

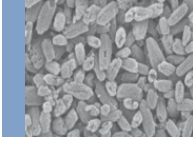


IPS[®] e.max[®]

CAD

Veneering Solutions
Instructions for Use



Table of Contents

Product Information		3	IPS e.max System
		4	IPS e.max CAD
		5	IPS e.max CAD Veneering Solutions
			Description Uses Scientific data CAD/CAM partners Materials for IPS e.max CAD Veneering Solutions
Practical Procedure		10	Shade Determination – Tooth Shade, Preparation Shade Shade concept Preparation guidelines Minimum layer thicknesses
		15	Completing the Restoration Finishing the IPS e.max CAD veneering structure Preparation for multiple IPS e.max CAD veneering structures Preparing the fusion process Fusion process – Cleaning and verification – Fusion/Crystallization firing Glazing and characterization
General Information		32	Frequently Asked Questions Cementation and Aftercare Shade Combination Table Crystallization and Firing Parameters Accessories

Symbols in the Instructions for Use



Important



Contraindication



Note on firing

IPS e.max® System

IPS e.max is an innovative all-ceramic system which covers the entire all-ceramic indication range – from thin veneers to 14-unit bridges.

IPS e.max comprises highly esthetic high-strength materials for the PRESS and the CAD/CAM technologies. The system consists of innovative lithium disilicate glass-ceramics for smaller restorations and high-strength zirconium oxide for long-span bridges.

Every patient situation presents its own requirements and objectives. IPS e.max meets these requirements. Due to the system components you obtain exactly what you need.

- For the field of **Press technology** there is the **IPS e.max Press**, a highly esthetic **lithium disilicate glass-ceramic** and **IPS e.max ZirPress** a **fluor apatite glass-ceramic ingot** for the quick and efficient press-on technique on zirconium oxide.
- For **CAD/CAM technology**, depending on the case requirements, either the **IPS e.max CAD**, an innovative **lithium disilicate block**, or the high-strength **zirconium oxide IPS e.max ZirCAD** can be used.
- The **nano-fluorapatite layering ceramic IPS e.max Ceram**, which is used to characterize and/or veneer all IPS e.max components – glass or oxide ceramics – completes the IPS e.max System.



Three solutions for maximum flexibility

IPS e.max® CAD Solutions

IPS e.max CAD stands for individuality. Depending on the indication, users may select from three approaches: This ensures maximum flexibility in the digital work process.

IPS e.max® CAD Monolithic Solutions

Efficient fabrication of full-contour restorations with high strength (≥ 360 MPa) ranging from thin veneers to three-unit bridges.



IPS e.max® CAD Veneering Solutions

Digitally fabricated high-strength veneering structures for zirconium oxide frameworks (ZrO_2) – for tooth- and implant-retained crowns and long-span bridges (CAD-on).



IPS e.max® CAD Abutment Solutions

Individual CAD/CAM-fabricated hybrid restorations for implants – for single-tooth restorations in the anterior and posterior region.



IPS e.max CAD is the innovative lithium disilicate glass-ceramic (LS_2) for the CAD/CAM technology. It is unique and combines an outstanding esthetic appearance with high user friendliness. The digitally fabricated restoration is selected from a comprehensive range of indications, which is only offered by IPS e.max CAD. A multitude of translucency levels, shades and block sizes enables flexible working. Proven and coordinated cementation materials ideally supplement the range of products.

These Instructions for Use describe the fabrication of **IPS e.max CAD Veneering Solutions**. There are separate Instructions for Use for **IPS e.max CAD Monolithic Solutions** and **IPS e.max CAD Abutment Solutions**.

IPS e.max® CAD Veneering Solutions

Description

The IPS e.max Veneering Solutions (IPS e.max CAD-on technique) allows the lithium disilicate glass-ceramic (LS₂) IPS e.max CAD to be used for the fabrication of high-strength zirconium oxide-based restorations.

The CAD/CAM-based fabrication technique IPS e.max CAD-on is characterized by the combination of the two materials: IPS e.max CAD and IPS e.max ZirCAD or Zenostar® MO (zirconium oxide). The LS₂ glass-ceramic is already being very successfully used for single-tooth restorations, such as monolithic crowns, and serves as veneering structure in the IPS e.max CAD-on technique. The zirconium oxide materials IPS e.max ZirCAD or Zenostar MO are used for the fabrication of a high-strength frameworks.

Both components are designed in the software and milled to high precision in the milling unit.

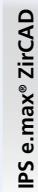
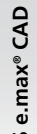
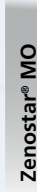








The IPS e.max ZirCAD or Zenostar MO framework is then sintered in the Programat® S1, for instance. The homogeneous all-ceramic fusion between the two separately milled parts is achieved with the specially developed innovative fusion glass-ceramic IPS e.max CAD Crystall./Connect during the crystallization of the IPS e.max CAD material.



Increasing speed and efficiency

The IPS e.max CAD-on technique increases the efficiency and productivity in the fabrication of tooth- or implant-borne posterior restorations. With this technique, zirconium oxide-supported IPS e.max CAD restorations can be made quickly and easily.

For Sirona inLab users the entire fabrication process can be carried out independently using the Sirona MC XL. 3Shape users have the option of allowing the structures to be fabricated by AMPs (Authorized Milling Partners) or to only order the IPS e.max CAD veneering structures. The Zenostar MO framework can be fabricated in a Zenotec® milling machine (select or mini).

Software provider	Sirona inLab®	3Shape Dental Designer
Workflow	Scan and Design (CAD)	Scan and Design (CAD)
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>IPS e.max® ZirCAD</p> </div> <div style="text-align: center;">  <p>IPS e.max® CAD</p> </div> </div>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Zenostar® MO</p> </div> <div style="text-align: center;">  <p>IPS e.max® CAD</p> </div> </div>
Production	Sirona MC XL 	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Zenotec® select/mini</p> </div> <div style="margin-left: 10px;"> <p>Authorized Milling Partner</p> </div>  </div>
	 	 

An overview of the partnerships to machine manufacturers and milling centres (indication and material overview) is available at www.ivoclarvivadent.com.

Uses

Indications

- Crowns
- Splinted crowns
- Multi-unit bridges

Contraindications

- Restorations with more than two connected bridge pontics
- Two bridge pontics as extension units
- Very deep subgingival preparations
- Severely reduced residual dentition
- Bruxism
- Any other uses not listed in the indications
- Use of IPS e.max Ceram layering materials (layering technique, cut-back technique)
- Use of IPS e.max Ceram Glaze, Shades, Essences (staining technique)



The fabrication of IPS e.max CAD HT bridges which are not supported by a zirconium oxide structure is contraindicated.

Important processing restrictions

Failure to observe the following restrictions may compromise the results achieved with IPS e.max CAD:

- Milling of IPS e.max CAD and IPS e.max ZirCAD/Zenostar MO with non-compatible CAD/CAM systems.
- Failure to observe the necessary minimum connector and restoration layer thicknesses
- Sintering of IPS e.max ZirCAD/Zenostar MO in a non-compatible high-temperature furnace
- Conducting the Fusion/Crystallization firing or the Stain/Glaze firing in a ceramic furnace which has not been approved and which is not recommended
- Conducting the Fusion/Crystallization firing or the Stain/Glaze firing with deviating parameters
- Conducting the Fusion/Crystallization firing or the Stain/Glaze firing in a non-calibrated ceramic furnace
- Conducting the Fusion/Crystallization firing or the Stain/Glaze firing in a high-temperature furnace (e.g. Programat S1)
- Mixing of IPS e.max CAD Crystall./Glaze, Shades and Stains with other ceramic materials (e.g. IPS e.max Ceram Glaze, Stains and Essences)
- Wetting or rewetting IPS e.max CAD Crystall./Connect
- Mixing of IPS e.max CAD Crystall./Connect with other ceramic materials in general
- Using a vibrator other than Ivomix

Warnings

- Do not inhale ceramic dust – use an extraction unit and wear a face mask for protection.
- IPS Contrast Spray Labside must not be used intraorally.
- Observe the Safety Data Sheet (SDS).

Scientific data

Since the beginning of the development, the IPS e.max System has been monitored by the scientific community. Many renowned experts have contributed to an excellent data base with their studies. The worldwide success story, the ever growing demand, as well as over 70 million (as per 2013) fabricated restorations are testament to the success and the reliability of the system. More than 20 clinical *in-vivo* studies to date and even more *in vitro* studies, as well as the continuously rising number of clinical studies throughout the world show the long-term success of the IPS e.max System in the oral cavities of the patients. The most important study results are compiled in the "IPS e.max Scientific Report".

Further scientific data (i.e. strength, wear, biocompatibility) are contained in the "Scientific Documentation IPS e.max CAD". It can be obtained from Ivoclar Vivadent.

For further information about all-ceramics and IPS e.max, please refer to the Ivoclar Vivadent Report No. 16 and 17.



CAD/CAM partners

IPS e.max CAD has to be processed with an authorized CAD/CAM system. For questions regarding the different systems, please contact the respective cooperation partners.

Additional information is available on the Internet from www.ivoclarvivadent.com.

Materials for IPS e.max® CAD Veneering Solutions

IPS e.max® CAD



IPS e.max CAD is a lithium disilicate glass-ceramic block for the CAD/CAM technology. It is fabricated using an innovative process which provides an impressive homogeneity of the material. The block can be processed very easily in a CAM unit in this crystalline intermediate stage (metasilicate).

The typical and striking colour of IPS e.max CAD ranges from whitish to blue and bluish-grey. This shade is a result of the composition and the microstructure of the glass-ceramic. Crystallization takes place in a combined IPS e.max CAD-on Fusion/ Crystallization firing in an Ivoclar Vivadent ceramic furnace (e.g. Programat® P710). This leads to a change in the microstructure in the IPS e.max CAD material, during which lithium disilicate crystals grow. The final physical properties, such as the flexural strength of ≥ 360 MPa, and the desired optical properties are achieved through the transformation of the microstructure.

Please observe the IPS e.max CAD Instructions for Use. More information can be found at www.ivoclarvivadent.com

IPS e.max® ZirCAD/Zenostar®



IPS e.max® ZirCAD or Zenostar® MO are presintered yttrium-stabilized zirconium oxide blocks or discs for the CAD/CAM technology.

The blocks and discs are available both

shaded and unshaded. IPS e.max ZirCAD or Zenostar MO can be processed very easily in a CAD/CAM unit in its partly sintered, "chalk-like" state. Milling is carried out with an enlargement of the framework of approximately 20-25%. Given the controlled manufacturing process of the blocks and discs, combined with a coordinated sintering process in a high temperature furnace (e.g. Programat® S1) the shrinkage of the enlarged milled frameworks can be controlled in such a way that excellent accuracy of fit can be achieved. During the sintering procedure, the final material-specific properties of IPS e.max ZirCAD/Zenostar MO are achieved. In the process, a structure that is densified to more than 99 % is created, which features high flexural strength (>900 MPa) combined with high fracture toughness ($5 \text{ MPa m}^{0.5}$) and thus fully meets the clinical requirements presented by masticatory forces – particularly in the posterior region.

Please observe the corresponding instructions for use. More information can be found at www.ivoclarvivadent.com or www.wieland-dental.de.

IPS e.max® CAD Crystall./Connect



IPS e.max CAD Crystall./Connect is a specially developed fusion glass-ceramic which is used to create a homogeneous bond between the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure during the IPS e.max CAD-on Fusion/Crystallization firing. The shades of the fusion glass-ceramic are adjusted in such a way that the IPS e.max ZirCAD/Zenostar MO shades combined with the IPS e.max CAD HT shades correspond to the shades of the IPS e.max shade concept. IPS e.max CAD Crystall./Connect is a pre-dosed, ready-to-use powder/liquid system available in single doses and nine shades. The precisely adjusted powder/liquid mixture of IPS e.max CAD Crystall./Connect turns liquid when vibrated (with the Ivomix®). This allows the material to be mixed and the components to be joined on the Ivomix. Without vibration, IPS e.max CAD Crystall./Connect returns to a firm state, which enables the joined restoration to be checked in the articulator. This special property is known as thixotropy. After the IPS e.max CAD-on Fusion/Crystallization firing at 840°C/1544°F, the sintered material demonstrates high flexural strength of 160 MPa. The sintering temperature of IPS e.max CAD Crystall./Connect has been adjusted to the crystallization temperature of IPS e.max CAD so that the fusion process and the crystallization of IPS e.max CAD can be conducted in one firing cycle (Fusion/Crystallization firing).

Predrying the restoration including the fusion area is an important partial step of the firing process, as the fusion ceramic requires even drying throughout the fusion gap. Insufficient or too quick drying might result in the veneering structure being completely or partially lifted off the framework.

IPS e.max® CAD Veneering Solutions

Shade determination – tooth shade, shade of the preparation

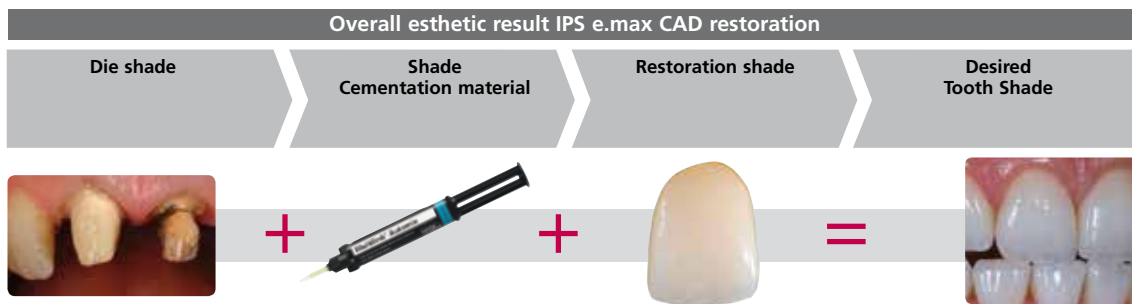
Optimum integration in the oral cavity of the patient is the prerequisite for a true-to-nature all-ceramic restoration.

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 prepared tooth** (natural preparation, core build-up, abutment, implant)
- **Shade of the restoration** (framework shade, veneer, characterization)
- **Shade of the cementation material**

The visual effect of the preparation shade must not be underestimated during the fabrication of highly esthetic restorations. For that reason, the shade of the preparation should be determined together with the desired tooth shade in order to select the suitable block. This is of utmost importance in particular with severely discoloured preparations or non-tooth-coloured abutments. Only if the dentist determines the shade of the preparation and then shares this information with the laboratory may the desired esthetic appearance be achieved as necessary.



Shade determination of the natural tooth

After tooth cleaning, the tooth shade of the non-prepared tooth and/or the adjacent teeth is determined with the help of a shade guide. Individual characteristics have to be considered when determining 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 determination should be carried out at daylight. Furthermore, the patient should not wear clothes of intensive colours and/or lipstick.



Die shade determination

In order to facilitate the reproduction of the desired tooth shade, the shade of the preparation is determined with the help of the IPS Natural Die Material shade guide. 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 restorations may be selected.



Another option for shade determination is provided by the Programat® P710. The integrated image processing software DSA (Digital Shade Assistant) compares three preselected shade guide teeth with the tooth to be analyzed and automatically indicates the closest matching tooth shade.

You can find additional information about this topic in the Operating Instructions "Programat P710 with DSA Function". They can be ordered from your Ivoclar Vivadent contact address.



Shade concept

In the IPS e.max CAD-on technique, the desired restoration shade is achieved by the following combination:

- the shade of the framework (IPS e.max ZirCAD/Zenostar MO)
- the shade of the fusion glass-ceramic (IPS e.max CAD Crystall./Connect)
- the shade of the veneering structure (IPS e.max CAD HT)
- characterizations (IPS e.max CAD Crystall./Shades, Stains)

The desired esthetic properties can be specifically achieved if the correct materials which correspond to the tooth shade are selected.



If other combinations are selected (e.g. different zirconium oxide shades), the final shade may differ.

	Desired tooth shade																			
	BL1	BL2	BL3	BL4	A1	A2	A3	A3.5	A4	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
IPS e.max ZirCAD	MO 0				MO 1		MO 2		–	MO 1		–		MO 1	–					
Zenostar MO	MO 0				MO 1		MO 2		MO 4	MO 1		MO 3		MO 1	MO 4					
IPS e.max CAD Crystall./Connect	1	2			3	4	5	6	9	3	4	7		7	9			8	9	
IPS e.max CAD HT C14	BL1	BL2	BL3	BL4	A1	A2	A3	A3.5	A4	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
IPS e.max CAD HT B40	–	BL2	BL2 ¹	BL2 ¹	A1	A2	A3	A3.5	A3.5 ¹	B1	B2	B2 ¹	B2 ¹	C1	C2	C2 ¹	C2 ¹	D2	D2 ¹	D2 ¹
IPS e.max CAD HT B40L	–	BL2	BL2 ¹	BL2 ¹	A1	A2	A3	A3.5	A3.5 ¹	B1	B2	B2 ¹	B2 ¹	C1	C2	C2 ¹	C2 ¹	D2	D2 ¹	D2 ¹

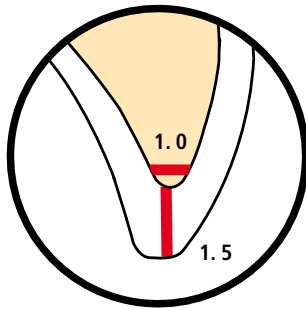
¹ IPS e.max CAD HT B40 and B40L blocks are available in 10 shades. To create the desired tooth shade, select the closest block shade in the respective shade group and determine the restoration shade by means of Stains.



Do not use IPS e.max Ceram layering materials and/or Shades, Essences or Glaze Glaze materials including IPS Ivocolor materials. in conjunction with the IPS e.max CAD-on technique.

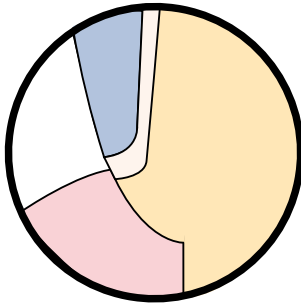


Preparation guidelines



Basic preparation guidelines for all-ceramic restorations

- no angles or edges
- The incisal edge of the preparation, particularly for anterior teeth, should be at least 1.0 mm (milling tool geometry) in order to permit optimum milling during CAD/CAM processing.

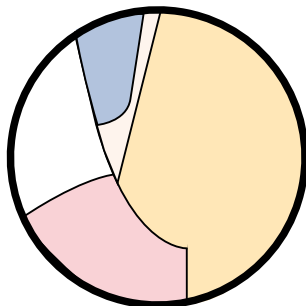


A very pronounced shoulder/chamfer results in a narrow zirconium oxide collar.

The following notes should also be observed when using the IPS e.max CAD-on technique:

The zirconium oxide framework is designed in the software with a circumferential collar on abutment teeth / crown framework due to technical reasons. The height of this collar is mainly determined by the shape of preparation and the designed fully anatomical tooth shape.

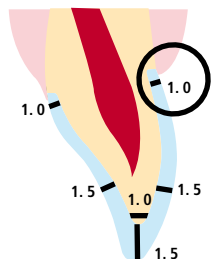
- A very pronounced shoulder/chamfer results in a thin zirconium oxide collar.
- A minor shoulder/chamfer results in a wider zirconium oxide collar.



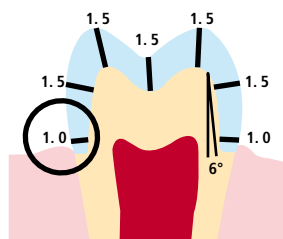
A minor shoulder/chamfer results in a wider zirconium oxide collar.

Singe Crowns to 3-Unit Bridges

Anterior crown

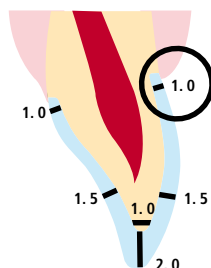


- Reduce the anatomical shape and observe the stipulated minimum thickness. Prepare a circular shoulder with rounded inner edges or a chamfer at an angle of approximately 10°–30°. Width of the circular shoulder/chamfer at least 1.0 mm.
- Reduce the incisal crown third – in the incisal area – by approx. 1.5 mm.
Reduce the vestibular and/or oral area by approx. 1.5 mm.
- For conventional and/or self-adhesive cementation, the preparation must demonstrate retentive surfaces

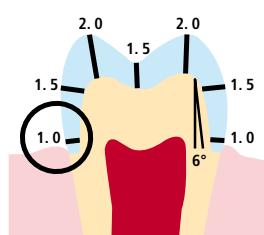


Posterior crowns

4- and more-unit bridges



- Evenly reduce the anatomical shape while observing the stipulated minimum thicknesses. prepare a circular shoulder with rounded inner edges or a chamfer of a width of at least 1.0 mm.
- Reduce the incisal crown third – incisal and/or occlusal – by approx. 2.0 mm.
- For anterior crowns, the reduction in the labial and/or palatal/lingual area is at least 1.5 mm. The incisal edge of the preparation should be at least 1.0 mm (milling tool geometry) in order to permit optimum milling of the incisal area during CAD/CAM processing.
- For posterior crowns, the reduction in the buccal and/or palatal/lingual area is at least 1.5 mm.
- For conventional and/or self-adhesive cementation, the preparation must demonstrate retentive surfaces



Minimum layer thicknesses

The restoration design is key to the success of durable all-ceramic restorations. The more attention given to the design, the better the final results and the clinical success will turn out to be.

The following basic guidelines have to be observed:

- The restoration design generated by the software may need to be individually adapted according to the clinical situation.
- **During the construction of an IPS e.max CAD-on restoration, once the anatomical tooth contour has been designed, the software separates the design into the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure, in compliance with the stipulated minimum thicknesses.**
- If changes are made to the framework during construction, make sure that no undercuts are created.
- After the milling process, only the attachment point to the block may be smoothed out on the IPS e.max ZirCAD/Zenostar MO framework. Further processing is not possible, as this would negatively affect the size of the fusion joint.

The following minimum layer thicknesses are stored in the software and must be observed:

IPS e.max CAD veneering structure	Minimum layer thickness in mm	
	circular	occlusal
Crowns	0.7	0.7
Splinted crowns	0.7	0.7
Bridges	0.7	0.7

IPS e.max ZirCAD/Zenostar MO framework	Minimum layer thickness in mm		Connector dimensions mm ²
	circular	occlusal	
Crowns	0.5	0.5	–
Splinted crowns	0.5	0.5	7
3-unit bridges	0.5	0.5	9
4- and multi-unit bridges* with two pontics	0.5	0.7	12

* In Canada, bridge indications are restricted to 6 units with a maximum of 2 connected pontics.

Practical Procedure

Completion of the Restoration

Finishing the IPS e.max® CAD veneering structure



Refer to the following Instructions for Use for detailed information:

- IPS e.max CAD Monolithic Solutions labside
- IPS e.max ZirCAD
- Zenostar T/MO

It is of critical importance to use suitable instruments for finishing IPS e.max CAD. If unsuitable grinding instruments are used, chipping of the edges and local overheating may occur (please observe the Ivoclar Vivadent Flow Chart "Recommended grinding tools for IPS e.max glass-ceramics").

- Carry out grinding adjustments of IPS e.max CAD veneering structures while they are still in their pre-crystallized (blue) state, if possible.
- Only use suitable grinding instruments, low speed and light pressure to prevent delamination and chipping at the margins in particular.
- Overheating of the glass-ceramic must be avoided.

Observe the following procedure for finishing IPS e.max CAD veneering structures:

- Carefully separate the IPS e.max CAD veneering structure from the block using a diamond-coated separating disc.
- Place the IPS e.max CAD veneering structure on the sintered IPS e.max ZirCAD/Zenostar MO framework and check the fit.
- The IPS e.max CAD veneering structure must touch the entire circular collar of the bridge abutment or the crown framework.
- If it is necessary to adjust the fit of the IPS e.max CAD veneering structure on the IPS e.max ZirCAD/Zenostar MO framework, always carry out corrections and adjustments on the IPS e.max CAD veneering structure.
- There should only be contact between the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure at the cervical collar, so that it can then be accurately joined with the IPS e.max CAD Crystall./Connect fusion glass-ceramic.
- In the case of bridges, the IPS e.max CAD veneering structure and the IPS e.max ZirCAD/Zenostar MO framework must not touch each other in the basal pontic area. Adjust by grinding, if necessary. – Finish the outer aspects of the IPS e.max CAD veneering structure with rubber polishers. The veneering structure can be placed on the IPS e.max ZirCAD/Zenostar MO framework in order to prevent excessive reduction.
- **Do not separate the interdental space with separating discs.** The interdental space can be adjusted with fine, tapered diamond burs or diamond-coated rubber wheels. "V-shaped" cuts must be avoided.
- Carefully smooth out the attachment point on the restoration. Pay attention to the proximal contact.
- Place the restoration (IPS e.max ZirCAD/Zenostar MO framework with IPS e.max CAD veneering structure in place) on the model. Check occlusal contact points and articulation in the articulator. Carry out individual corrections, if required.
- Surface-grind the entire occlusal surface of the IPS e.max CAD veneering structure with a fine diamond to smooth out the surface structure created by the CAD/CAM procedure.
- Make sure that the minimum layer thicknesses are observed.
- Design surface textures.
- Clean the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure in an ultrasonic bath or using a steam cleaner before further processing.
- Make sure to thoroughly clean the restoration before further processing and to remove any residue of the milling additive from the CAD/CAM milling unit. Residue of the milling additive remaining on the surface may result in bonding problems and discolouration.
- Do **not** blast restorations with Al_2O_3 or glass polishing beads!



Carefully separate the IPS e.max CAD veneering structure from the block with a diamond separating disc and smooth out the attachment point with suitable grinding instruments.



Place the IPS e.max CAD veneering structure on the zirconium oxide framework and check the fit.



If corrections of the fit are required, always carry out the corrections on the IPS e.max CAD veneering structure.



The contact between the IPS e.max CAD veneering structure and the zirconium oxide should be exclusively located on the collar.

Finish the margins of the IPS e.max CAD veneering structure with suitable instruments.
The IPS e.max CAD veneering structure may be placed on the zirconium oxide framework for this purpose.



Do not separate the interdental space with separating discs.



Check the occlusion and articulation as well as the proximal contact points on the model.

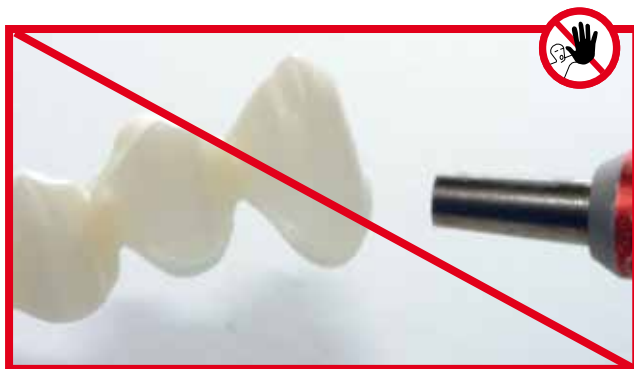


Finish the contact points, occlusion and surface texture with fine diamond grinding instruments.
Pay attention to functional contact points.

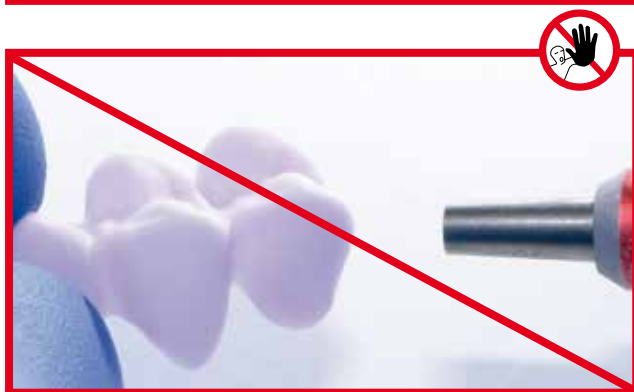




Completely fitted IPS e.max CAD-on restoration prior to the fusion process.



Do not blast the IPS e.max CAD veneering structure and the zirconium oxide framework with Al_2O_3 or glass polishing beads.



Preparation for multiple IPS e.max® CAD veneering structures



For multiple IPS e.max CAD veneering structures, the following working steps must be followed:

Secure the zirconium oxide framework with the IPS e.max CAD veneering structure using modelling wax.



Apply the silicone material using a suitable tray.



Trimming the silicone key. Ensure that the veneering structure is securely fixed.



Cleaning / removing the wax residue with the steam cleaner.



Preparing the fusion process

To prepare for the fusion process, please observe the following procedure:

- Select the suitable IPS e.max CAD Crystall./Connect material on the basis of the desired tooth shade according to the combination table (p. 11).
- Press the Ivomix onto a smooth work surface and switch it on. Please refer to the respective Operating Instructions for more details on the Ivomix.
- To mix the material, lightly press the closed IPS e.max CAD Crystall./Connect capsule onto the vibrating plate of the Ivomix for approx. 10 seconds and slightly agitate it.
- Completely remove the sealing lid from the capsule.
- Make sure that the material has been properly mixed and that it shows a homogeneous consistency. Use the IPS Spatula for this purpose. Mix with the IPS Spatula while vibrating the capsule.
- **Do not add any liquid.**



Firmly press the Ivomix onto a smooth work surface. If required, slightly moisten the suction cups beforehand.



Lightly press and agitate the closed capsule on the vibrating plate of the Ivomix for approx. 10 seconds.



Completely remove the sealing lid from the capsule.
Make sure that the material has been properly mixed and that it shows a homogeneous consistency. Use the IPS Spatula for this purpose.

Fusion process

The fusion process must be completed quickly in order to prevent a premature drying of IPS e.max CAD Crystall./Connect.

The amount of IPS e.max CAD Crystall./Connect contained in one capsule is sufficient for a 4-unit bridge.

Please observe the following procedure for the fusion process:

- Place the open capsule on the finger clip and slide the clip onto your finger.
- Place some IPS e.max CAD Crystall./Connect on the occlusal aspect of the IPS e.max ZirCAD/Zenostar MO framework in order to avoid hollow spaces in the fusion area. Evenly distribute the IPS e.max CAD Crystall./Connect material by vibrating it for a short time with the Ivomix.
- Remove small amounts of IPS e.max CAD Crystall./Connect with IPS Spatula and distribute it on all inner aspects of the IPS e.max CAD veneering structure.
- Hold the occlusal surface of the IPS e.max CAD veneering structure against the vibrating plate of Ivomix for a short time so that the IPS e.max CAD Crystall./Connect material is evenly distributed.
- Insert the IPS e.max ZirCAD/Zenostar MO framework in the correct position into the IPS e.max CAD veneering structure.
- Hold the occlusal surface of the restoration against the vibrating plate of the Ivomix. At the same time, apply slight pressure against the IPS e.max ZirCAD/Zenostar MO framework, e.g. by means of the IPS Spatula, in order to evenly insert it into the IPS e.max CAD veneering structure.
- If there are places where no IPS e.max CAD Crystall./Connect is squeezed out, then an insufficient amount of material has been applied to the IPS e.max CAD veneering structure, the IPS e.max CAD Crystall./Connect material must be **evenly squeezed out of the entire circular fusion joint**.

If no IPS e.max CAD Crystall./Connect is being squeezed out in some places, an insufficient amount of material has been applied to the IPS e.max CAD veneering structure, and the entire procedure must be repeated with a new capsule. Separate and clean the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure under running water before repeating the procedure.

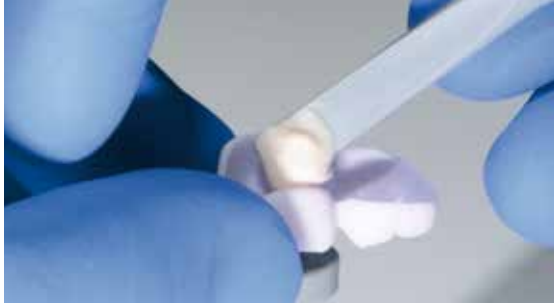
The IPS e.max CAD veneering structure is in the correct position when it sits flush on the collar of the IPS e.max ZirCAD/Zenostar MO framework.



Hold the restoration against the vibrating plate of the Ivomix only until the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure are in the correct position to one another. End the fusion process immediately after the correct position has been reached.

The IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure are in a firm position when the restoration is no longer being vibrated.

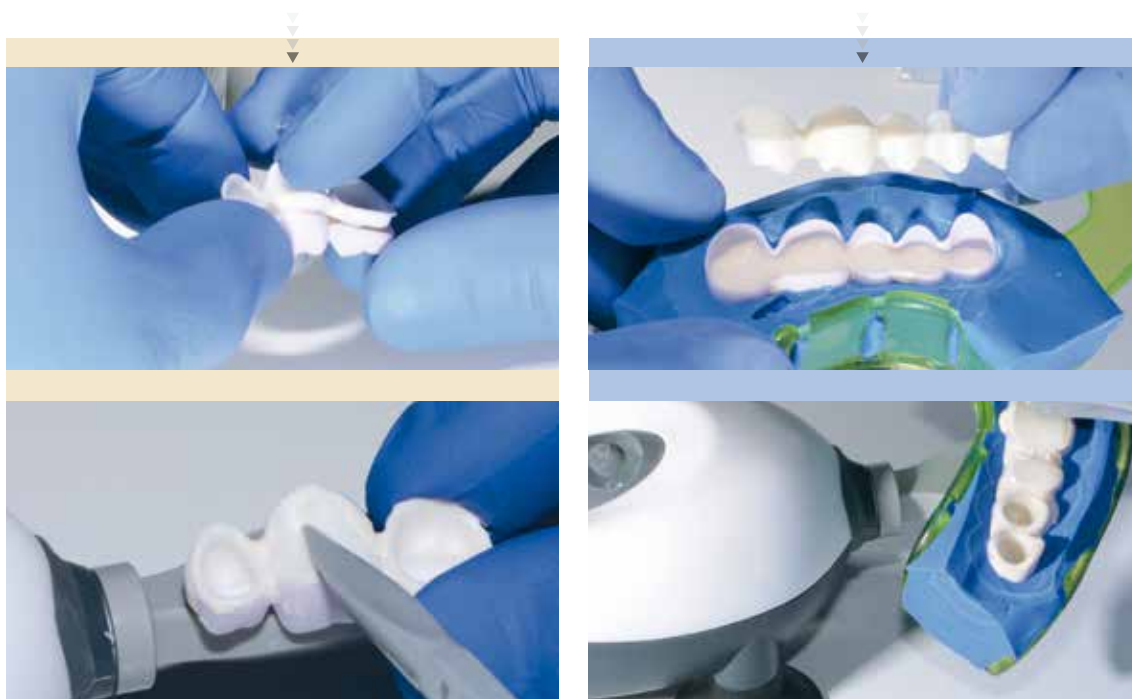
**Fusion process for
one veneering structure**



**Fusion process for
multiple veneering structures**



Remove IPS e.max CAD Crystall./Connect with the IPS Spatula from the capsule and distribute it on the occlusal surface of the IPS e.max ZirCAD/Zenostar MO framework. Subsequently, apply IPS e.max CAD Crystall./Connect on the inner aspect of the IPS e.max CAD veneering structure and evenly distribute IPS e.max CAD Crystall./Connect by means of vibration.



Insert the IPS e.max ZirCAD/Zenostar MO framework in the correct position into the IPS e.max CAD veneering structure.

Hold the restoration onto the vibrating plate of the Ivomix with the occlusal surface or tray facing the plate. At the same time, apply slight pressure to insert the IPS e.max ZirCAD/Zenostar MO framework evenly into the IPS e.max CAD veneering structure.



The IPS e.max CAD veneering structure is in the correct position when it sits flush on the collar of the IPS e.max ZirCAD/Zenostar MO framework.

Cleaning and verification

After the fusion process, the restoration is cleaned and the fusion result is checked.

To do so, observe the following procedure:

- Before cleaning, allow the restoration to dry for a short time.
- Carefully remove excess IPS e.max CAD Crystall./Connect material from the occlusal and proximal area as well as around the restoration margins by means of the IPS Spatula.
- Smooth out the IPS e.max CAD Crystall./Connect material at the fusion joint.
- Carefully remove all residue of IPS e.max CAD Crystall./Connect material from the IPS e.max CAD veneering structure (e.g. occlusal aspect) by means of the IPS Spatula or a dry short-haired brush.
- Check the cavities of the IPS e.max ZirCAD/Zenostar MO framework, remove any residue of IPS e.max CAD Crystall./Connect material with the IPS Spatula or a brush.
- Check in the articulator: Is the final occlusal position achieved?

If not, the IPS e.max ZirCAD/Zenostar framework and the IPS e.max CAD veneering structure have not been correctly joined. In this case, the fusion process has to be repeated. Separate and clean the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure under running water before repeating the procedure.



Do not re-use the Ivomix on the joined restoration.



Lift the restoration out of the silicone key and remove excess IPS e.max CAD Crystall./Connect material with the IPS Spatula.

Remove residue of IPS e.max CAD Crystall./
Connect material from the restoration with a dry
short-haired brush.



Basal view: Joined, cleaned restoration.



Joined, cleaned restoration.

Note: Smooth out IPS e.max CAD Crystall./
Connect material at the fusion joint.



Verification in the articulator.

If the final occlusal position is achieved, the
IPS e.max ZirCAD/Zenostar MO framework and the
IPS e.max CAD veneering structure have been
correctly joined.



Fusion/Crystallization firing

The glass-ceramic fusion of the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure is first conducted without the application of IPS e.max CAD Crystall./Glaze, Shades or Stains. The characterizations (Shades, Stains) and the glazing material are applied to the tooth-coloured restoration and fired in a separate Stain/Glaze firing.

Please observe the following procedure for the Fusion/Crystallization firing:

- Keep the joined and cleaned restoration away from liquids and do not steam.
- Only the IPS e.max CAD Crystallization Tray and the corresponding IPS e.max CAD Crystallization Pins must be used for the Fusion/Crystallization firing.
- Place the IPS e.max CAD-on restoration in the centre of the IPS e.max CAD Crystallization Tray.
- For this purpose, place the IPS e.max CAD Crystallization Pins as close as possible to the centre of the IPS e.max CAD Crystallization Tray.
- The IPS e.max CAD-on restoration may be placed on the IPS e.max CAD Crystallization Pins by means of IPS Object Fix Putty or Flow material. Apply a small amount of IPS Object Fix Putty or Flow into the cavity of the restoration and place it on the pins.
- Carry out the Fusion/Crystallization firing with the indicated parameters (page 38). Observe the furnace type!
- At the beginning of the firing procedure, 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.
- Remove restoration on the IPS e.max CAD Crystallization Tray from the furnace after completion of the firing cycle (wait for the acoustic signal of the furnace).
- Allow the restoration to cool to room temperature in a place protected from draft.
- Do not touch the hot restoration with metal tongs.



Note on the Fusion/Crystallization firing

A special firing program with pre-drying function has been developed for the Fusion/Crystallization firing in the IPS e.max CAD-on technique. The firing parameters have been precisely adjusted to the IPS e.max CAD Crystall./Connect fusion glass-ceramic. This ensures optimum firing results.



Please observe the firing parameters for IPS e.max CAD Veneering Solutions (CAD-on) on page 38.



Apply some IPS Object Fix Putty or Flow material to the cavity of the restoration to secure the restoration on the IPS e.max CAD Crystallization Pins.



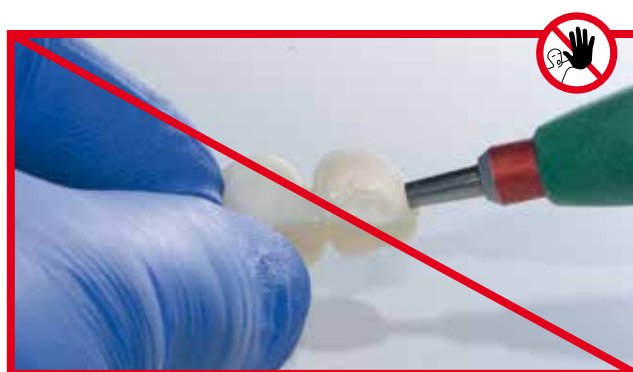
Make sure to place the ceramic structure in the centre of the IPS e.max CAD Crystallization Tray.

Notes on cleaning and verification after completion of the firing program

Remove adhering IPS Object Fix Putty or Flow residue with ultrasound in a water bath and/or with the steam jet.



Do not remove IPS Object Fix Putty or Flow residues with Al_2O_3 or glass polishing beads.



Smooth out possible
IPS e.max CAD Crystall./Connect
excess with a fine diamond instrument.



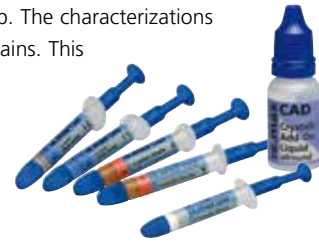
Check the fit of the restoration on the model and
in the articulator.
For bridges, pay particular attention to the fit of
the bridge pontic on the "gingiva".



Glazing and characterization

After the Fusion/Crystallization firing, the Stain/Glaze firing is carried out as a second step. The characterizations are applied to the tooth-coloured restoration with IPS e.max CAD Crystall./Shades and Stains. This enables a very precise shade reproduction.

- IPS e.max CAD Crystall./Shades are ready-to-use "Dentin" stains in syringes.
- IPS e.max CAD Crystall./Stains are ready-to-use intensive stains in syringes.
- IPS e.max CAD Crystall./Glaze Paste is a ready-to-use glazing paste in syringes.



Do not use IPS e.max Ceram layering materials and/or Shades, Essences or Glaze materials as well as IPS Ivocolor materials in conjunction with the IPS e.max CAD-on technique.



For the application of the glaze and characterizations, observe the following procedure:

- Before starting the characterization and glazing procedure, make sure that the outside of the restoration is free from contamination.
- Hold the restoration in place with diamond-coated tweezers.
- Extrude the glaze material from the syringe and mix thoroughly.
- If a slight thinning is desired, the ready-to-use glazing material may be mixed with a small amount of IPS e.max CAD Crystall./Glaze Liquid. However, the consistency should still remain pasty.
- Apply the glazing material on the entire outer aspect of the restoration. Avoid applying too thick a glaze layer. Avoid "pooling", especially on the occlusal surface.
- Too thin a glaze layer may lead to an unsatisfactory gloss.
- In the case of bridges, apply the glaze also to the IPS e.max ZirCAD/Zenostar MO framework at the basal side of the bridge pontic.
- If characterizations are desired, they can be applied with IPS e.max CAD Crystall./Shades and/or IPS e.max CAD Crystall./Stains.
- Extrude Shades and Stains from the syringe and mix thoroughly.
- The Shades and Stains may be slightly thinned using IPS e.max CAD Crystall./Glaze Liquid. However, the consistency should still remain pasty.
- Apply mixed Shades and Stains directly into the unfired glaze layer using a fine brush. The margin of the IPS e.max ZirCAD/Zenostar MO framework may also be characterized.
- Only the IPS e.max CAD Crystallization Tray and the corresponding IPS e.max CAD Crystallization Pins must be used for the Stain/Glaze firing.
- Place the IPS e.max CAD-on restoration in the centre of the IPS e.max CAD Crystallization Tray.
- The IPS e.max CAD-on restoration may be placed on the IPS e.max CAD Crystallization Pins by means of IPS Object Fix Putty or Flow material. Apply a small amount of IPS Object Fix Putty or Flow into the cavity of the restoration and place it on the pins.
- Carry out the Stain/Glaze firing with the indicated parameters (see page 38).
- Remove restoration on the IPS e.max CAD Crystallization Tray from the furnace after completion of the firing cycle (wait for the acoustic signal of the furnace).
- Do not touch the hot restoration with metal tongs.
- Allow the restoration to cool to room temperature in a place protected from draft.
- If required, an additional Stain/Glaze firing can be conducted.
- **A maximum of 3 Stain/Glaze firings** may be conducted.



Please observe the firing parameters for IPS e.max CAD Veneering Solutions (CAD-on) on page 38.

Secure the restoration with diamond-coated tweezers and apply IPS e.max CAD Crystall./Glaze Paste evenly on the entire outer surface and the basal side of the bridge pontic.



Characterizations with IPS e.max CAD Crystall./ Shades and/or Stains can be applied to the unfired glazing material.



Apply some IPS Object Fix Putty or Flow material to the cavity of the restoration to secure the restoration on the IPS e.max CAD Crystallization Pins.



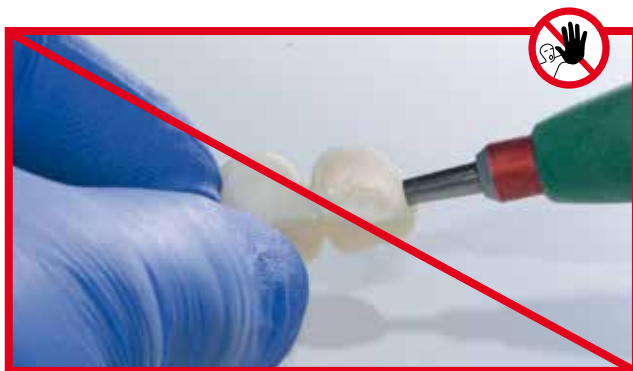
Make sure to place the ceramic structure in the centre of the IPS e.max CAD Crystallization Tray.



Notes on cleaning and verification after completion of the firing program



Remove adhering IPS Object Fix Putty or Flow residue with ultrasound in a water bath and/or with the steam jet.










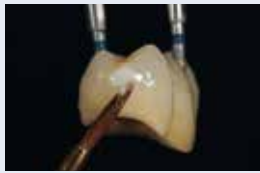

Do not remove IPS Object Fix Putty or Flow residue with Al_2O_3 or glass polishing beads.



Five-unit bridge (23-27) fabricated using IPS e.max CAD Veneering Solutions.

Optional – Adjustments with IPS e.max CAD Crystall./Add-On

If adjustments of the shade or shade or corrections at the fusion joint of IPS e.max CAD-on restorations are necessary, three IPS e.max Crystall./Add-On materials are available.

Mix IPS e.max CAD Crystall./Add-On Connect 	... Incisal 	... Dentin 
... for adjustments	... in the fusion area	... in the incisal area	... in the dentin area or the basal area of the pontic
... with IPS e.max CAD Crystall./...	... Add-On Liquid longlife 	... Add-On Liquid allround 	... Add-On Liquid allround 
Application on the fused, crystallized restoration	 Correction at the fusion joint with vibration with Ivomix	 Correction of proximal contact	 Circular or basal correction

Procedure for the application of the IPS e.max CAD Crystall./Add-On materials on the **fused, crystallized** IPS e.max CAD restoration

- Mix IPS e.max CAD Crystall./**Add-On Connect** with IPS e.max CAD Crystall./**Add-On Liquid longlife** to obtain a creamy consistency which flows when vibrated.
- Apply the IPS e.max CAD Crystall./Add-On Connect material to the area of the fusion joint of the crystallized restoration to be corrected while using the vibrator (Ivomix).
- To mix the IPS e.max CAD Crystall./**Add-On Incisal** and **Dentin**, the IPS e.max CAD Crystall./**Add-On Liquid allround** is used. This creates a stable consistency which can be layered. Apply the mixed Add-On materials to the area to be corrected.
- If required, additionally apply IPS e.max CAD Crystall./Glaze, Shades and Stains to the crystallized restoration. Characterizations can also be applied on the IPS e.max CAD Crystall./Add-On Connect material.
- Conduct the Corrective firing on the IPS e.max CAD Crystallization Tray.



Please observe the firing parameters for IPS e.max CAD Veneering Solutions (CAD-on) on page 38.

Frequently Asked Questions

What are the preparation requirements for IPS e.max CAD-on restorations?

The mandatory Ivoclar Vivadent preparation guidelines for all-ceramic restorations apply also to the IPS e.max CAD-on technique. Sharp edges on the preparation are to be avoided in order to ensure exact milling in the CAD/CAM system. In addition, the width of the circular margin on the framework can be reduced by designing a pronounced chamfer.

Can the IPS e.max CAD Veneering Solutions (CAD-on technique) also be used to fabricate anterior restorations?

The Sirona and 3Shape software supports the fabrication of anterior restorations. In the 3Shape software, enhanced anterior esthetics can be achieved with the use of mamelons.

Which materials determine the esthetics of IPS e.max Veneering Solutions?

The desired restoration shade is the result of the combination of the IPS e.max ZirCAD/Zenostar MO framework, the IPS e.max CAD veneering structure and the shade of the fusion glass-ceramic. If, for instance, another framework shade is selected, the final shade may differ.

Is it possible to use an IPS e.max CAD LT block instead of an HT block for the fabrication of crowns with IPS e.max CAD Veneering Solutions?

Generally, an IPS e.max CAD LT block could be used. However, the esthetic properties of the resulting restoration might be compromised.

Which are the software and hardware requirements for the IPS e.max CAD-on Technique?

- With Sirona inLab:
The Sirona inLab® 3D software V3.81 or higher and a Sirona inLab MC XL milling unit are necessary to fabricate IPS e.max CAD-on restorations. The restoration is designed using the "Multilayer" mode.
- With 3Shape:
3Shape Dental Designer 2015 offers the possibilities to design "Multilayer Bridges". The Add-on Solutions from Wieland enables the integration of SR Phonares II tooth data including mamelons.

Is it possible to manually grind the IPS e.max ZirCAD/Zenostar MO frameworks with rotary instruments?

If necessary, the sintered framework can be adjusted to fit onto the model. Any further processing is contraindicated, as it might negatively influence the fit to the IPS e.max CAD veneering structure.

Is a Regeneration firing for the IPS e.max ZirCAD/Zenostar MO framework necessary prior to the fusion process?

No. Any processing of the sintered IPS e.max ZirCAD/Zenostar MO framework is not admissible, in order not to compromise the fit between the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure. This is also the reason why no Regeneration firing cycle is necessary.

Is it possible to manually grind the IPS e.max CAD veneering structures with rotary instruments?

Modifications of the IPS e.max CAD veneering structure should be carried out on the "blue", partially crystallized IPS e.max CAD veneering structure whenever possible. Make sure to use suitable grinding tools. If adjustments are necessary to achieve an optimum fit between the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure, the adjustments should be made on the IPS e.max CAD veneering structure.

Does the IPS e.max CAD veneering structure require occlusal adjustment after the CAD/CAM process?

Yes. To smooth the surface relief created by the CAD/CAM process, the occlusal surface, particularly the function areas with antagonist contact, must be surface-ground with a fine diamond instrument.

Is it permissible to blast the IPS e.max ZirCAD/Zenostar MO framework or the IPS e.max CAD veneering structure prior to the fusion process?

No. Any processing of the sintered IPS e.max ZirCAD/Zenostar MO framework is not admissible, in order not to compromise the fit between the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure.

Is it necessary to apply IPS e.max Ceram ZirLiner to the IPS e.max ZirCAD/Zenostar MO framework in the IPS e.max CAD-on technique?

No. In the IPS e.max CAD-on technique, the homogeneous bond and the shade are achieved by means of the fusion glass-ceramic IPS e.max CAD Crystall./Connect.

Is it possible to dilute the IPS e.max CAD Crystall./Connect fusion glass-ceramic with a liquid?

No. The fusion glass-ceramic, which is predosed and ready for use in the Single Dose, must not be diluted. The addition of liquid results in a defective fusion. The consistency of the fusion glass ceramic is adjusted in such a way that optimum flow properties with vibration (Ivomix) and a high stability without vibration are achieved.

Is it possible to mix and use (unused) leftover IPS e.max CAD Crystall./Connect fusion glass-ceramic again?

No. The very specific powder/liquid ratio in the predosed mixture ensures an optimum fusion. If leftover materials are mixed, the mixture is changed and no longer meets the specifications.

Is it possible to use other vibrators than Ivomix?

The vibration (frequency, amplitude) of Ivomix has been optimally adjusted to the flow properties of the fusion glass-ceramic IPS e.max CAD Crystall./Connect. Other vibrators are not suitable.

How is the IPS e.max CAD-on restoration cleaned after the fusion process?

The IPS e.max CAD Crystall./Connect fusion glass-ceramic is allowed to dry for a short time. Subsequently, remove excess with the IPS Spatula and fine residue with a short-haired brush. Make sure that no IPS e.max CAD Crystall./Connect material is removed from the fusion gap.

How can the correct position of the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure be checked after fusing and prior to firing?

The fused IPS e.max CAD-on restoration can carefully be checked on the model in the articulator. If the fusion is not correct, the restoration must not be vibrated again. In such a case, the fusion process has to be repeated with fresh material.

Is it possible to characterize the fused, "blue" IPS e.max CAD-on restoration prior to the Fusion/Crystallization firing?

If required, only the occlusal third can be characterized with IPS e.max CAD Crystall./Shades and Stains.

Important: Do not apply IPS e.max CAD Crystall./Shades, Stains or Glaze on or near the fusion gap.

Is it possible to apply IPS e.max Ceram layering materials or Shades, Essences and Glaze to IPS e.max CAD-on restorations?

No. In the IPS e.max CAD-on technique, only IPS e.max CAD Crystall./Shades, Stains, Glaze and Add-On should be used.

Is it necessary to use the auxiliary firing paste IPS Object Fix Putty or Flow for the Fusion/Crystallization firing?

IPS Object Fix Putty or Flow is not required for IPS e.max CAD-on restorations, as the IPS e.max ZirCAD/Zenostar MO framework provides sufficient support for the IPS e.max CAD veneering structure. A small amount of IPS Object Fix Putty or Flow material can be used to facilitate the placement of the restoration on the IPS e.max CAD Crystallization Pins.

Which ceramic furnaces can be used for the Fusion/Crystallization firing of IPS e.max CAD-on restorations?

Only recommended furnaces which are equipped with a pre-drying function can be used for the Fusion/Crystallization firing. Please refer to the notes on ceramic furnaces (see p. 38).

Why is the predrying function so important for the Fusion/Crystallization firing in the IPS e.max CAD-on technique?

The controlled predrying of the IPS e.max CAD-on restoration allows the liquid contained in the fusion glass-ceramic to escape through the very thin gap between the IPS e.max ZirCAD/Zenostar MO framework and the IPS e.max CAD veneering structure. This controlled drying is a prerequisite for a homogeneous bond. If no controlled predrying is employed, there is the risk that the IPS e.max CAD veneering structure is lifted off the IPS e.max ZirCAD/Zenostar MO framework, which renders the restoration useless.

Can firing trays other than the IPS e.max CAD Crystallization Tray be used for the firing of IPS e.max CAD-on restorations?

No other firing trays should be used. The IPS e.max CAD Crystallization Tray contained in the assortment stores the heat necessary for slow and above all tension-free cooling of the restoration. Other firing trays, e.g. honey-combed trays, are therefore not suitable.

How can IPS e.CAD-on restorations be cemented?

IPS e.max CAD-on restorations can be cemented adhesively or conventionally. For conventional cementation, however, an appropriately retentive preparation design must be observed. If this is not possible, adhesive luting should be preferred, e.g. with Multilink Automix. Vivaglass CEM is available for conventional cementation. SpeedCEM is recommended for self-adhesive cementation.

What must be considered after the firing of IPS e.max CAD-on restorations?

In order to prevent tension within the ceramic, remove the restoration from the furnace only after the firing cycles have been completed (wait for the acoustic signal of the ceramic furnace). Allow the objects to cool to room temperature in a place protected from draft and do not touch them with metal tongs during that time. Do not blast or quench the objects.

Which stains and glazing materials are used to characterize/glaze IPS e.max CAD-on restorations?

Only the IPS e.max CAD Crystall./Shades, Stains and Glaze materials may be used.

Is it possible to modify the shade of the circular collar of IPS e.max ZirCAD/Zenostar MO and the basal rest of bridges?

The IPS e.max ZirCAD/Zenostar MO collar can also be individualized using IPS e.max CAD Crystall./Shades and Stains after the Fusion/Crystallization firing. In the case of bridges, the basal rest of the bridge pontic can also be characterized and glazed.

Which materials should be used if additional shade adjustments are necessary after the Stain/Glaze firing?

Only the IPS e.max CAD Crystall./Shades, Stains and Glaze materials may be used. A maximum of 3 Characterization/Glaze firings may be conducted.

Cementation and Aftercare

Cementation options

Esthetic cementation options are decisive for the harmonious shade effect of an all-ceramic restoration. Depending of the indication, IPS e.max CAD-on restorations can be seated using either adhesive, self-adhesive or conventional cementation.

- For the adhesive cementation of IPS e.max CAD-on restorations, Multilink® Automix is ideally suitable.
- SpeedCEM® is available for the self-adhesive cementation of IPS e.max CAD-on restorations.
- The glass ionomer cement Vivaglass® CEM is recommended for the conventional cementation of IPS e.max CAD-on restorations.

Definition

– Adhesive cementation

With adhesive cementation, the bond is also created by static friction, but primarily by the chemical and/or micro-mechanical bond between the luting material and the restoration, as well as between the luting material and the preparation. Given the chemical and/or micromechanical bond, retentive preparation is not required. Irrespective of the cementation material, special adhesive systems are used on the preparation to generate the micromechanical bond with the dentin and/or enamel. Adhesive cementation results in enhanced fracture strength of the seated all-ceramic restoration.

– Self-adhesive cementation

The cementation material features self-conditioning properties to the tooth, which is why no additional special pre-treatment of the tooth surface is necessary. Hence, the adhesion of the restoration is partially achieved by a micro-mechanical and/or chemical bond. In order to achieve sufficient bonding strength values, retentive preparation is recommended. Self-adhesive cementation does not result in a significant improvement of the fracture strength of the all-ceramic restoration.

– 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 up to 6° is required. Conventional cementation does not result in an improvement of the fracture strength of the all-ceramic restoration.



Finding your way out of the cement maze

The **Cementation Navigation System**, the new multimedia application from Ivoclar Vivadent provides dentists with a practical orientation and decision aid for cementation cases.

www.cementation-navigation.com

Care Notes

















Same as natural teeth, high-quality IPS e.max restorations require regular professional care. This is beneficial for both the health of the gingiva and teeth, as well as the overall appearance. The pumice-free Proxyt® pink polishing paste is used to care for the surfaces without causing any wear. The low RDA* value = 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.



Shade Combination Table

Individual characterizations and shade adjustments of IPS e.max CAD-pn restorations are achieved with IPS e.max CAD Crystall./Shades, Stains.

IPS e.max Crystall./Shades, Stains

A-D tooth shade	BL1	BL2	BL3	BL4	A1	A2	A3	A3.5	A4	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
IPS e.max CAD Crystall./ Shade		 0					 1				 2				 3				 4	
IPS e.max CAD Crystall./ Shade Indisal		 I1						 I2			 I1						 I2			
IPS e.max CAD Crystall./ Stains			 white		 cream			 sunset		 copper		 olive		 khaki		 mahogany				

Crystallization and Firing Parameters

Compatible ceramic furnaces for the IPS e.max® CAD-on technique

A **special firing program** with **pre-drying function** has been developed for the **Fusion/Crystallization firing** in the IPS e.max CAD-on technique. The firing parameters – particularly the pre-drying time and the pre-drying temperature – have been precisely adjusted to the IPS e.max CAD Crystall./Connect fusion glass-ceramic. This ensures optimum firing results.

Due to the required functions of the ceramic furnace, only the following compatible ceramic furnaces may be used:





additional compatible furnaces: Programat P300, P500, P700, EP 3000, EP 5000)



General notes on conducting the Fusion/Crystallization firing and the Stain/Glaze firing

- Only the IPS e.max CAD Crystallization Tray and the corresponding IPS e.max CAD Crystallization Pins must be used for the Fusion/Crystallization firing as well as the Stain/Glaze firing.
- Place the IPS e.max CAD-on restoration in the centre of the IPS e.max CAD Crystallization Tray.
- The IPS e.max CAD-on restoration may be placed on the IPS e.max CAD Crystallization Pins by means of IPS Object Fix Putty or Flow material. Apply a small amount of IPS Object Fix Putty or Flow into the cavity of the restoration and place it on the pins.
- Carry out the Fusion/Crystallization firing with the indicated parameters. **Select the correct firing parameters for your furnace!**
- At the beginning of the firing procedure, 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.

Crystallization and Firing Parameters

Fusion/Crystallization firing

Furnace	 [°C/°F]	 [min]	Stand-by temperature B [°C/°F]	Closing time S [min]	Heating rate t₁ [°C/°F/min]	Firing temperature T₁ [°C/°F]	Holding time H₁ [min]	Heating rate t₂ [°C/°F/min]	Firing temperature T₂ [°C/°F]	Holding time H₂ [min]	Vacuum 1 1₁ [°C/°F] 1₂ [°C/°F]	Vacuum 2 2₁ [°C/°F] 2₂ [°C/°F]	Long-term cooling L [°C/°F]	Cooling rate t₁ [°C/°F/min]
P300	Pre-drying function (software V5.1 or higher)		403/757	2	30/54	820/1508	2	30/54	840/1544	7	550/820 1022/1508	820/840 1508/1544	600/1112	0
P500 P700 EP 3000 EP 5000	403/757	6	403/757	2	30/54	820/1508	2	30/54	840/1544	7	550/820 1022/1508	820/840 1508/1544	600/1112	0
P310 P510 P710 EP 3010 EP 5010			403/757	2	30/54	830/1526	2	30/54	850/1562	7	550/830 1022/1526	830/850 1526/1562	610/1130	0

 Use the pre-drying function for this firing cycle.
 For pre-drying, set the furnace head position to 100%.

Corrective firing – Stain/Glaze firing

Furnace	Stand-by temperature B [°C/°F]	Closing time S [min]	Heating rate t₁ [°C/°F/min]	Firing temperature T₁ [°C/°F]	Holding time H₁ [min]	Heating rate t₂ [°C/°F/min]	Firing temperature T₂ [°C/°F]	Holding time H₂ [min]	Vacuum 1 1₁ [°C/°F] 1₂ [°C/°F]	Vacuum 2 2₁ [°C/°F] 2₂ [°C/°F]	Long-term cooling L [°C/°F]	Cooling rate t₁ [°C/°F/min]
P300 P500 P700 EP 3000 EP 5000	403/757	6	60/108	820/1508	0:10	30/54	840/1544	3	550/820 1022/1508	820/840 1508/1544	600/1112	0
P310 P510 P710 EP 3010 EP 5010	403/757	6	60/108	830/1526	0:10	30/54	850/1562	3	550/830 1022/1526	830/850 1526/1562	610/1130	0



Notes on cooling after completion of the firing program

In order to ensure "smooth" 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 the firing tray with the fired objects is removed.
- Do not touch the 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.

Ivoclar Vivadent – worldwide

Ivoclar Vivadent AG
Bendererstrasse 2
9494 Schaan
Liechtenstein
Tel. +423 235 35 35
Fax +423 235 33 60
www.ivoclarvivadent.com

Ivoclar Vivadent Pty. Ltd.
1 – 5 Overseas Drive
P.O. Box 367
Noble Park, Vic. 3174
Australia
Tel. +61 3 9795 9599
Fax +61 3 9795 9645
www.ivoclarvivadent.com.au

Ivoclar Vivadent GmbH
Tech Gate Vienna
Donau-City-Strasse 1
1220 Wien
Austria
Tel. +43 1 263 191 10
Fax: +43 1 263 191 111
www.ivoclarvivadent.at

Ivoclar Vivadent Ltda.
Alameda Caiapós, 723
Centro Empresarial Tamboaré
CEP 06460-110 Barueri – SP
Brazil
Tel. +55 11 2424 7400
Fax +55 11 3466 0840
www.ivoclarvivadent.com.br

Ivoclar Vivadent Inc.
1-6600 Dixie Road
Mississauga, Ontario
L5T 2Y2
Canada
Tel. +1 905 670 8499
Fax +1 905 670 3102
www.ivoclarvivadent.us

Ivoclar Vivadent Shanghai Trading Co., Ltd.
2/F Building 1, 881 Wuding Road,
Jing An District
200040 Shanghai
China
Tel. +86 21 6032 1657
Fax +86 21 6176 0968
www.ivoclarvivadent.com

Ivoclar Vivadent Marketing Ltd.
Calle 134 No. 7-B-83, Of. 520
Bogotá
Colombia
Tel. +57 1 627 3399
Fax +57 1 633 1663
www.ivoclarvivadent.co

Ivoclar Vivadent SAS
B.P. 118
F-74410 Saint-Jorioz
France
Tel. +33 4 50 88 64 00
Fax +33 4 50 68 91 52
www.ivoclarvivadent.fr

Ivoclar Vivadent GmbH
Dr. Adolf-Schneider-Str. 2
D-73479 Ellwangen, Jagst
Germany
Tel. +49 7961 889 0
Fax +49 7961 6326
www.ivoclarvivadent.de

Wieland Dental + Technik GmbH & Co. KG
Lindenstrasse 2
75175 Pforzheim
Germany
Tel. +49 7231 3705 0
Fax +49 7231 3579 59
www.wieland-dental.com

Ivoclar Vivadent Marketing (India) Pvt. Ltd.
503/504 Raheja Plaza
15 B Shah Industrial Estate
Veera Desai Road, Andheri (West)
Mumbai, 400 053
India
Tel. +91 22 2673 0302
Fax +91 22 2673 0301
www.ivoclarvivadent.in

Ivoclar Vivadent s.r.l.
Via Isonzo 67/69
40033 Casalecchio di Reno (BO)
Italy
Tel. +39 051 6113555
Fax +39 051 6113565
www.ivoclarvivadent.it

Ivoclar Vivadent K.K.
1-28-24-4F Hongo
Bunkyo-ku
Tokyo 113-0033
Japan
Tel. +81 3 6903 3535
Fax +81 3 5844 3657
www.ivoclarvivadent.jp

Ivoclar Vivadent Ltd.
12F W-Tower
54 Seocho-daero 77-gil, Seocho-gu
Seoul, 06611
Republic of Korea
Tel. +82 2 536 0714
Fax +82 2 596 0155
www.ivoclarvivadent.co.kr

Ivoclar Vivadent S.A. de C.V.
Av. Insurgentes Sur No. 863,
Piso 14, Col. Napoles
03810 México, D.F.
México
Tel. +52 55 5062 1000
Fax +52 55 5062 1029
www.ivoclarvivadent.com.mx

Ivoclar Vivadent BV
De Fruittuinen 32
2132 NZ Hoofddorp
Netherlands
Tel. +31 23 529 3791
Fax +31 23 555 4504
www.ivoclarvivadent.com

Ivoclar Vivadent Ltd.
12 Omega St, Rosedale
PO Box 303011 North Harbour
Auckland 0751
New Zealand
Tel. +64 9 914 9999
Fax +64 9 914 9990
www.ivoclarvivadent.co.nz

Ivoclar Vivadent Polska Sp. z o.o.
Al. Jana Pawla II 78
00-175 Warszawa
Poland
Tel. +48 22 635 5496
Fax +48 22 635 5469
www.ivoclarvivadent.pl

Ivoclar Vivadent Marketing Ltd.
Prospekt Andropova 18 korp. 6/
office 10-06
115432 Moscow
Russia
Tel. +7 499 418 0300
Fax +7 499 418 0310
www.ivoclarvivadent.ru

Ivoclar Vivadent Marketing Ltd.
Qlaya Main St.
Siricon Building No.14, 2nd Floor
Office No. 204
P.O. Box 300146
Riyadh 11372
Saudi Arabia
Tel. +966 11 293 8345
Fax +966 11 293 8344
www.ivoclarvivadent.com

Ivoclar Vivadent S.L.U.
Carretera de Fuencarral nº24
Portal 1 – Planta Baja
28108-Alcobendas (Madrid)
Spain
Telf. +34 91 375 78 20
Fax: +34 91 375 78 38
www.ivoclarvivadent.es

Ivoclar Vivadent AB
Dalvägen 14
S-169 56 Solna
Sweden
Tel. +46 8 514 939 30
Fax +46 8 514 939 40
www.ivoclarvivadent.se

Ivoclar Vivadent Liaison Office
: Tesvikiye Mahallesi
Sakayik Sokak
Nisantasi' Plaza No:38/2
Kat:5 Daire:24
34021 Sisli – Istanbul
Turkey
Tel. +90 212 343 0802
Fax +90 212 343 0842
www.ivoclarvivadent.com

Ivoclar Vivadent Limited
Ground Floor Compass Building
Feldspar Close
Warrens Business Park
Enderby
Leicester LE19 4SE
United Kingdom
Tel. +44 116 284 7880
Fax +44 116 284 7881
www.ivoclarvivadent.co.uk

Ivoclar Vivadent, Inc.
175 Pineview Drive
Amherst, N.Y. 14228
USA
Tel. +1 800 533 6825
Fax +1 716 691 2285
www.ivoclarvivadent.us

C€ 0123

Rx ONLY
For dental use only!



Manufacturer:
Ivoclar Vivadent AG, 9494 Schaan, Liechtenstein
www.ivoclarvivadent.com

Date information prepared: 2015-09, Rev. 0

These materials have been developed solely for use in dentistry. Processing should be carried out strictly according to the Instructions for Use. Liability cannot be accepted for damages resulting from failure to observe the Instructions or the stipulated area of application. The user is responsible for testing the products for their suitability and use for any purpose not explicitly stated in the Instructions. Descriptions and data constitute no warranty of attributes and are not binding. These regulations also apply if the materials are used in conjunction with products of other manufacturers.

Printed in Liechtenstein
© Ivoclar Vivadent AG, Schaan / Liechtenstein
664521/en

ivoclar
vivadent
technical