D3	T2	D3	1x outside 1x inside	1x outside		
D4	T2	D4	1x outside	1x outside		

Zenostar T sun und T sun chroma

Tooth shade	Zenostar disc	Zenostar Color Zr	Number of brush strokes		Zenostar Color Modifier (individual use)	Stains (individual use)
			cervikal	body		
A1	T sun	A1	-	1x outside	Fissures: brown, orange Incisal/cusp areas: ivory, grey-violet, white	See combination tables "Monolithic restorations fabricated in the Staining Technique"
A2	T sun	A2	1x inside	1x outside		
A3	T sun	A3	1x outside 1x inside	2x outside		
A4	T sun chroma	A4	-	1x outside 1x inside		
B2	T sun	B2	-	1x outside		
B3	T sun	B3	1x inside	1x outside		
D2	T sun	D2	1x outside 1x inside	2x outside		
D3	T sun	D3	1x inside	1x outside		

Detailed information on the location and direction, e.g. "inside" or "outside", can be found on the pages 34 and 35.

Zenostar T/MO – Layering Technique

IPS e.max Ceram

Tooth shade	Zenostar disc	IPS e.max Ceram Dentin	IPS e.max Ceram Transpa Incisal
A1	MO1/T1	A1	T11
A2	MO1/T1	A2	T11
A3	MO2/T2	A3	T12
A 3.5	MO2/T2	A 3.5	T12
A4	MO4/T4	A4	T13
B1	MO1/T1	B1	T11
B2	MO1/T1	B2	T11
B3	MO3/T3	B3	T11
B4	MO3/T3	B4	T12
C1	MO1/T1	C1	T11
C2	MO4/T4	C2	T13
C3	MO4/T4	C3	T13
C4	MO4/T4	C4	T13
D2	MO2/T2	D2	T13
D3	MO4/T4	D3	T13
D4	MO4/T4	D4	T13
BL1	MO0/T0	BL1	I BL
BL2	MO0/T0	BL2	I BL
BL3	MO0/T0	BL3	I BL
BL4	MO0/T0	BL4	I BL

We recommend using IPS e.max Ceram Deep Dentin for the veneering of Zenostar T to ensure that the brightness value of restoration is maintained. If the veneer is more than one millimetre thick, the brightness value may drop if only Dentin materials are used. Consequently, it is recommendable to apply IPS e.max Ceram Deep Dentin underneath the Dentin material. For more detailed information, please refer to the IPS e.max Ceram Instructions for Use.



Zenostar T/MO – Press-On Technique

Zenostar MO is pressed over with IPS e.max ZirPress

Tooth shade	Zenostar disc	IPS e.max ZirLiner	IPS e.max ZirPress
A1	MO1 / T1	ZL clear	A1
A2	MO1 / T1	ZL clear	A2
A3	MO2 / T2	ZL clear	A3
A 3.5	MO2 / T2	ZL clear	A 3.5
A4	MO4 / T4	ZL clear	A4
B1	MO1 / T1	ZL clear	B1
B2	MO1 / T1	ZL clear	B2
B3	MO3 / T3	ZL clear	B3
B4	MO3 / T3	ZL clear	B4
C1	MO1 / T1	ZL clear	C1
C2	MO4 / T4	ZL clear	C2
C3	MO4 / T4	ZL clear	C3
C4	MO4 / T4	ZL clear	C4
D2	MO4 / T4	ZL clear	D2
D3	MO4 / T4	ZL clear	D3
D4	MO4 / T4	ZL clear	D4
BL1	MO0 / T0	ZL clear	BL1
BL2	MO0 / T0	ZL clear	BL2
BL3	MO0 / T0	ZL clear	BL3
BL4	MO0 / T0	ZL clear	BL4

If Zenostar T is used in combination with IPS e.max ZirPress HT, the framework should provide ideal structural support in order to avoid any decreases in brightness, particularly in the fabrication of large-volume restorations. In such cases, the use of an ingot with a lower translucent, e.g. LT, is recommended.



Firing parameters for Zenostar MT, Zenostar T and Zenostar MO

The following points need to be observed to achieve optimum firing results:

- In order to ensure an even thickness of the veneer, the zirconium oxide restoration must be designed in such a way that it provides support at the cusp area. Depending on the clinical situation, the consequences are different wall thicknesses and dimensions of the framework.
- Since zirconium oxide is a poor heat conductor compared to other framework materials, a low temperature increase rate is required. This ensures even heat distribution in the bonding area between the framework and the veneer, as well as at the outer surface of the restoration even with different framework thicknesses. In this way, an optimum bond is achieved and the layering material is homogeneously sintered.
- During cooling of the restorations after firing, stress occurs as a result of the different cooling speed at the outside and within the material. By means of long-term cooling after the "final" firing cycle, this stress can be reduced and the risk of delamination minimized, particularly in zirconium oxide-supported restorations.
- Several objects (e.g. multi-unit bridges with massive bridge pontics) in the furnace delay even heating of the objects to be fired.
- An even temperature distribution within the firing chamber depends on the type of furnace as well as the size of the firing chamber.
- The parameters stipulated in the Instructions for Use are coordinated with Ivoclar Vivadent furnaces (tolerance range $\pm 10^{\circ}\text{C}$).
- If a non-Ivoclar Vivadent furnace is used, temperature corrections may be necessary.
- At the beginning, open the furnace and wait for the acoustic signal. Subsequently, place the firing tray with the objects in the centre of the firing table and start the program.

Notes on cooling after completion of the firing program

In order to ensure controlled cooling of the restoration after firing, please observe the following notes:

- Wait for the acoustic signal or optical indication of the furnace at the end of the firing cycle before removing the firing tray with the fired objects.
- Do not touch hot objects with metal tongs.
- Allow the objects to cool to room temperature in a place protected from draft.
- Do not blast or quench the objects.

Firing parameters for IPS Ivocolor



IPS Ivocolor on Zenostar MT/ Zenostar T - Staining Technique

Parameter name	Stand-by temperature	Closing time	Heating rate	Firing temperature	Holding time	Vacuum 1	Vacuum 2
Parameter symbol	B	S	t	T	H	V₁	V₂
Unit	[°C]	[min]	[°C / min]	[°C]	[min]	[°C]	[°C]
Stain and Glaze firing	403	6:00	45	710	1:00	450	709

Note!: Long-term cooling to 450°C is required for the final Stain and/or Glaze firing of veneered Zenostar restorations.

If several Zenostar restorations (multi-unit bridges with massive pontics or several full-contour restorations) are fired in the same firing procedure, thorough heating of the objects may be delayed. This can be counteracted by reducing the heating rate or prolonging the holding time at the final temperature.



Firing parameters for Zenostar Art Module

Zenostar Art Module on Zenostar MT / Zenostar T - Staining Technique

Parameter name	Stand-by temperature	Closing time	Heating rate	Firing temperature	Holding time	Vacuum	Relaxation cooling
Parameter symbol	B	S	t	T	H	V₁	
Unit	[°C]	[min]	[°C / min]	[°C]	[min]	[°C]	[°C]
Stain firing	575	5:00	45 / 15	890	1:00	-	8 / 15
Glaze firing	575	5:00	45 / 15	900	1:00	-	8 / 15
Glaze firing 2 / optional	575	5:00	45 / 15	930	2:00	-	8 / 15

Important: When firing monolithic Zenostar T single-tooth crowns, use a heating rate of 45°C (81°F)/min, whereas for monolithic Zenostar T bridges, use a heating rate of 15°C (27°F)/min. Very massive objects or works involving gingival masks should be cooled more slowly; allow them to cool for at least 15 minutes to 25 minutes.

Firing parameters for IPS e.max Ceram

IPS e.max Ceram on Zenostar T/MO – Layering Technique

Parameter name	Stand-by temperature	Closing time	Heating rate	Firing temperature	Holding time	Vacuum 1	Vacuum 2	Long-term cooling
Parameter symbol	B	S	t	T	H	V₁	V₂	L
Unit	[°C]	[min]	[°C / min]	[°C]	[min]	[°C]	[°C]	[°C]
ZirLiner firing	403	4:00	40	960	1:00	450	959	0
1 st Margin firing	403	4:00	40	800	1:00	450	799	0
2 nd Margin firing	403	4:00	40	800	1:00	450	799	0
Wash firing	403	4:00	40	750	1:00	450	749	0
1 st Dentin-/Incisal firing	403	4:00	40	750	1:00	450	749	0
2 nd Dentin-/Incisal firing	403	4:00	40	750	1:00	450	749	0
Stain firing	403	6:00	60	725	1:00	450	724	450
Glaze firing	403	6:00	60	725	1:00	450	724	450
Add-on with Glaze firing	403	6:00	60	725	1:00	450	724	450
Add-on after Glaze firing	403	6:00	50	700	1:00	450	699	450

IPS e.max Ceram on Zenostar MT/T - Staining Technique

Parameter name	Stand-by temperature	Closing time	Heating rate	Firing temperature	Holding time	Vacuum 1	Vacuum 2
Parameter symbol	B	S	t	T	H	V₁	V₂
Unit	[°C]	[min]	[°C / min]	[°C]	[min]	[°C]	[°C]
Stain and Characterization firing	403	6:00	60	770	1:00	450	769
Glaze firing	403	6:00	60	770	1:00-2:00	450	769
Add-on after Glaze firing	403	6:00	50	770	1:00	450	769

If several objects (multi-unit bridges with massive bridge pontics or several full-contour restorations) are fired in one firing cycle, the heating of the objects in the furnace may be delayed. This delay can be counteracted by either reducing the heating rate or by extending the holding time at the final temperature.

The heating of the firing chamber depends on the type of furnace as well as the size of the firing chamber!



IPS e.max Ceram on IPS e.max ZirPress/Zenostar (Cut-Back, Layering Technique)

Parameter name	Stand-by temperature	Closing time	Heating rate	Firing temperature	Holding time	Vacuum 1	Vacuum 2	Long-term cooling
Parameter symbol	B	S	t	T	H	V₁	V₂	L
Unit	[°C]	[min]	[°C / min]	[°C]	[min]	[°C]	[°C]	[°C]
ZirLiner firing - prior to waxing up and pressing	403	4:00	40	960	1:00	450	959	0
Wash firing	403	4:00	40	750	1:00	450	749	0
Wash firing Characterization	403	4:00	40	750	1:00	450	749	0
1 st Dentin/Incisal firing	403	4:00	40	750	1:00	450	749	0
2 nd Dentin/Incisal firing	403	4:00	40	750	1:00	450	749	0
Stain firing	403	6:00	60	725	1:00	450	724	450
Glaze firing	403	6:00	60	725	1:00	450	724	450
Add-on with Glaze firing	403	6:00	60	725	1:00	450	724	450
Add-on after Glaze firing	403	6:00	50	700	1:00	450	699	450

IPS e.max Ceram on IPS e.max ZirPress/Zenostar (Staining Technique)

Parameter name	Stand-by temperature	Closing time	Heating rate	Firing temperature	Holding time	Vacuum 1	Vacuum 2	Long-term cooling
Parameter symbol	B	S	t	T	H	V₁	V₂	L
Unit	[°C]	[min]	[°C / min]	[°C]	[min]	[°C]	[°C]	[°C]
ZirLiner firing - prior to waxing up and pressing	403	4:00	40	960	1:00	450	959	0
Stain and Characterization firing	403	6:00	60	770	1:00-2:00	450	769	450
Glaze firing	403	6:00	60	770	1:00-2:00	450	769	450
Add-on after Glaze firing	403	6:00	50	700	1:00	450	699	450

IPS e.max Ceram on IPS e.max ZirPress/ Zenostar restorations (Gingiva Technique)

Parameter name	Stand-by temperature	Closing time	Heating rate	Firing temperature	Holding time	Vacuum 1	Vacuum 2	Long-term cooling
Parameter symbol	B	S	t	T	H	V₁	V₂	L
Unit	[°C]	[min]	[°C / min]	[°C]	[min]	[°C]	[°C]	[°C]
ZirLiner firing - prior to waxing up and pressing	403	4:00	40	960	1:00	450	959	0
Wash firing	403	4:00	40	750	1:00	450	749	450
Wash firing Characterization	403	4:00	40	750	1:00	450	749	450
1 st Dentin/Incisal firing	403	4:00	40	750	1:00	450	749	450
2 nd Dentin/Incisal firing	403	4:00	40	750	1:00	450	749	450
Stain firing	403	6:00	60	725	1:00	450	724	450
Glaze firing	403	6:00	60	725	1:00	450	724	450
Add-on with Glaze firing	403	6:00	60	725	1:00	450	724	450
Add-on after Glaze firing	403	6:00	50	700	1:00	450	699	450

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