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# IPS e.max ZirPress




all ceramic
all you need

INSTRUCTIONS FOR USE

CE 0123

ivoclar vivadent technical

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# IPS e.max® System
## all you need

**IPS e.max – one system for every indication**
IPS e.max is an innovative all-ceramic system which covers the entire all-ceramic indication range – from Thin Veneers to 12-unit bridges.

IPS e.max delivers high-strength and highly esthetic materials for the Press and the CAD/CAM technologies. The system consists of innovative lithium disilicate glass-ceramics used mainly for single-tooth restorations and high-strength zirconium oxide for large-span bridges.

Every patient situation presents its own requirements and objectives. IPS e.max meets these requirements, because due to the system components you obtain exactly what you need.
- The components for the Press technology include the highly esthetic IPS e.max Press lithium disilicate glass-ceramic ingots and the IPS e.max ZirPress fluorapatite glass-ceramic ingots for the fast and efficient press-on-zirconia technique.
- Depending on the case requirements, two types of materials are available for the CAD/CAM technique: the innovative IPS e.max CAD lithium disilicate glass-ceramic blocks and the IPS e.max ZirCAD high-strength zirconium oxide.
- The nano-fluorapatite layering ceramic IPS e.max Ceram, which is used to characterize/veneer all IPS e.max components – glass or oxide ceramics –, complete the IPS e.max System.

### IPS e.max ZirPress
The shades and translucency levels of the IPS e.max ZirPress ingots are based on the overarching IPS e.max shade system. The system has a flexible design and can be used in conjunction with the A–D, Chromascop as well as Bleach BL shade guides.

The shades of the Press ingots and CAD/CAM blocks offered in the IPS e.max System are all coordinated with each other. They are available in different degrees of opacity and/or translucency. The selection of the translucency level is based on the clinical requirements (shade of the prepared tooth, desired tooth shade) presented by the patient, as well as the desired processing technique (layering, cut-back, staining technique).

The more opaque MO ingots are predominantly suitable for the layering technique, while the more translucent LT and HT ingots are used for the cut-back and also the staining technique.






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# IPS e.max® ZirPress

# Product Information

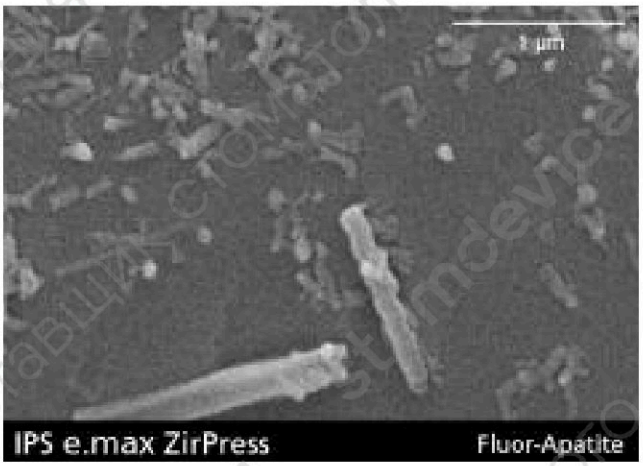
## Material




IPS e.max ZirPress is a fluorapatite glass-ceramic ingot which is pressed onto zirconium oxide. Since the fluorapatite crystals are present in various sizes, the interplay of translucency, opalescence, and brightness can be controlled in a targeted fashion and thus results in optimum masking of the less translucent zirconium oxide frameworks.

In the press-over technique, the advantages of the PRESS technology (accuracy of fit) are optimally combined with those of the CAD/CAM technology (processing of zirconium oxide). IPS e.max ZirPress is suitable to press over IPS e.max ZirCAD single-tooth and multi-unit bridge frameworks as well as $ZrO_2$ abutments. With minimum technical effort and in a short time, the tried-and-tested PRESS technology is used to press on the IPS e.max ZirPress ingots. Frameworks pressed over with IPS e.max ZirPress demonstrate firing-stable ceramic shoulders with excellent accuracy of fit and may subsequently be efficiently characterized or veneered using IPS e.max Ceram. In this way, esthetic and highly functional zirconium oxide-support restorations are fabricated in accordance with the customer's needs and in an economical fashion.

With the use of IPS e.max ZirPress Gingiva, the press-over technique can be used to fabricate exact, homogeneous gingival areas particularly for larger restorations.




| | |
|---|---|
| CTE (100-400°C) [$10^{-6}$ /K] | 9.8 |
| CTE (100-500°C) [$10^{-6}$ /K] | 9.9 |
| Flexural strength (biaxial) [MPa]* | 110 |
| Vickers hardness [MPa] | 5400 |
| Chem. solubility [µg/cm²]* | 30 |
| Press temperature [°C/°F] | 900–910/1652–1670 |

*according to ISO 6872

## Uses

### Indications

- Pressing over IPS e.max ZirCAD single-tooth frameworks
- Pressing over multi-unit IPS e.max ZirCAD bridge frameworks
- Pressing over IPS e.max ZirCAD inlay-retained bridge frameworks
- Pressing over implant superstructures made of IPS e.max ZirCAD (single-tooth and bridge frameworks)
- Pressing over Straumann® Anatomic IPS e.max® Abutments
- Pressing over frameworks, implant abutments and implant superstructures made of sintered zirconium oxide and/or HIP zirconium oxide with a CTE range of 10.5–11.0 x $10^{-6}$ $K^{-1}$ (100–500 °C/212–932 °F).
- Veneers

### Contraindications

- Pressing over zirconium oxide frameworks with a CTE outside the stipulated range
- Pressing over non-sintered zirconium oxide frameworks
- Very deep sub-gingival preparations
- Patients with substantially reduced residual dentition
- Bruxism
- Bridges with more than one extension unit
- Any other use not listed in the indications

### Important processing restrictions

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

- Failure to observe the necessary IPS e.max ZirCAD minimum connector and framework thicknesses
- IPS e.max ZirPress ingots must not be pressed on the zirconium oxide framework without prior application of IPS e.max Ceram ZirLiner
- Pressing the IPS e.max ZirPress ingots without zirconium oxide frameworks (except for veneers)
- Layering with a veneering ceramic other than IPS e.max Ceram
- Failure to observe the necessary minimum thicknesses for pressed ceramics
- Exceeding the maximum thicknesses for pressed ceramics
- Pressing over metal frameworks
- Pressing over zirconium oxide frameworks for which the manufacturer's instructions regarding minimum framework and connector thicknesses have not been observed

### Side effects

If the patient is known to be allergic to any of the components of IPS e.max ZirPress, the material must not be used to fabricate restorations.



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## Composition

The IPS e.max ZirPress ingots and the corresponding processing accessories consist of the following main components:

- **IPS e.max ZirPress ingots**
  Components: $SiO_2$
  Additional components: $Li_2O$, $Na_2O$, $K_2O$, MgO, $Al_2O_3$, CaO, $ZrO_2$, $P_2O_5$ and other oxides

- **IPS Alox Plunger**
  Components: $Al_2O_3$

- **IPS Alox Plunger Separator**
  Components: Boron nitride

- **IPS e.max Press Invex Liquid**
  Components: Hydrofluoric acid and sulphuric acid in water

- **IPS Natural Die Material**
  Components: Polyester urethane dimethacrylate, paraffin oil, $SiO_2$ and copolymer

- **IPS Natural Die Material Separator**
  Components: Wax dissolved in hexane

- **IPS PressVEST Powder**
  Components: $SiO_2$, MgO and $NH_4H_2PO_4$

- **IPS PressVEST Liquid**
  Components: Colloidal silicic acid in water

- **IPS PressVEST Speed Powder**
  Components: $SiO_2$, MgO and $NH_4H_2PO_4$

- **IPS PressVEST Speed Liquid**
  Components: Colloidal silicic acid in water

**Warning**

- Hexane is highly flammable and detrimental to health. Avoid contact of the material with skin and eyes. Do not inhale vapours and keep away from sources of ignition.
- Do not inhale ceramic dust during finishing – use exhaust air discharge and dust mask.
- IPS e.max Press Invex Liquid contains hydrofluoric acid. Contact with skin, eyes and clothing must be prevented at all costs, since the material is extremely toxic and corrosive. The liquid is intended for professional use only and must not be applied intraorally (inside the mouth).



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## Scientific Data

Further scientific data (i.e. strength, wear, biocompatibility) are contained in the "Scientific Documentation IPS e.max ZirPress". The Documentation also provides a set of studies that describe the clinical performance of IPS e.max ZirPress.
This Scientific Documentation can be obtained from Ivoclar Vivadent.

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






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## Ingot Concept

IPS e.max ZirPress ingots are available in **three levels of translucency (HT, LT, MO)** and **one size**. For the fabrication of gingival areas, e.g. for implant superstructures **IPS e.max ZirPress Gingiva** ingots are available.
From a processing point of view, basically all restorations can be fabricated of any ingot. For reasons of esthetics, however, the following processing technique and indication are recommended for the individual ingots (translucency levels):

| Translucency Level | Processing Technique | | | Pressing without $ZrO_2$ framework | Pressing over frameworks made of $ZrO_2$ | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Staining Technique | Cut-Back Technique | Layering Technique | Veneers | Single-Tooth Frameworks (Anterior and Posterior Teeth) | Multi-Unit Bridge Frameworks | Implantat Abutments/ Superstructures | Inlay-Retained Bridge Frameworks | Gingival Areas |
| High Translucency | | | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Low Translucency | | | | ✓ | ✓ | ✓ | ✓ | | |
| Medium Opacity | | | | | ✓ | ✓ | ✓ | | |
| Gingiva | | | | | | | | | ✓ |

CR %



**IPS e.max ZirPress HT (High Translucency)**
The ingots are available in **16 A-D** and **4 Bleach BL shades**. Given their high translucency they are ideally suitable for fully anatomical pressing over zirconium oxide frameworks (staining technique). The Characterization and Glaze firing is subsequently conducted using IPS e.max Ceram Shades, Essence and Glaze materials. If adjustments are required, the IPS e.max Ceram layering materials can be used.



**IPS e.max ZirPress LT (Low Translucency)**
The ingots are available in **16 A-D** and **4 Bleach BL shades**. Given their high translucency they are ideally suitable for the cut-back technique, but also for the staining technique. The cut-back is subsequently supplemented with IPS e.max Ceram Incisal and/or Impulse and characterized using IPS e.max Ceram Essence and Shades.



**IPS e.max ZirPress MO (Medium Opacity)**
The ingots are available in **9 A-D** and **4 Bleach BL shades**. Given their opacity they are ideally suitable for pressing a dentin core or shoulder on zirconium oxide frameworks. The anatomical shape is subsequently individually layered using ISP e.max Ceram. Finally, the Stain/Glaze firing with IPS e.max Ceram is conducted.



**IPS e.max ZirPress Gingiva**
The ingots are available in **2 shades** (G3 and G4). In particular, they are ideally suitable for implant superstructures in order to press voluminous gingival areas on the zirconium oxide framework. The actual layering of the restoration is conducted with IPS e.max Ceram layering materials with the exact accuracy of fit of the gingival area being maintained.



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# IPS e.max® ZirPress – Clinical Steps, Framework Preparation, Contouring, Pressing Procedure

| Working step | | Ivoclar Vivadent Products |
|---|---|---|
| Practice | Laboratory | |
| Shade Determination, Preparation, Shade of the Prepared Tooth, Impression Taking |   | OptraGate, IPS Natural Die Material |
| Framework fabrication |  | IPS Contrast Spray Labside<br>IPS e.max ZirCAD |
| Contouring and Investing |  | IPS Investment Ring System 100 g, 200 g, 300 g<br>IPS PressVEST, IPS PressVEST Speed |
| Pressing |  | IPS e.max Press<br>Programat EP 3000, EP5000<br>IPS Alox Plunger<br>IPS Alox Plunger Separator<br>IPS One-Way Plunger 300 g |
| Staining Technique / Cut-Back Technique / Layering Technique |  | IPS e.max Ceram Layering Materials<br>IPS UniTray<br>Programat P300, P500, P700 |
| Glazing |  | IPS e.max Ceram Glaze Paste, Powder<br>IPS e.max Ceram Glaze Spray<br>IPS e.max Ceram Essence, Shade |
| Preparing for Cementation |  | IPS Ceramic Etching Gel<br>Monobond Plus |
| Cementation |  | OptraGate<br>OptraDam<br>Variolink II, Variolink Veneer<br>Multilink Automix<br>SpeedCEM<br>Vivaglass CEM<br>bluephase |
| Checking the Articulation/Occlusion |  | OptraFine |
| Recall |  | Proxyt |

The range of available products may vary from country to country



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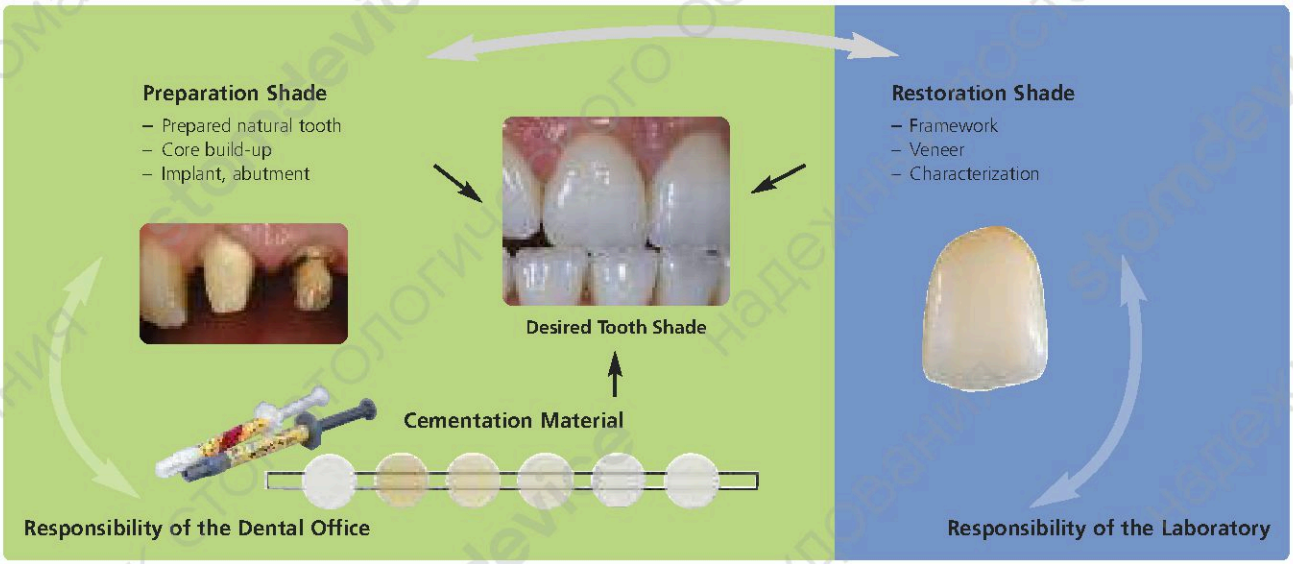


## Shade Determination – Tooth Shade, Shade of the Prepared Tooth

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

The optical 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. Especially with severely discoloured preparations or non-tooth-shaded build-ups, this is of utmost importance. Only if the dentist determines the shade of the preparation and its subsequent transmission to the laboratory may the desired esthetics be achieved in a targeted fashion.




### 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 selection

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.





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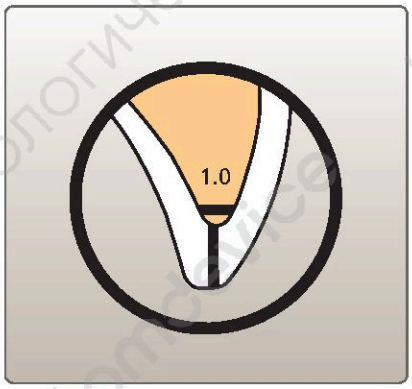
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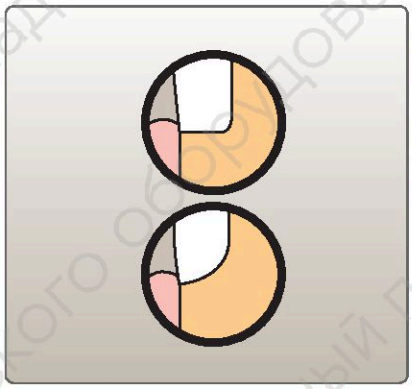
## Preparation Guidelines

Successful results can only be achieved with IPS e.max ZirPress/ZirCAD if the guidelines and layer thicknesses are strictly observed.

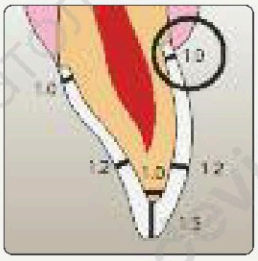
**Basic preparation guidelines for all-ceramic restorations**

- no angles or sharp edges
- shoulder preparation with rounded inner edges and/or chamfer preparation
- the indicated dimensions reflect the minimum thickness for IPS e.max restorations
- the radius of the preparation edges, particularly for anterior teeth, should be at least 1.0 mm (milling tool geometry) in order to permit optimum milling during CAD/CAM processing



### Single Crowns to 3-Unit Bridges





- Evenly reduce the anatomical shape and observe the stipulated minimum thickness. 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. 1.5 mm.
- For anterior crowns, the reduction in the labial and/or palatal/lingual area is at least 1.2 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 1.2 mm.
- For conventional and/or self-adhesive cementation, the preparation must demonstrate retentive surfaces.

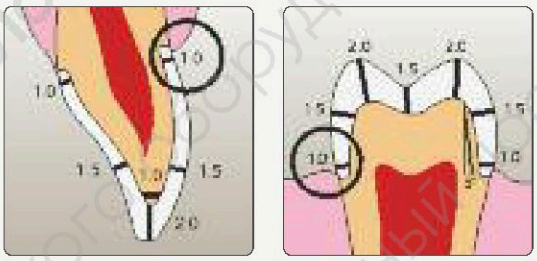


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## Multi-Unit Bridges




- Evenly reduce the anatomical shape and observe the stipulated minimum thickness. 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.



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# Framework Fabrication – IPS e.max ZirCAD

**The individual steps for the fabrication of a framework of IPS e.max ZirCAD are described below. The complete procedure for the processing of IPS e.max ZirCAD is described in the IPS e.max ZirCAD Instructions for Use.**




If a $ZrO_2$ framework of an other manufacturer is used, the corresponding recommendations regarding processing must be observed.

## Layer thicknesses

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



The following basic guidelines have to be observed:

- **The IPS e.max ZirCAD framework material is the high-strength component of your restoration and must be given a design that supports the overall shape of the restoration and the cusps.**
- **The excess in available space (severely prepared teeth, atrophied alveolar ridge) must be compensated by corresponding framework dimensions and not by the pressed material.**
- **The parameters stored in the respective software are considered guidelines and have to be adjusted according to the total thickness of the restoration using the available software tools.**
- If possible, the connector design should be extended in the vertical direction, rather than in the horizontal direction. Since the necessary connector dimensions cannot always be established in the sagittal (lingo-vestibular) directions, the connector dimensions should always be expanded in the vertical (inciso-cervical) direction.
- **A reduction in framework thickness always means a reduction in strength.**

The following minimum thicknesses have to be observed for the framework design with IPS e.max ZirCAD (sintered):
**Please note**: The minimum dimensions of the IPS e.max ZirCAD framework must be 25% larger before sintering.

| Anterior Region | | Crowns | Splinted crowns | 3-Unit Bridges | 4-12-unit bridges with 2 pontics | Cantilever bridges with 1 pontic |
|---|---|---|---|---|---|---|
| Minimum framework thickness | circular | 0.5 mm | 0.5 mm | 0.5 mm | 0.7 mm | 0.7 mm |
| | incisal | 0.7 mm | 0.7 mm | 0.7 mm | 1.0 mm | 1.0 mm |
| Connector dimensions | | – | 7 mm² | 7 mm² | 9 mm² | 12 mm² |
| Design type | | Supporting the tooth shape and/or gingiva (incisal, occlusal and/or basal) | | | | |

| Posterior Region | | Crowns | Splinted crowns | 3-Unit Bridges Inlay-retained bridges | 4-12-unit bridges with 2 pontics | Cantilever bridges with 1 pontic |
|---|---|---|---|---|---|---|
| Minimum framework thickness | circular | 0.5 mm | 0.5 mm | 0.5 mm | 0.7 mm | 0.7 mm |
| | occlusal | 0.7 mm | 0.7 mm | 0.7 mm | 1.0 mm | 1.0 mm |
| Connector dimensions | | – | 9 mm² | 9 mm² | 12 mm² | 12 mm² |
| Design type | | Supporting the tooth shape and/or gingiva (incisal, occlusal and/or basal) | | | | |

The IPS e.max ZirCAD framework must be designed in such a way that the following layer thicknesses can be observed during the contouring for pressing on IPS e.max ZirPress:

- In order to ensure the desired **tooth and gingiva shades** as well as **pressability**, a **minimum thickness of 0.7 mm** must be observed.
- Unsupported press and layering ceramics must ***not*** **exceed a total thickness of 2.5 mm**.

**Failure to observe the stipulated framework design criteria and minimum thicknesses may result in clinical failures, such as cracks, delamination and fracture of the restoration.**



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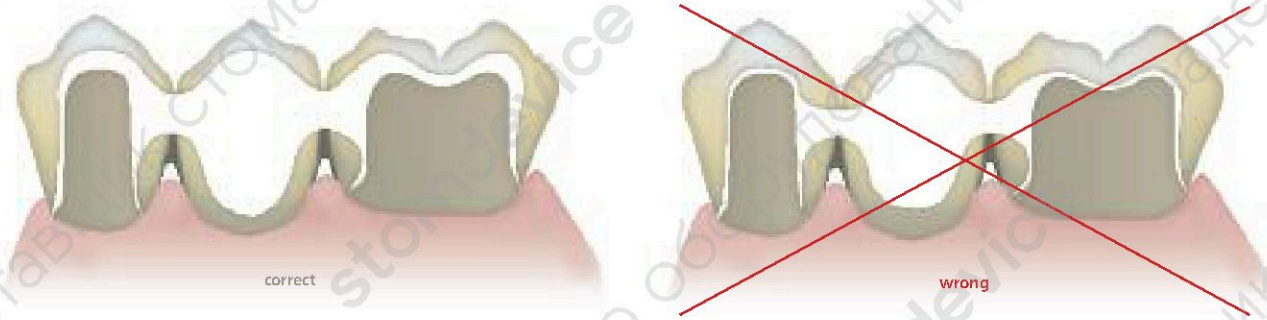
## Framework Design Criteria

The framework design must always support the shape of the restoration as well as the cusps.

### Anterior and Posterior Crowns

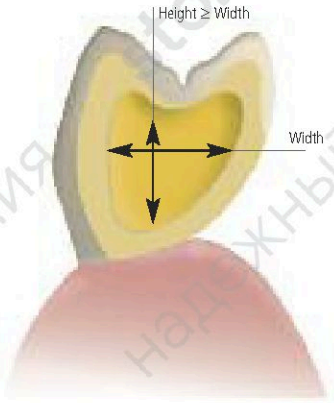



### Bridges




Always observe the relation between width and height as well as the suitable dimensions when designing the connectors.

Basically, the following applies: Height ≥ Width






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### Preparation of the IPS e.max ZirCAD framework (after sintering)

Adjustments of sintered IPS ZirCAD frameworks should be kept to a minimum (fine adjustment of the edges).

- For the selection of the grinding instruments, please refer to the Ivoclar Vivadent Flow Chart "Recommended grinding tools for IPS e.max zirconium oxide".
- Finishing is carried out at low pressure, since too much pressure may result marginal chipping and local phase transition.
- Place IPS e.max ZirCAD framework on the model, check fit and make slight adjustments, if necessary.
- Do not "post-separate" the bridge framework with separating disks after sintering. This may result in undesired pre-determined breaking points, which will subsequently compromise the stability of the all-ceramic restoration.
- Check marginal areas and slightly finish, if necessary.
- For the fabrication of a pressed shoulder, the edges may be reduced up to the inner edge of the chamfer or shoulder preparation.
- Make sure that the minimum thicknesses are maintained even after the minor adjustments.
- Before veneering, clean the framework with running water or the steam jet and dry.
- Do **not** blast the framework with $Al_2O_3$ or glass polishing beads, since this may damage the surface.



Use the grinding instruments specifically developed for $ZrO_2$ to carry out the required adjustments.



Completely sintered and finished IPS e.max ZirCAD framework.



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## Regeneration firing (optional)

Basically, adjustments of sintered IPS ZirCAD frameworks should be kept to a minimum.

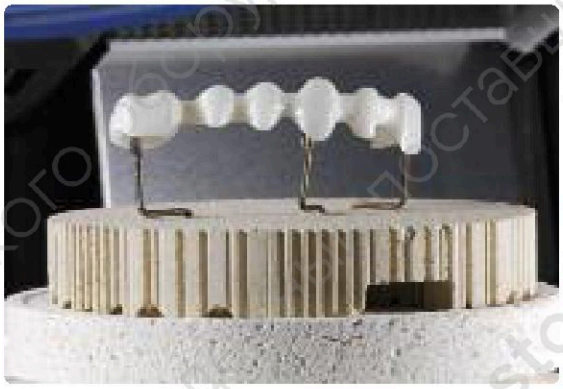
A Regeneration firing is **only recommended after:**

- large-scale adjustment of the IPS e.max ZirCAD framework (e.g. reduction of cusps and overall thickness)
- use of grinding instruments not listed in the IPS e.max grinding tool recommendations.
- grinding with diamond grinding tools (graining >100 µm).

**Please note:**
Fractures or cracks in the IPS e.max ZirCAD framework caused by rough finishing, e.g. blasting with high pressure, cannot be "healed" by a Regeneration firing.

A Regeneration firing should be conducted in order to reverse changes in the sintered $ZrO_2$ due to an abrasive finishing (see above). Please observe the following procedure for conducting the Regeneration firing:

- Clean and dry the framework with a steam jet.
- Position the framework on metal pins on a honey-combed tray.
- Conduct the Regeneration firing in a ceramic furnace (e.g. Programat P700) using the respective parameters.
- As an option, a regular sinter firing in the Sintramat (Program P1) can be conducted again. In this case, position the object on $ZrO_2$ beads (not on a honey-combed tray)



**Firing parameters for the IPS e.max ZirCAD Regeneration firing in the ceramic furnace**

| Furnace | B °C/°F | S min | $t_1$↗ °C/°F/min | $T_1$ °C/°F | $H_1$ min | L °C/°F | t↘ °C/°F/min |
|---|---|---|---|---|---|---|---|
| P300<br>P500<br>P700<br>EP 3000<br>EP 5000 | 403<br>757 | 0:18 | 65<br>117 | 1050<br>1922 | 15:00 | 750<br>1382 | 25<br>45 |
| P80<br>P100<br>P200<br>EP 600 | 403<br>757 | 0:18 | 65<br>117 | 1050<br>1922 | 15:00 | 750<br>1382 | — |
| PX1 | 403<br>757 | 0:30 | 65<br>117 | 1050<br>1922 | 15:00 | 750<br>1382<br>12 min | — |

- Do **not** adjust the framework by grinding after the Regeneration firing.
- Do **not** blast the framework with $Al_2O_3$ or glass polishing beads before veneering, since this may cause lasting damage to the surface.



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## Application of IPS e.max Ceram ZirLiner



IPS e.max Ceram ZirLiner must always be applied prior to the wax-up to achieve a sound bond between the framework and the material pressed onto it. With the application of the ZirLiner, the framework shade and fluorescence are adjusted to the desired tooth shade.
Direct press-on procedures on IPS e.max ZirCAD frameworks without using ZirLiner results in a poor bond and may lead to delamination. Do **not** blast the framework with $Al_2O_3$ or glass polishing beads, since this may damage the surface.

- Clean the IPS e.max ZirCAD framework with the steam jet before the application of the IPS e.max Ceram ZirLiner.
- Mix the IPS e.max Ceram ZirLiner in the desired shade with the respective IPS e.max Ceram ZirLiner Build-Up Liquid to a creamy consistency.
- For shaded zirconium oxide frameworks, use IPS e.max ZirLiner clear.
- If a different consistency is desired, IPS e.max Ceram Build-Up Liquid (allround or soft) as well as the IPS e.max Ceram Glaze and Stain Liquids (allround or longlife) may be used. The liquids may also be mixed with each other at any mixing ratio.
- Apply ZirLiner on the entire framework, paying special attention to the margins. If required, the restoration may be vibrated until an even, greenish colour effect is achieved. If the colour appears too pale, the layer is too thin.
- For more intensively shaded areas, four IPS e.max Ceram Intensive ZirLiners (yellow, orange, brown, incisal) are available.
- After that, the applied ZirLiner is dried.
- Conduct the firing on a honey-combed firing tray.
- After firing, the IPS e.max Ceram ZirLiner should exhibit a layer thickness of approx. 0.1 mm.



Before veneering, clean the framework with the steam jet.



Do **not** blast the framework with $Al_2O_3$ or glass polishing beads.




Mix the corresponding ZirLiner with IPS e.max Ceram ZirLiner Liquid to a creamy consistency.



Cover the entire framework with ZirLiner.



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IPS e.max Ceram Intensive ZirLiner can be used to design intensively shaded areas.



The fired ZirLiner shows a homogeneous, silky-mat surface.

**Firing parameters for the IPS e.max Ceram ZirLiner firing**

| IPS e.max Ceram on IPS e.max ZirPress | B °C/°F | S min. | t↗ °C/°F/min. | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| ZirLiner firing before wax-up and pressing | 403/757 | 4:00 | 40/72 | 960/1760 | 1:00 | 450/842 | 959/1758 | 0 |

## Firing process for zirconium oxide-supported restorations

In order to obtain optimum firing results for IPS e.max Ceram, the following points have to be observed:

- In order to ensure an even thickness of the veneer, the zirconium oxide framework must be designed in such a way that it supports the cusps. Depending on the clinical situation, the results are different wall thicknesses and dimensions of the framework.
- Since $ZrO_2$ is a poor heat conductor compared to other framework materials, a **low temperature increase rate t↗** is required. This ensures even heat distribution in the bonding area between the framework and the veneer as well as the outer surfaces of the restoration even with different framework thicknesses. In this way, an optimum bond as well as even sintering of the layering materials are achieved.
- During cooling of the restorations after firing, stress occurs as a result of the different cooling speed at the outside and within the material. With **long-term cooling L** for the "final firing cycle" this stress can be reduced and the risk of delamination minimized, particularly in $ZrO_2$-supported restorations.

**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.



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## Contouring

- In order to check the wax thickness after contouring, measure the ZirCAD framework with a sensor and record the values.
- Weigh the IPS e.max ZirCAD framework with the fired IPS e.max Ceram ZirLiner and record the weight. The weight is used to determine the wax weight after contouring. The wax weight is used to determine the number of required ingots.



Measure and record the framework thickness including the fired ZirLiner.



Weigh the ZirCAD framework with the fired ZirLiner and record the weight.

Contour the restoration in accordance with the desired processing technique (staining, cut-back or layering technique).

Please observe the following basic guidelines:
- Isolate the plaster dies with a commercial plaster-wax separator.
- Use only organic waxes for contouring, since they fire without leaving residue.
- Secure the framework on the model in the correct position and attach the margins with wax.
- Exactly contour the restoration, particularly in the area of the preparation margins. Do not over-contour the preparation margins, since this would require time-consuming and risky fitting procedures after pressing.
- For fully anatomical restorations, the possible occlusal relief must be taken into consideration as early as during the wax-up, since the application of the Stains and Glaze results in slight increase in vertical dimensions.

Observe the following minimum and maximum layer thicknesses during contouring for pressing IPS e.max ZirPress.
- In order to ensure the desired **tooth shade** as well as **complete pressing**, a **minimum thickness of 0.7 mm** must be observed.
- Unsupported press and layering ceramic components must ***not*** **exceed a total thickness of 2.5 mm**.



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### 1. Contouring for the staining technique

Design the restoration to full anatomical contour so that only requires glazing and, if necessary, characterization after pressing.





Fully anatomical wax-up made of organic wax on the IPS e.max ZirCAD framework. Observe the minimum and maximum layer thicknesses! Check the occlusal contact points.

**Tip**

An acrylate polymer block IPS AcrylCAD that fires without leaving residue can be used instead of modelling wax. An anatomically shaped component is created with the inLab®System (Sirona) and waxed onto the zirconium oxide framework.



### 2. Contouring for the cut-back technique

In a first step, the restoration is given fully anatomical contours. Then, the cut-back of the wax-up (before investment) is carried out. As an alternative, the cut-back may also be performed after pressing. In this way, the cut-back technique enables the fabrication of highly esthetic restorations in a very efficient manner.



Secure the ZirCAD framework on the die, attach margins with wax and build-up the shape.



Reduction of the oral surfaces is not required

The following points should be observed for the reduction of the wax-up:

- Reduce the contouring in the incisal third
- No design extreme mamelons (points and edges)
- Check the cut-back with a silicone key
- The minimum thicknesses must be observed to ensure pressability



Conduct the wax cut-back and check with a silicone key.



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### 3. Contouring for the layering technique

Contouring of the "dentin core" and/or ceramic shoulder depends on the available space.

The following points have to be observed:

- Precisely attach the restoration margins and/or shoulder with wax.
- In bridges, contour the basal surface of the bridge pontic.
- Contour the dentin core.
- Observe a wax thickness of at least 0.7 mm to avoid incomplete press results.





Sintered IPS e.max ZirCAD framework onto which IPS e.max Ceram ZirLiner has been fired on the model.





Precisely attach the restoration margins and contour the "dentin area". In bridges, contour the basal surface of the bridge pontic. Observe the minimum layer thickness of 0.7 mm.



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## Sprueing

Always attach the sprues in the direction of flow of the ceramic and at the thickest part of the wax-up so that smooth flowing of the viscous ceramic during pressing is enabled. Depending on the number and size of objects to be invested, either the 100 g, 200 g, or 300 g IPS Investment Ring System is selected. Bridges must only be pressed in the 200 g or 300 g IPS Investment Ring System. Before sprueing, weigh the ring base and record the weight (seal the opening of the ring base with wax).

We recommend the following procedure to determine the accurate wax weight:

- Weigh the IPS ring base (seal the opening of the ring base with wax)
- Position the objects to be pressed on the ring base and attach them with wax. Weigh again.
- The wax weight is calculated by deducting the weight of the ring base and the weight of the ZirCAD framework from the total weight.
- Use the respective number of ingots for the calculated wax weight.



| | 1 ingot | 2 ingots | 3 ingots | 6 ingots |
|---|---|---|---|---|
| Wax Weight | max. 0.7 g | max. 1.7 g | max. 2.2 g | max. 5.1 g |
| Investment Ring System: | 100 g, 200 g | 100 g, 200 g | 300 g | 300 g |

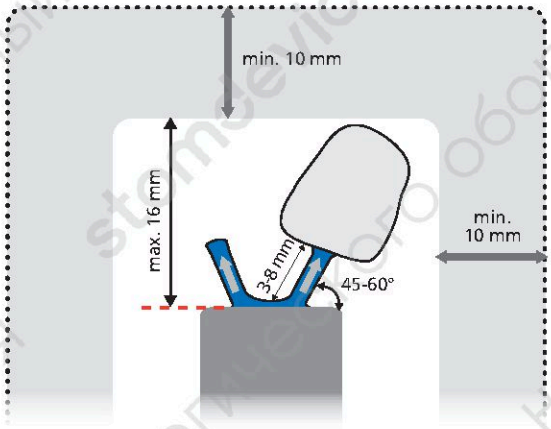
The following sprueing guidelines must be observed:

- Observe a distance of at least 10 mm between the wax-up objects and silicone ring.
- The maximum length (wax objects + sprue) of 16 mm (100 g, 200 g) or 20 mm (300 g) must not be exceeded.
- If only one object is invested, a second short (blind) sprue must be placed. This ensures that the switch-off function of the furnace works properly at the end of the pressing procdure.
- If the 100 g IPS Investment Ring System is used, a somewhat steeper sprueing angle to the ring base must be observed.
- In bridges, provide at least one sprue for each bridge element.
- In large crowns and/or bridge units (e.g. molars) 2 sprues should be provided (see "Sprueing of long-span bridges").

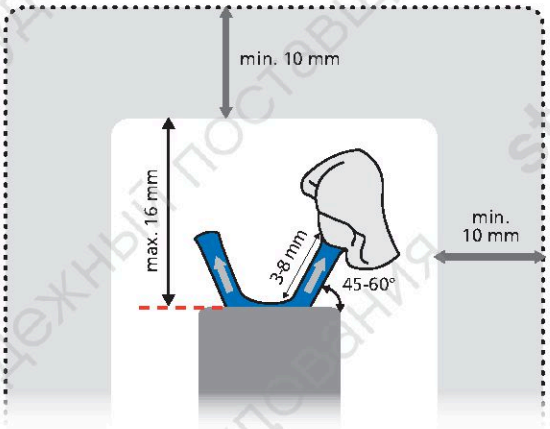


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## Sprueing the single tooth restorations

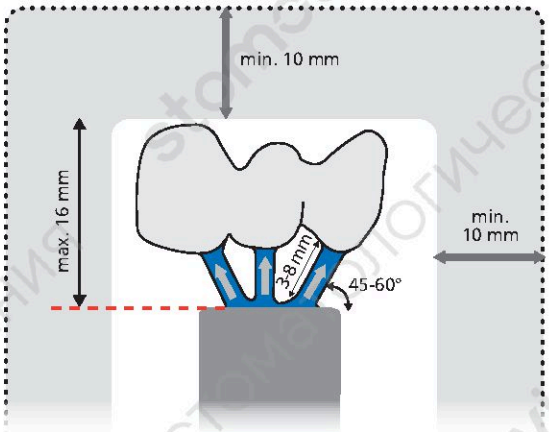



**Anterior Crown**
IPS Investment Ring System 100 g, 200 g or 300 g

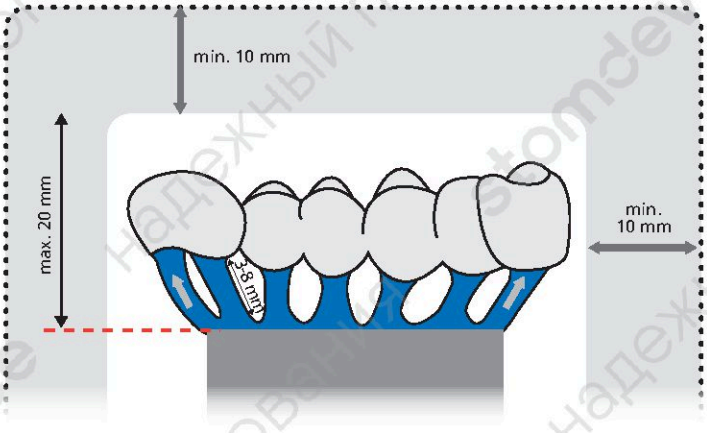



**Posterior Crown**
IPS Investment Ring System 100 g, 200 g or 300 g

## Sprueing of bridges




**3-Unit Bridge**
IPS Investment Ring System 200 g or 300 g




**Long-Span Bridges**
IPS Investment Ring System 300 g



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The following sprueing guidelines must be observed:

| | Single-Tooth Restorations | Bridges |
|---|---|---|
| **Investment Ring System** | 100 g, 200 g, 300 g | 200 g, 300 g |
| **Diameter of the wax wire** | 3 mm | 3 mm |
| **Length of the wax wire** | min. 3 mm, max. 8 mm | min. 3 mm, max. 8 mm |
| **Length of the wax wire including waxed-up object** | max. 16 mm (100 g, 200 g)<br>max. 20 mm (300 g) | max. 16 mm (200 g,)<br>max. 20 mm (300 g) |
| **Sprue attachmenet point at the waxed-up object** | thickest part of the wax-up | bridge abutments and each bridge pontic |
| **Sprue angle to the waxed-up object** | axial | axial |
| **Sprue angle to the ring base** | 45–60° | 45–60° |
| **Design of the attachment points** | round and slightly tapered, no sharp angles or edges | round and slightly tapered, no sharp angles or edges |
| **Distance between the objects and the sprues** | min. 3 mm | min. 3 mm |
| **Distance to the silicone ring** | min. 10 mm (check with the IPS Sprue Guide) | min. 10 mm (check with the IPS Sprue Guide) |
| **Note** | | Larger bridges may also be placed in the center of the investment ring. |



On the selected IPS investment ring base, attach sprues in the direction of flow of the ceramic and to the thickest parts of the restorations. Correct sprueing is checked using the IPS Sprue Guide.

**Tip**

To faciliate divesting, the position of the objects can be marked on the ring base with a little wax prior to investment.





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## Investing

Investing is carried out using either IPS PressVEST (e.g. overnight) or IPS PressVEST Speed. The corresponding IPS Silicone Ring (100 g, 200 g, 300 g) with the matching IPS Ring Gauge is used for investment. Please refer to the Instructions for Use of the corresponding investment material for the detailed processing parameters. If resin objects are invested, the conventional investment material should be preferred. The use of the Speed version presents an increased risk of investment ring cracks.

The following procedure is recommended:

- Do **not** use a debubblizer on the wax objects.
- The processing temperature of the investment material is 18 – max. 23 °C (64–73°F). Higher or lower processing temperatures substantially affect the setting behaviour.
- Mix the investment material. **Note**: The investment material contains quartz powder. Therefore, avoid the inhalation of dust.
- Use a suitable instrument for the fine investment of the cavity (e.g. a small brush). Make sure that the delicate wax margins are not damaged.
- Carefully place the IPS Silicone Ring on the ring base without damaging the wax objects. The silicone ring must sit flush on the ring base.
- Carefully fill the investment ring with investment material up to the marking on the IPS Silicone Ring. Make sure that no air is trapped in the material.
- Position the ring gauge with a hinged movement.
- Allow the investment ring to set without manipulating it.
- The invested ring must be further processed after a setting time of 24 hours at the latest to prevent crystallization of the IPS Press VEST investment material.

| Indication | IPS PressVEST | | | IPS PressVEST Speed | | |
|---|---|---|---|---|---|---|
| | 100 g Investment Ring Liquid : Dist. Water | 200 g Investment Ring Liquid : Dist. Water | 300 g Investment Ring Liquid : Dist. Water | 100 g Investment Ring Liquid : Dist. Water | 200 g Investment Ring Liquid : Dist. Water | 300 g Investment Ring Liquid : Dist. Water |
| **IPS e.max ZirPress** | | | | | | |
| Pressing Over Single Tooth Frameworks, Abutments | 13 ml : 9 ml<br>15.5 ml : 6.5 ml | 26 ml : 18 ml<br>31 ml : 13 ml | 39 ml : 27 ml | 16 ml : 11 ml | 32 ml : 22 ml | 48 ml : 33 ml |
| Pressing Over Bridge Frameworks | | 26 ml : 18 ml<br>31 ml : 13 ml | 39 ml : 27 ml | | 27 ml : 27 ml | 48 ml : 33 ml |
| **Mixing Time**<br>(under vacuum at approx.. 350 rpm) | 60 seconds | | | 2.5 minutes<br>If a high-speed mixer is used, the mixing time under vacuum has to be reduced. | | |



Use the IPS Silicone Ring for investment.



Use a suitable instrument for the fine investment (e.g. a small brush).



Pour the investment material in a thin stream.



Allow the investment ring to set without manipulating it.



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## Preheating

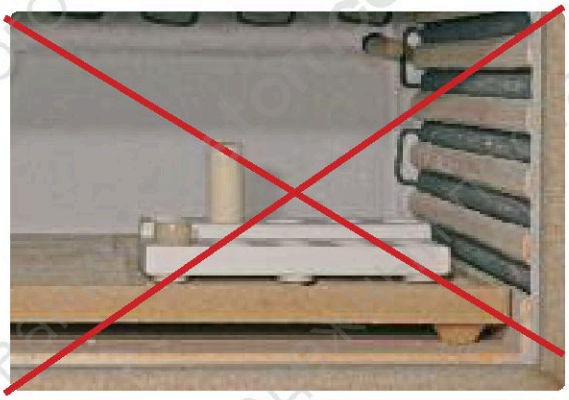
After the stipulated setting time of the respective investment material (IPS PressVEST or IPS PressVEST Speed), the investment ring is prepared for preheating as follows:

- Remove the ring gauge with a turning movement.
- Carefully push the investment ring out of the IPS Silicone Ring.
- Remove the ring base with a turning movement.
- Remove rough spots on the bottom surface of the investment ring with a plaster knife. Check the 90° angle. Investment material residue must not enter the sprues. Blow into the sprues if necessary.
- If several investment rings are preheated together, mark them accordingly.

| | IPS PressVEST | IPS PressVEST Speed |
|---|---|---|
| **Setting time** | min. 1 hour, max. 24 hours | min. 30 min., max. 45 min. |
| **Temperature of the preheating furnace when placing the investment ring** | Room temperature max. heating rate 5 °C/9°F/min. to 850°C/1562 °F | 850 °C (1562 °F) |
| **Position of the investment ring in the preheating furnace** | towards the rear wall, tipped with the opening facing down | towards the rear wall, tipped with the opening facing down |
| **IPS e.max ZirPress ingots** | **no preheating** | **no preheating** |
| **IPS Alox Plunger or IPS One-Way Plunger 300 g** | **no preheating** | **no preheating** |
| **Note** | | If several Speed investments are to be conducted, they should be invested consecutively and placed into the preheating furnace at an interval of approximately 20 minutes. Make sure that the furnace temperature does not drop too much when placing the investment rings into the preheating furnace. The stipulated holding time counts from the point when the preheating temperature has been reached again. |



towards the rear wall, tipped with the opening facing down



Do not preheat the ZirPress ingot and Alox plunger.



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## Pressing



Carry out the following preparatory steps for pressing before the preheating cycle for the investment ring has been completed:

- Switch on and preheat the press furnace in time.
- Select the press program for IPS e.max ZirPress in accordance with the investment ring size used.
- Prepare the **cold** IPS Alox Plunger or **cold** IPS One-Way Plunger 300 g.
- Dip the cold IPS Alox Plunger into the opening of the IPS Alox Plunger Separator.
- Prepare the**cold** IPS e.max ZirPress ingot(s) in the required shade.

Remove the investment ring from the preheating furnace immediately after completion of the preheating cycle. This step may take 1 minute at most to prevent the investment ring from cooling down too much.

- Place the **cold** IPS e.max ZirPress ingot into the **hot** investment ring.
- Insert the ingots in the investment ring with the non-imprinted side facing down. The imprinted side faces up to check the ingot shade. Use the IPS Ingot Tongs to load the 300 g investment system.
- Place the powder-coated side of the **cold** IPS Alox Plunger or the IPS One-Way Plunger 300 g into the **hot** investment ring.
- Place the completed investment ring in the center of the **hot** press furnace.
- The selected press program is started by pressing START.

After the end of the press cycle (optical and/or acoustic signal), proceed as follows:

- Remove the investment ring from the press furnace using the investment ring tongs immediately after pressing.
- Place the investment ring on a cooling grid to cool in a place protected from draft.
- Do not speed up cooling, e.g. by blasting with compressed air

| | 100 g Investment Ring | 200 g Investment Ring | 300 g Investment Ring |
|---|---|---|---|
| **Maximum number of ingots** | 1 ingot | 2 ingots | 6 ingots |
| **IPS e.max ZirPress ingots** | cold plunger | cold ingot | cold ingot |
| **IPS Alox Plunger isolated with IPS Alox Plunger Separator** | cold ingot | cold plunger | — |
| **IPS One-Way Plunger 300 g** | — | — | cold plunger |



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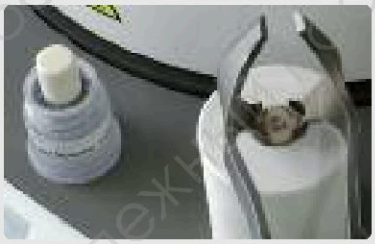
## Procedure for pressing when using the...

### IPS Alox Plunger for the IPS Investment Ring System 100, 200 g





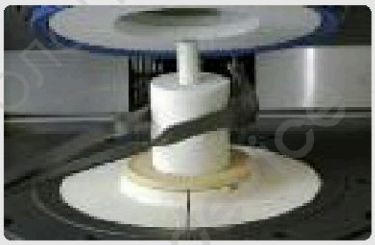
Provide a **cold** IPS Alox Plunger and **cold** IPS e.max ZirPress ingots in the desired shade.



Place the **cold** IPS e.max ZirPress ingot into the **hot** investment ring, with shade imprint facing upward.



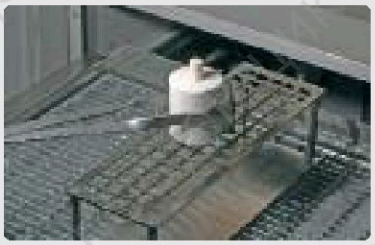
Then, place the powder-coated side of the IPS Alox Plunger into the **hot** investment ring.



Place the **hot** and completed investment ring in the center of the **hot** press furnace using the IPS Investment Ring Tongs



Press START to start the selected program.



Once the press program is completed, place the hot investment ring on the cooling grid using the investment ring tongs and allow it to cool to room temperature.

### IPS One-Way Plunger 300 g for the IPS Investment Ring System 300 g





Provide a **cold** IPS Alox-Plunger and **cold** IPS e.max ZirPress ingots in the desired shade.



Place the **cold** IPS e.max ZirPress ingot into the **hot** investment ring, with shade imprint facing upward.



Place the **cold** IPS One-Way Plunger 300 g ing the **hot** investment ring.



Place the **hot** and completed investment ring in the center of the **hot** press furnace using the IPS Investment Ring Tongs



Press START to start the selected program.



Once the press program is completed, place the hot investment ring on the cooling grid using the investment ring tongs and allow it to cool to room temperature.



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## Press parameters for IPS e.max Press

**Programat EP 3000**



Select the press program in accordance with the investment ring size used.



**Programat EP 5000**



Select the press program in accordance with the investment ring size used.

Note:
Starting with software version V3.3, the IPF (Intelligent Press Function) is available for IPS e.max ZirPress. With this function, the pressing times in the IPS Investment Ring System 300 g can be substantially shortened.



The press parameters for older-generation press furnaces are listed on Page 73 under Press Parameters.



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## Divesting

After cooling to room temperature (approximately 60-90 minutes), the investment ring may show cracks which developed during the cooling phase (immediately around the Alox plunger) as a result of the different CTEs of the various materials (Alox plunger, investment material, ZirPress ingot). They do not compromise the press results in any way.



Mark the length of the Alox plunger.

Divest the investment ring as follows:

- Mark the length of the plunger on the cooled investment ring.
- Separate the investment ring using a separating disk. Observe the marks on the investment ring regarding the position of the restoration. This predetermined breaking point enables reliable separation of the investment material and the ceramic material.
- Break the investment ring at the predetermined breaking point using a plaster knife.
- Always use polishing beads to divest the pressed objects (rough and fine divestment).
- Rough divestment is carried out with polishing beads at 4 bar (60 psi) pressure.
- Fine divestment is carried out with polishing beads at 2 bar (30 psi) pressure.
- Do not use $Al_2O_3$ for rough and fine divestment.
- Observe the blasting direction and distance to prevent damage to the object margins during divestment.
- Remove possible ceramic residue at the Alox plunger with Type 100 $Al_2O_3$.





Separate the Investment Ring System 200 g including the One-Way Plunger at the marking using a separating disk.
With the Investment Ring Systems 100 g and 200 g, separate the investment ring at the marking at the height of the Alox plunger.





Rough divesting with polishing jet medium at 4 bar pressure until the objects become visible. Use 2 bar pressure for fine divesting.

**Tip**

For long-span restorations, it is recommended to cut the sprues while the restoration is still in the investment ring in order to relieve tensions before final divestment. Make sure not to damage the restoration when cutting the various sprues.





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## Removing the Reaction Layer

After fine divestment, the reaction layer formed during the press procedure is removed using IPS e.max Press Invex Liquid. The procedure is carried out as follows:

- Pour the Invex Liquid into a plastic cup.
- Immerse the pressed object in the Invex Liquid and clean with ultrasound for at least 5 and max. 10 min. at most. Make sure that the objects are covered with Invex Liquid.
- Next, thoroughly rinse the objects with running water and blow them dry.
- Carefully remove the white reaction layer with type 100 $Al_2O_3$ at max. 1-2 bar (15-30 psi) pressure.
- Make sure that the reaction layer is completely removed (repeat the procedure, if necessary).
- If the reaction layer is not completely removed, bubbles may form, which subsequently may lead to bonding problems and cracks in the layering ceramic.
- Replace the Invex liquid after 20 applications or after sedimentation of the liquid.





Remove the reaction layer with Invex and carefully clean with $Al_2O_3$ at max. 1-2 bar (15-30 psi) pressure.

### Warning




- The Invex liquid contains < 1% hydrofluoric acid.
- It is harmful when inhaled or swallowed and when it comes into contact with the skin. Furthermore, it is corrosive.
- Keep the container tightly sealed and store it in a well-ventilated place (acid cabinet).
- If the material comes into contact with the eyes, immediately rinse with copious amounts of water and see a physician immediately.
- In case of accidental contact with skin, immediately wash with plenty of water.
- Use suitable protective clothing, gloves and goggles when working.
- In case of an accident or physical discomfort, see a physician immediately. Bring the Invex label, if possible.



### Disposal

- Neutralized the Invex Liquid before disposal!
- Use the IPS Ceramic Neutralization Powder to neutralize the Invex Liquid.
- For 50 ml Invex Liquid, approximately 3–4 g of IPS Ceramic Neutralization Powder are required
- Note: Strong foam development during neutralization.
- Carefully add the neutralization powder to the Invex Liquid in small portions until foam is no longer formed; then allow a reaction time of 5 minutes.
- If larger quantities are disposed, check the liquid with litmus paper (must show an alkaline reaction).
- After the reaction time, pour the neutralized solution into the sink, flushing it with running water.



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# IPS e.max® ZirPress
## Staining Technique





In the staining technique, the fully anatomical, pressed restorations are completed by the application of stains (IPS e.max Ceramic Shades, Essence) and glazing materials. In this way, the use of translucent IPS e.max ZirPress blocks permit the fabrication of very esthetic restorations on only slightly or non-discoloured preparations with minimum effort.

Observe the following procedure for finishing IPS e.max ZirPress restorations:

- Even though adjustment by grinding of pressed IPS e.max ZirPress restorations is possible, it should be kept to a minimum.
- Wet the area to be ground and use a fine diamond disk to cut the sprues.
- Overheating of the ceramic must be avoided. Low speed and light pressure is recommended.
- Smooth out the attachment points of the sprues.
- Do not "post-separate" the framework connectors with separating disks. This may result in undesired predetermined breaking points, which will subsequently compromise the stability of the all-ceramic restoration.
- Check the occlusion and articulation and grind in the appropriate adjustments, if necessary.
- Design surface textures.
- To clean the restoration, briefly blast with $Al_2O_3$ at 1 bar (15 psi) pressure and clean with the steam jet.
- Some blasting devices may require different pressure settings to accomplish this procedure.



Use a fine separating disk and continuous water cooling to cut the sprues.



Smooth out the attachment points of the sprue using low speed and light pressure and design a natural surface structure.



Blast the restoration with Type 1 $Al_2O_3$ at 1 bar (15 psi) pressure.



Before staining and characterization, thoroughly clean the restoration under running water or with a steam jet.





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## Stain and Characterization Firing

The following paragraphs will explain the most important steps for staining and characterizing with IPS e.max Ceram Essence and Shade. For further information on the nano-fluorapatite layering ceramic and its processing, please refer to the IPS e.max Ceram Instructions for Use.



- IPS e.max Ceram Shades are ready-to-use stains in syringes.
- IPS e.max Ceram Essence are intensively shaded powdered stains which are mixed with IPS e.max Ceram Glaze and Stain Liquid.
- IPS e.max Ceram Glaze Paste is a ready-to-use glaze paste supplied in a syringe.
- IPS e.max Ceram Glaze Spray is a ready-to-use glaze spray.
- IPS e.max Ceram Glaze Powder is a glazing material in powder form to mix with IPS e.max Ceram Glaze and Stain Liquid.

Before the Stain and Characterization firing, the restoration must be free of dirt and grease.
Any contamination after cleaning must be prevented. The following steps must be observed:

- For better wetting of the stains, a small quantity of IPS e.max Ceram Glaze and Stain Liquid may be slightly rubbed into the restoration surface.
- Mix the paste or powder with the IPS e.max Ceram Glaze and Stain Liquids allround or longlife to the desired consistency.
- More intensive shades are achieved by several staining procedures and repeated firing, not by applying thicker layers.
- To imitate the incisal area and translucency in the incisal third, IPS e.max Ceram Shade Incisal may be used.
- The cusps and fissures can be individualized using Essence.
- Conduct the Stain and Characterization firing using the indicated firing parameters.



Coat the surface with a small amount of the IPS e.max Ceram Glaze and Stain Liquid to enhance the wettability of the surface.



Apply IPS e.max Ceram Shade Incisal to imitate the incisal area.



Individually design cusps and fissures using Essence.



Conduct the Stain and Characterization firing on a honey-combed tray using the indicated firing parameters.



### Firing parameters for the Stain and Characterization firing

| IPS e.max Ceram on IPS e.max ZirPress<br>*Staining technique* | B<br>°C/°F | S<br>min. | t↗<br>°C/°F/min. | T<br>°C/°F | H<br>min. | $V_1$<br>°C/°F | $V_2$<br>°C/°F | L<br>°C/°F |
|---|---|---|---|---|---|---|---|---|
| Stain and Characterization Firing | 403/757 | 6:00 | 60/108 | 770/1418 | 1:00-2:00 | 450/842 | 769/1416 | 450/842 |

**Additional Stain and Characterization firing cycles can be conducted with the same firing parameters.**



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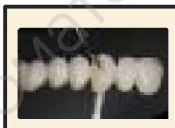
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## Glaze Firing

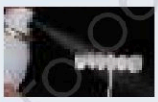
Glaze firing is conducted with powder, paste or spray glaze. The following procedure is recommended:

- Mix the glazing material (IPS e.max Ceram Glaze Paste or Powder) with the IPS e.max Ceram Glaze and Stain Liquids all-round or longlife to the desired consistency.
- Apply the glazing material in an evenly covering layer on the restoration in the usual manner.
- If a higher fluorescence is desired in the cervical area, it can be achieved using the Glaze Fluo material (paste or powder).
- If the IPS e.max Ceram Glaze Spray accidentally reached the inner aspects of the restoration, remove it with a dry short-hair brush before firing. Please observe the Instructions for Use of the IPS e.max Ceram Glaze Spray!
- Conduct the Glaze firing on a honey-combed firing tray using the stipulated firing parameters.
- Remove the restoration from the furnace after completion of the firing cycle (wait for the acoustic signal of the furnace).
- Allow the objects to cool to room temperature in a place protected from draft.
- Do not touch the hot objects with metal tongs.
- If adjustments are required after Glaze firing (e.g. contact points), they may be applied using IPS e.max Ceram Add-On (see page 46).



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.



Evenly spray on the IPS e.max Ceram 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.

**Firing parameters for the Glaze firing – note the temperature control**



| IPS e.max Ceram on IPS e.max ZirPress *Staining technique* | B °C/°F | S min. | t↗ °C/°F/min. | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Glaze firing | 403/757 | 6:00 | 60/108 | 770/1418 | 1:00-2:00 | 450/842 | 769/1416 | 450/842 |

**If the gloss is unsatisfactory after the first Glaze firing, further Glaze firing procedures may be conducted using the same firing parameters.**





Completed IPS e.max ZirPress HT restoration – fabricated in the staining technique



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## Example of use: IPS e.max ZirPress HT inlay-retained bridge



Application of the ZirLiner on the sintered IPS e.max ZirCAD framework. Use ZirLiner orange in the fissure area.



For the firing procedure, position the framework on the honey-combed firing tray using metal pins and IPS Object Fix Flow.



Fully anatomical wax-up of the inlay-retained bridge. The ZirCAD framework must be designed in such a way that all preparation margins can be designed in wax and IPS e.max ZirPress.



Wax-up sprued with a wax wire (ø 3 mm). A holding pin at the ZirCAD framework secures the framework in the investment material.



Pressed inlay-retained bridge on the model.



The Stain and Glaze firing is conducted with IPS e.max Ceram Glaze, Shades and Essence



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Completed inlay-retained bridge made of IPS e.max ZirPress HT and IPS e.max ZirCAD



Inlay-retained bridge made of IPS e.max ZirPress HT and IPS e.max ZirCAD in transmitted light.

The dental lab work was performed by
Jürgen Seger, Ivoclar Vivadent, Schaan/Liechtenstein



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# IPS e.max® ZirPress
## Cut-Back Technique





In the cut-back technique, IPS e.max Ceram Impulse and Incisal materials are applied in the incisal and/or occlusal area of the reduced IPS e.max ZirPress. The limited application of layering material permits achieving highly esthetic restorations in an efficient manner.

## Finishing

It is of critical importance to use the correct grinding instruments for finishing and adjusting high-strength glass-ceramics. 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 PS e.max glass-ceramics2.

Observe the following procedure for finishing IPS e.max ZirPress restorations:

- Even though adjustment by grinding of pressed IPS e.max ZirPress restorations is possible, it should be kept to a minimum.
- Separate the sprues with a fine diamond disk under permanent water cooling of the cutting area.
- Overheating of the ceramic must be avoided. Low speed and light pressure is recommended.
- Smooth out the attachment points of the sprues.
- Do not "post-separate" the framework connectors with separating disks. This may result in undesired predetermined breaking points, which will subsequently compromise the stability of the all-ceramic restoration.
- If a fully anatomical wax-up was pressed, the restoration is now cut back. Cut back the restoration to make room for the application of the subsequent layers of Incisal and Impulse materials. Make sure that the minimum thicknesses are maintained even after the cut-back.
- If the reduction was already carried out on the wax-up, the surface requires slight finishing.
- Make sure that the minimum thickness of 0.6 mm for the pressed ceramic is maintained. If this is not the case, shade deviations may occur.
- To clean the restoration, briefly blast with $Al_2O_3$ at 1 bar (15 psi) pressure and clean with the steam jet.
- Some blasting devices may require different pressure settings to accomplish this procedure.





Separate the sprues with a thin diamond disk and fit the restoration on the model.



Smooth out the attachment points of the sprues using low speed and light pressure and finish the surfaces.



IPS e.max ZirPress restoration with cut-back



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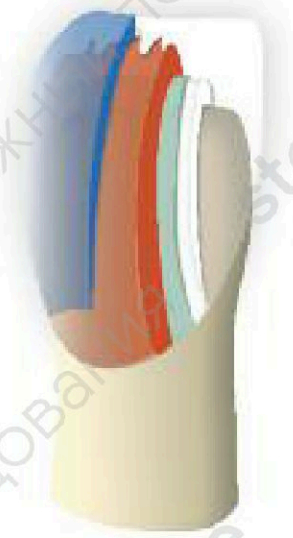


Blast the restoration with Type 100 $Al_2O_3$ at 1 bar (15 psi) pressure. Thoroughly clean the surface with a steam jet prior to the wash firing and subsequently dry.

## Veneering with IPS e.max Ceram

The following paragraphs will explain the most important veneering steps. For further information on the nano-fluorapatite layering ceramic and its processing, please refer to the IPS e.max Ceram Instructions for Use.





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## Wash firing (foundation)

The restoration must be free of dirt and grease before the wash firing is done. Any contamination after cleaning must be prevented. Conduct the wash firing, e.g. with Transpa Incisal, Impulse or Shades and Essence.

### Option A: Powder

With ideal space, conduct the wash firing with the required IPS e.max Ceram Transpa Incisal and/or Impulse material. Use the IPS e.max Ceram Build-Up Liquids all-round or soft to mix the materials. If a more plastic consistency is desired, IPS e.max Ceram Glaze and Stain Liquid allround of longlife can be used. Apply the wash in a thin coat on the reduced (cut-back) areas and fire using the stipulated firing parameters.



Apply the wash using Transpa Incisal and/or Impulse materials…



…and fire using the indicated firing parameters.

### Option B: Paste

With limited space or to enhance the in-depth chroma effect, the wash firing can be conducted with IPS e.max Ceram Shades and Essence. Mix the paste or powder with the IPS e.max Ceram Glaze and Stain Liquids allround or longlife to the desired consistency. Apply the wash in a thin coat on the entire framework and fire using the stipulated firing parameters.



Apply the wash using Shades and Essence…



…and fire using the indicated firing parameters.

**Layering materials must not be applied on unfired wash layers (powders and pastes), since this will result in a delamination of the layering ceramic. The wash (foundation) must be fired before the actual layering procedure is started.**

**Firing parameters for the Wash firing (foundation firing)**

| IPS e.max Ceram on IPS e.max ZirPress *Cut-Back and Layering Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Wash firing (foundation) | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 0 |



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## Incisal firing

With the IPS e.max Ceram layering materials (e.g. Transpa, Transpa Incisal, Impulse), the anatomical shape is completed and the individual esthetic appearance achieved. Use the IPS e.max Ceram Build-Up Liquids allround or soft to mix the materials. If required, conduct a second Incisal firing using the same firing parameters.



Application of Impulse materials, e.g. Opal Effect 1



Complete the restoration using, Incisal materials and Opal Effect 3, for instance.



Place restoration on the firing tray and fire with the firing parameters for the Incisal firing.



Restoration after Incisal firing

### Firing parameters for the Incisal firing



| IPS e.max Ceram on IPS e.max ZirPress *Cut-Back and Layering Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Incisal firing | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 0 |



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**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 structure, such as growth lines and convex/concave areas.
- Areas which should exhibit a higher gloss after Glaze firing can be smoothed out and prepolished using silicone disks.
- If gold and/or silver dust was used to visualize the surface texture, the restoration has to be thoroughly cleaned with steam. Make sure to remove all gold or silver dust in order to avoid any discolouration.



Finish the restoration with diamonds and give it a true-to-nature shape and surface structure.

## Stain and Glaze firing

Stain firing is conducted with IPS e.max Ceram Essence and/or IPS e.max Ceram Shades, while Glaze firing is carried out with IPS e.max Ceram. Depending on the situation, the Stain and Glaze firings may be conducted together or separately one after the other. The firing parameters are identical.

In order to achieve an even gloss during Glaze firing of cut-back restorations veneered with IPS e.max Ceram, two different procedures are possible:

**Standard**
(high-gloss appearance)

- Prepolish unlayered areas (IPS e.max ZirPress) using rubber wheels.
- Rub the surface with moist ceramic in order to improve the wetting properties of the surface.
- Clean the restoration with steam
- Apply IPS e.max Ceram Glaze(Paste, Powder, or Spray) on the entire restoration.

**Option**
(true-to-nature appearance)

- Prepolish unlayered areas (IPS e.max ZirPress) using rubber wheels.
- Rub the surface with moist ceramic in order to improve the wetting properties of the surface.
- Clean the restoration with steam
- Apply IPS e.max Ceram Glaze (Paste or Powder) only on unlayered areas (IPS e.max ZirPress).
- Use Self-Glaze for veneered areas.



Apply IPS e.max Ceram Glaze on the entire restoration



Apply IPS e.max Ceram Glaze only on unlayered areas



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Observe the following notes for the Stain and Glaze firing:
- Conduct the Stain and Glaze firing on a honey-combed firing tray using the stipulated firing parameters.
- Remove restoration from the furnace after completion of the firing cycle (wait for the acoustic signal of the furnace).
- Allow the objects to cool to room temperature in a place protected from draft.
- Do not touch the hot objects with metal tongs.
- If adjustments are required after Glaze firing (e.g. contact points), they may be applied using IPS e.max Ceram Add-On (see page 46).



**Firing parameters for the Stain and Glaze firing**

| IPS e.max Ceram on IPS e.max ZirPress *Cut-Back and Layering Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Stain firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |
| Glaze firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |





Completed IPS e.max ZirPress restoration pressed partially reduced and veneered with IPS e.max Ceram

The dental lab work was performed by
Jürgen Seger, Ivoclar Vivadent, Schaan/Liechtenstein



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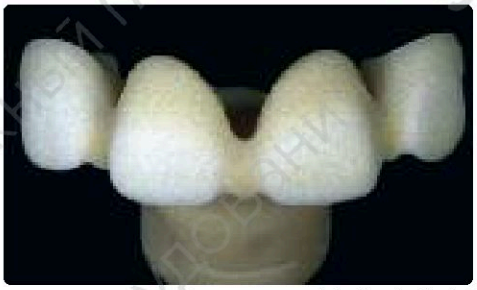
# IPS e.max® ZirPress
## Layering Technique



The layering technique is used in particular for pressing a dentin core or shoulder onto zirconium oxide frameworks. Individual and highly esthetic restorations can be fabricated using the IPS e.max Ceram layering materials.

### Finishing

It is of critical importance to use the correct grinding instruments for finishing and adjusting glass-ceramics. 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 PS e.max glass-ceramics".



Restoration after divesting

Observe the following procedure for finishing IPS e.max ZirPress restorations:

- Separate the sprues with a fine diamond disk under permanent water cooling of the cutting area.
- Overheating of the ceramic must be avoided. Low speed and light pressure is recommended.
- Smooth out the attachment points of the sprues.
- Do not "post-separate" the framework connectors with separating disks. This may result in undesired predetermined breaking points, which will subsequently compromise the stability of the all-ceramic restoration.
- To clean the restoration, briefly blast with $Al_2O_3$ at 1 bar (15 psi) pressure and clean with the steam jet.
- Do not blast ZirLiner or only very carefully in order not to remove it.
- Some blasting devices may require different pressure settings to accomplish this procedure.

### Veneering with IPS e.max Ceram

The following paragraphs will explain the most important veneering steps. For further information on the nano-fluorapatite layering ceramic and its processing, please refer to the IPS e.max Ceram Instructions for Use.





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### Wash firing (foundation)

The restoration must be free of dirt and grease prior to the application of the wash. Any contamination after cleaning must be prevented. Wash firing is carried out with IPS e.max Ceram Deep Dentin or IPS e.max Ceram Dentin.

The following steps must be observed:

- Use the IPS e.max Ceram Build-Up Liquids allround or soft to mix the Deep Dentin or Dentin materials. If a more plastic consistency is desired, IPS e.max Ceram Glaze and Stain Liquid allround of longlife can be used.
- Apply the wash in a thin coat on the entire restoration.



Conduct the wash firing with Deep Dentin or Dentin materials.



**Firing parameters for the Wash firing (foundation firing)**

| IPS e.max Ceram on IPS e.max ZirPress *Cut-Back and Layering Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Wash firing (foundation) | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 0 |

## Optional

### Wash firing (foundation) characterization



IPS e.max Ceram Essence can be used to design intensively characterized areas. These materials are excellently suitable for individualized characterizations.

**Firing parameters for the Wash firing (foundation firing) characterization**

| IPS e.max Ceram on IPS e.max ZirPress *Cut-Back and Layering Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Wash firing (foundation) characterization | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 0 |

**Layering materials must not be applied on unfired wash layers, since this will result in a delamination of the layering ceramic. The wash (foundation) must be fired before the actual layering procedure is started.**



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### 1st Dentin/Incisal firing

The layering procedure is conducted with IPS e.max Ceram layering material in accordance with the layering diagram. To achieve the desired consistency, the IPS e.max Ceram Build-Up Liquid allround and soft can be used. If a different consistency is desired, the liquids can also be mixed in any ratio.





Contour the tooth shape with IPS e.max Ceram layering materials.

**Firing parameters for the 1st Dentin and Incisal firing**



| IPS e.max Ceram on IPS e.max ZirPress *Cut-Back and Layering Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| 1st Dentin/Incisal firing | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 0 |

### 2nd Dentin/Incisal firing (corrective firing)

Compensate for the shrinkage and complete the missing areas.

**Firing parameters for the 2nd Dentin and Incisal firing – note the temperature control**



| IPS e.max Ceram on IPS e.max ZirPress *Cut-Back and Layering Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| 2nd Dentin/Incisal firing | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 0 |

### Stain and Glaze firing

Observe the following notes for the Stain and Glaze firing:

- Conduct the Stain and Glaze firing on a honey-combed firing tray using the stipulated firing parameters.
- Remove restoration from the furnace after completion of the firing cycle (wait for the acoustic signal of the furnace).
- Allow the objects to cool to room temperature in a place protected from draft.
- Do not touch the hot objects with metal tongs.
- If adjustments are required after Glaze firing (e.g. contact points), they may be applied using IPS e.max Ceram Add-On (see page 46).

**Firing parameters for the Stain and Glaze firing**



| IPS e.max Ceram on IPS e.max ZirPress *Cut-Back and Layering Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Stain firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |
| Glaze firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |



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Completed restoration after the Stain and Glaze firing.

Images courtesy of Katrin Rohde, MDT, Schorndorf, Germany.
The dental lab work was runner-up in the Golden Parallelometer 2007 competition.



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## Adjustments with IPS e.max Ceram Add-On



There are 3 IPS e.max Ceram Add-On materials available for adjustments, which are processed differently depending on their application.

*Option 1: Add-On with Glaze Firing*

This option is used if minor adjustments are made together with the Glaze firing. For this option, proceed as follows:

- Mix IPS e.max Ceram Add-On Dentin and Add-On Incisal with IPS e.max Ceram Dentin and Transpa Incisal in a 1:1 ratio.
- Use IPS e.max Ceram Add-On Margin unmixed.
- Mix IPS e.max Ceram Add-On with IPS e.max Ceram Build-Up Liquid soft or allround.
- Apply the Add–On material on the respective areas.
- Fire with the stipulated parameters for the "Add-On with Glaze firing".
- Polish the adjusted areas to a high gloss after firing.

*Option 2: Add-On after Glaze Firing*

After completion and try-in with the patient, further adjustments (e.g. contact points) might be necessary. For this option, proceed as follows:

- Mix IPS e.max Ceram Add-On Dentin and Add-On Incisal with IPS e.max Ceram Build-Up Liquid soft or allround and apply on the corresponding areas.
- Fire with the stipulated parameters for the "Add-On after Glaze firing".
- Polish the adjusted areas to a high gloss after firing.



**Firing parameters: Add-On with or after Glaze Firing**

| **IPS e.max Ceram on IPS e.max ZirPress** ***Cut-Back and Layering Technique*** | **B** °C/°F | **S** min. | **t↗** °C/°F/min | **T** °C/°F | **H** min. | **$V_1$** °C/°F | **$V_2$** °C/°F | **L** °C/°F |
|---|---|---|---|---|---|---|---|---|
| Add-On with Glaze Firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |
| Add-On after Glaze Firing | 403/757 | 6:00 | 50/90 | 700/1292 | 1:00 | 450/842 | 699/1290 | 450/842 |



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# IPS e.max® ZirPress Gingiva
## Gingiva Technique





IPS e.max ZirPress Gingiva technique can be used to fabricate gingival parts in conjunction with the press-on zirconium oxide. The advantages of this technique are the more efficient working method and increased processing reliability mainly for larger restorations. By using the press technique, it is possible to fabricate homogeneous precision gingival portions which make time-consuming adjustments and corrective firing cycles a thing of the past. The tooth-shaded portions are built up using the IPS e.max Ceram layering materials, while the accuracy of fit of IPS e.max ZirPress Gingiva is maintained. In addition, it is possible to characterize the restorations with IPS e.max Ceram Gingiva in the Dentin and Incisal firing cycles.



## Framework Design Criteria

The following guidelines have to be observed for the application of IPS e.max ZirPress Gingiva when designing the zirconium oxide framework:

- The IPS e.max ZirCAD framework material is the high-strength component of your restoration and should therefore be designed in such a way that it supports the shape of the restorations as well as the cusps. This applies to the cusp support and the gingival parts.
- With atrophied alveolar ridges, the excess in available space must be compensated by the design of the framework and not by IPS e.max ZirPress Gingiva press ceramic.



With atrophied alveolar ridges, the framework has to be adjusted to the course of the gingiva in the basal area.



Sintered zirconium oxide framework, adjusted to the course of the gingiva in the basal area.

**Failure to observe the stipulated framework design criteria and minimum thicknesses may result in clinical failures, such as cracks, delamination and fracture of the restoration.**

**Please note**:

- In order to ensure the desired gingiva shade as well complete pressing, a minimum thickness of 0.7 mm must be observed.
- Free-standing (unsupported) gingival portions must not exceed a width of 2.5 mm.



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## Framework Preparation and Application of ZirLiner

The framework is prepared according to the "Framework Preparation" notes (page 14ff). After preparing the framework, the following procedure has to be observed in the Gingiva technique:

- Before ZirLiner is applied, clean the framework with the steam jet.
- The framework must not be blasted with $Al_2O_3$, since this would damage the surface.
- IPS e.max Ceram ZirLiner must always be applied prior to the wax-up in order to achieve a sound bond as well as an in-depth shade effect and fluorescence.
- Direct press-on procedures on zirconium oxide frameworks without using ZirLiner results in a poor bond and may lead to cracks and delamination. Therefore, ZirLiner must be applied to all the areas onto which the restoration will be pressed.

**Apply IPS e.max Ceram ZirLiner Gingiva to all the areas of the framework onto which IPS e.max ZirPress Gingiva will be pressed.**

- The IPS e.max Ceram ZirLiner in the corresponding shade is also applied before the Gingiva pressing procedure on all areas of the framework which will be veneered after pressing the gingival parts.
- Mix the IPS e.max Ceram ZirLiner with IPS e.max Ceram ZirLiner Build-Up Liquid to a creamy consistency.
- If a different consistency is desired, IPS e.max Ceram Build-Up Liquid (allround or soft), as well as the IPS e.max Ceram Glaze and Stain Liquids (allround or longlife) may be used. The liquids may also be mixed with each other at any mixing ratio.
- Apply the different IPS e.max ZirLiners on the entire framework, paying special attention to the margins. If required, the restoration may be vibrated until an even shade effect is achieved. If the colour appears too pale, the layer is too thin.
- For more intensively shaded areas, four IPS e.max Ceram Intensive ZirLiners (yellow, orange, brown, incisal) are available.
- After that, the applied ZirLiner is briefly dried and fired.
- After firing, the IPS e.max Ceram ZirLiner should exhibit a layer thickness of approx. 0.1 mm.



Apply IPS e.max ZirLiner Gingiva in those areas to which IPS e.max ZirPress Gingiva will be subsequently pressed. Coat non-involved outer surfaces with IPS e.max Ceram ZirLiner in the respective tooth shade and fire.



Restoration after ZirLiner firing

**Firing parameters of IPS e.max Ceram ZirLiner**



| IPS e.max Ceram on IPS e.max ZirPress *Gingiva Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| ZirLiner firing before wax-up and pressing | 403/757 | 4:00 | 40/72 | 960/1760 | 1:00 | 450/842 | 959/1758 | 0 |



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## Contouring

Fabricate the wax-up using wax that burns out without leaving residue. The following procedure has to be applied for the gingiva technique:

- Isolate the plaster dies with a commercial plaster-wax separator.
- Weigh the zirconium oxide framework onto which the IPS e.max Ceram ZirLiner has been fired and record weight. The weight is used to determine the wax weight after contouring.
- Subsequently, secure the framework on the model in the proper position and attach the margins with wax.
- Contour the gingival protions. In order to exactly define the position and extension of gingival portions, it is also possible to fabricate a fully anatomical wax-up with subsequent cut-back.
- Observe a wax thickness of **at least 0.7 mm** to avoid incomplete press results.
- The **maximum thickness of 2.5 mm** for free-standing (not framework-supported) gingival parts has to be observed.



Secure the zirconium oxide framework on the model, attach margins with wax and contour the gingival portions. Thickness of the gingival portions between 0.7 and 2.5 mm.



Palatal view of the waxed up gingival parts



In order to exactly define the position and extension of gingival portions, it is also possible to fabricate a fully anatomical wax-up with subsequent cut-back.



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## Sprueing, Investing

Basically, the sprueing guidelines on pages 21ff apply.

Always attach the sprues in the direction of flow of the ceramic from the basal and at the thickest part of the wax-up so that smooth flowing of the viscous ceramic during pressing is enabled. Depending on the number and size of the objects to be invested, either the 100 g, 200 g, or 300 g IPS Investment Ring System is selected.



Provide sprues for the gingival parts at the thickest part…



… and secure with wax on the ring base.

For the processing steps **preheating, pressing, divesting, removing the reaction layer and separating the restoration**, please refer to the pages 25–30.

**Please note:**

- Blast the restoration with $Al_2O_3$ (type 100) at 1-2 bar (15-30 psi) pressure after removing the reaction layer using IPS e.max Press Invex Liquid.
- Carefully blast the non-pressed areas (exposed ZirLiner) in order to avoid complete removal of the ZirLiner.

## Finishing

It is of critical importance to use the correct grinding instruments for finishing and adjusting high-strength glass-ceramics. 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 PS e.max glass-ceramics".



Restoration with pressed gingival portions made of IPS e.max ZirPress Gingiva after divesting.

Observe the following procedure for finishing IPS e.max ZirPress Gingiva:

- Even though adjustment by grinding of pressed IPS e.max ZirPress restorations is possible, it should be kept to a minimum.
- Separate the sprues with a fine diamond disk under permanent water cooling of the cutting area.
- Overheating of the ceramic must be avoided. Low speed and light pressure is recommended.
- Smooth out the attachment points of the sprues.
- Design surface textures.
- To clean the restoration, briefly blast with $Al_2O_3$ at 1 bar (15 psi) pressure and clean with the steam jet.
- Some blasting devices may require different pressure settings to accomplish this procedure.



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## Veneering with IPS e.max Ceram

The following paragraphs will explain the most important veneering steps. For further information on the nano-fluorapatite layering ceramic and its processing, please refer to the IPS e.max Ceram Instructions for Use.



### Wash firing (foundation)

The restoration must be free of dirt and grease prior to the application of the wash. Any contamination after cleaning must be prevented. Conduct the wash firing with IPS e.max Deep Dentin or Dentin materials (IPS e.max Ceram ZirLiner must not be used. Given its firing temperature of 960°C/1760°F, it is exclusively suitable for use on zirconium oxide).

The following steps must be observed:

- Use the IPS e.max Ceram Build-Up Liquids allround or soft to mix the IPS e.max Ceram Gingiva, Deep Dentin or Dentin materials.
- If a more plastic consistency is desired, IPS e.max Ceram Glaze and Stain Liquid allround or longlife can be used.
- Apply the wash in a thin coat on the veneered areas and fire.
- If the gingival portions are subsequently individualized with Gingiva layering materials, the respective areas must be covered with IPS e.max Ceram Gingiva for the wash firing.



Wash firing is carried out with IPS e.max Ceram Deep Dentin or Dentin on the tooth-coloured areas and IPS e.max Ceram Gingiva on the gingival portions. Observe the firing control!



After wash firing



**Firing parameters for the Wash firing (foundation firing)**

| IPS e.max Ceram on IPS e.max ZirPress *Gingiva Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Wash firing (foundation) | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 450/842 |



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## Optional



### Wash firing (foundation) characterization

IPS e.max Ceram Essence can be used to design intensively characterized areas. These materials are excellently suitable for individualized characterizations.

**Firing parameters for the Wash firing (foundation firing) characterization**

| IPS e.max Ceram on IPS e.max ZirPress *Gingiva Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Wash firing (foundation) characterization | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 450/842 |

**Layering materials must not be applied on unfired wash layers, since this will result in a delamination of the layering ceramic. The wash (foundation) must be fired before the actual layering procedure is started.**



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### 1st Dentin and Incisal firing

The layering procedure of the tooth-coloured parts is carried out in accordance with the layering diagram. To achieve the desired consistency of the ceramic material, the IPS e.max Ceram Build-Up Liquid allround and soft can be used. If a different consistency is desired, the liquids can also be mixed in any ratio.





Contour the tooth shape with IPS e.max Ceram layering materials (Deep Dentin, Dentin, Incisal) according to the layering diagram. Separate the interdental areas before firing.



Then the restoration is fired using the firing parameters for the 1st Dentin and Incisal firing.



**Firing parameters for the 1st Dentin and Incisal firing**

| IPS e.max Ceram on IPS e.max ZirPress *Gingiva Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| 1st Dentin and Incisal firing | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 450/842 |



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## 2nd Dentin and Incisal firing (corrective firing)

Compensate for the shrinkage and complete the missing areas. If required, the gingival portions may be individualized using IPS e.max Ceram Gingiva.



Compensate for the shrinkage with Dentin, Transpa and Incisal materials. If required, the gingival portions may be individualized using IPS e.max Ceram Gingiva.



Then the restoration is fired using the firing parameters for the 2nd Dentin and Incisal firing.



### Firing parameters for the 2nd Dentin and Incisal firing

| IPS e.max Ceram on IPS e.max ZirPress *Gingiva Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| 2nd Dentin and Incisal firing | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 450/842 |

## Stain and Glaze firing

Stain firing is conducted with Essence and Shades, while glaze powder or paste is used for Glaze firing. Depending on the situation, the Stain and Glaze firings may be conducted together or separately one after the other. The firing parameters are identical.

If necessary, the gingival portions may be characterized with IPS e.max Ceram Essence (rose, berry or aubergine)



Prepare the restoration for the Stain and Glaze firing.



Apply IPS e.max Ceram Glaze, Essence and Shades.



### Firing parameters for the Stain and Glaze firing – note the temperature control

| IPS e.max Ceram on IPS e.max ZirPress *Gingiva Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Stain firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |
| Glaze firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |



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Completed restoration after the Stain and Glaze firing.

The dental lab work was performed by Thorsten Michel, MDT, Schorndorf, Germany.



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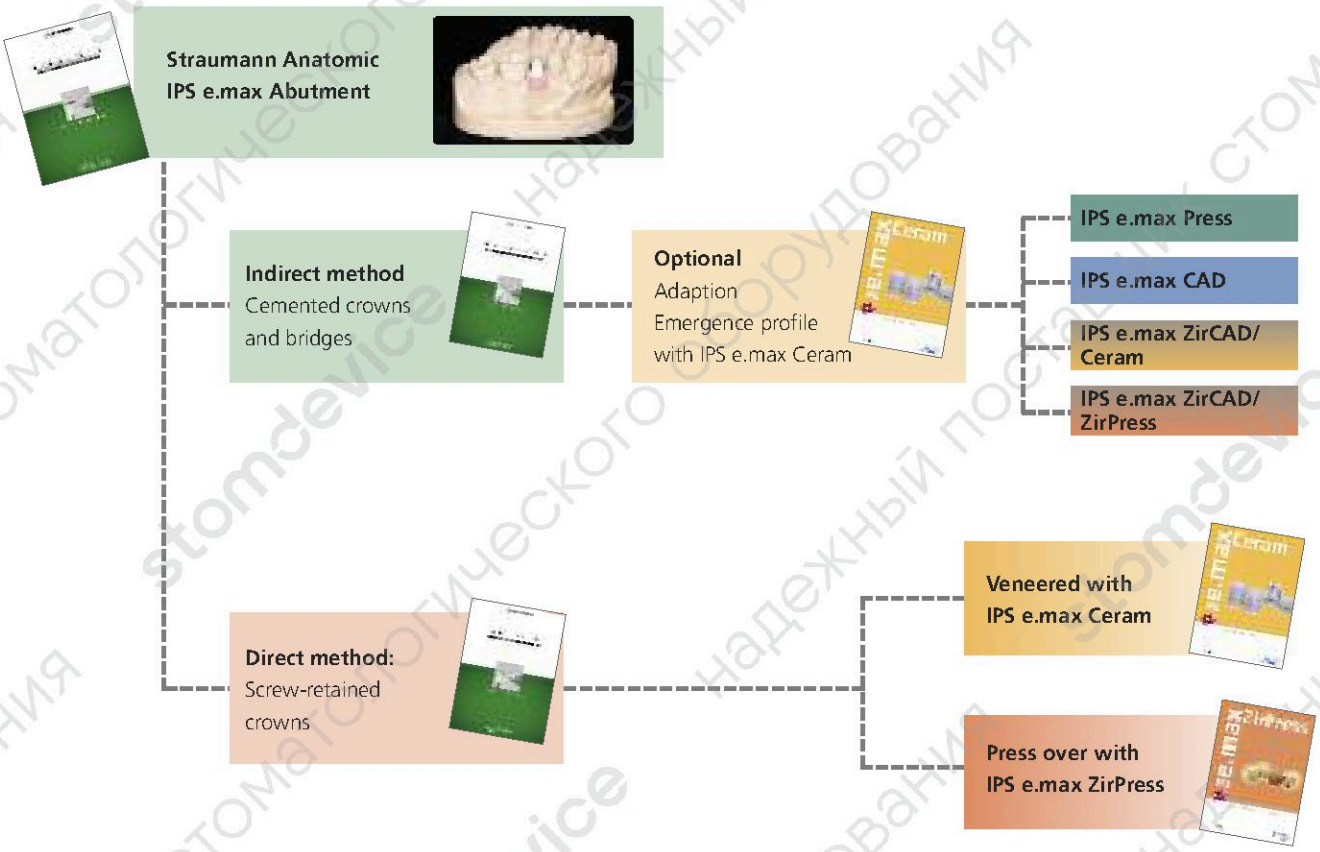
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# IPS e.max® ZirPress

## Abutment Technique

### Pressing over Straumann® Anatomic IPS e.max® Abutment

**Overview of the processing possibilities of the Straumann® Anatomic IPS e.max® Abutment**




**Definition "Indirect / Direct Method"**



**Indirect method** – Cemented crowns and bridges

- Straumann Anatomic IPS e.max Abutment screwed onto the implant
- (Laboratory) Fabrication of the IPS e.max restoration same as on natural preparations
- IPS e.max restorations incorporated using a cementation material



**Direct method** – Screw-retained crowns

- Direct veneering of the Straumann Anatomic IPS e.max Abutment with IPS e.max Ceram or direct pressing on of IPS e.max ZirPress
- Screwing down of the veneered and/or pressed-over Straumann Anatomic IPS e.max Abutment on the implant



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## Preparing the Straumann® Anatomic IPS e.max® Abutment



The Straumann Anatomic IPS e.max Abutment is prepared according to the step-by-step instructions. For the selection of the grinding instruments, please refer to the Ivoclar Vivadent Flow Chart "Recommended grinding tools for IPS e.max zirconium oxide".
Conduct a Regeneration firing (see page 15) after preparing the abutment



Individualized Straumann® Anatomic IPS e.max® Abutment on the model

Please observe the following procedure for conducting the Regeneration firing:

- Clean and dry the abutment with a steam jet.
- Position the abutment on a metal pin on a honey-combed tray.
- Conduct the Regeneration firing in a ceramic furnace (e.g. Programat P700) using the respective parameters.
- Do **not** adjust the abutment by grinding after the Regeneration firing.
- Do **not** blast the framework with $Al_2O_3$ or glass polishing beads before veneering, since this may cause lasting damage to the surface.
- Before veneering, clean the abutment with running water or the steam jet.



**Firing parameters for the Regeneration firing**

| Furnace | B °C/°F | S min | $t_1$↗ °C/°F/min | $T_1$ °C/°F | $H_1$ min | L °C/°F | t↘ °C/°F/min |
|---|---|---|---|---|---|---|---|
| P300<br>P500<br>P700<br>EP 3000<br>EP 5000 | 403<br>757 | 0:18 | 65<br>117 | 1050<br>1922 | 15:00 | 750<br>1382 | 25<br>45 |
| P80<br>P100<br>P200<br>EP 600 | 403<br>757 | 0:18 | 65<br>117 | 1050<br>1922 | 15:00 | 750<br>1382 | — |
| PX1 | 403<br>757 | 0:30 | 65<br>117 | 1050<br>1922 | 15:00 | 750<br>1382<br>12 min | — |



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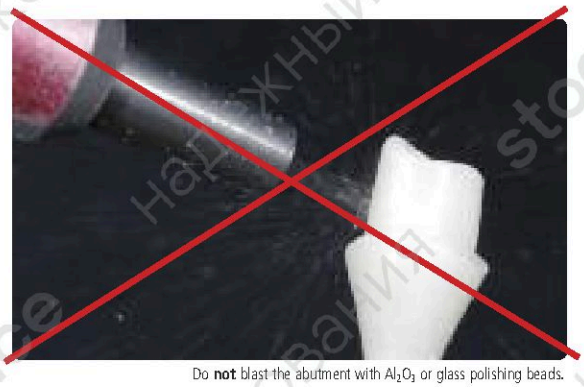
## Application of IPS e.max Ceram ZirLiner

IPS e.max Ceram ZirLiner must always be applied prior to the wax-up to achieve a sound bond between the abutment and IPS e.max ZirPress. With the application of the ZirLiner, the shade and fluorescence are adjusted to the desired tooth shade. Direct press-on procedures on the abutments without using ZirLiner results in a poor bond and may lead to cracks and delamination.

- Do not blast the Straumann Anatomic IPS e.max Abutment with $Al_2O_3$ or glass polishing beads, since this may damage the surface.
- Clean the abutment with the steam jet before the application of the IPS e.max Ceram ZirLiner.
- Mix the IPS e.max Ceram ZirLiner in the desired shade with the respective IPS e.max Ceram ZirLiner Build-Up Liquid to a creamy consistency.
- For shaded abutments, use IPS e.max ZirLiner clear.
- If a different consistency is desired, IPS e.max Ceram Build-Up Liquid (allround or soft), as well as the IPS e.max Ceram Glaze and Stain Liquids (allround or longlife) may be used. The liquids may also be mixed with each other at any mixing ratio.
- Cover the areas to be pressed over with ZirLiner. If necessary, briefly vibrate until an even, greenish colour effect is achieved. If the colour appears too pale, the layer is too thin.
- For more intensively shaded areas, four IPS e.max Ceram Intensive ZirLiners (yellow, orange, brown, incisal) are available.
- **It is important that no ZirLiner reaches the contact surface between the abutment and implant.**
- After that, the applied ZirLiner is dried.
- Conduct the firing on a honey-combed firing tray.
- After firing, the IPS e.max Ceram ZirLiner should exhibit a layer thickness of approx. 0.1 mm



Before the application of the ZirLiner, clean the abutment with the steam jet.



Do **not** blast the abutment with $Al_2O_3$ or glass polishing beads.



Cover the entire abutment with ZirLiner.



The fired ZirLiner shows a homogeneous, silky-mat surface.



**Firing parameters for the IPS e.max Ceram ZirLiner firing**

| IPS e.max Ceram ZirLiner on Straumann® Anatomic IPS e.max® Abutment | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| ZirLiner firing | 403/757 | 4:00 | 40/72 | 960/1760 | 1:00 | 450/842 | 959/1758 | 0 |



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## Contouring

Weigh the abutment with the fired IPS e.max Ceram ZirLiner and record the weight. The weight is used to determine the wax weight after contouring.



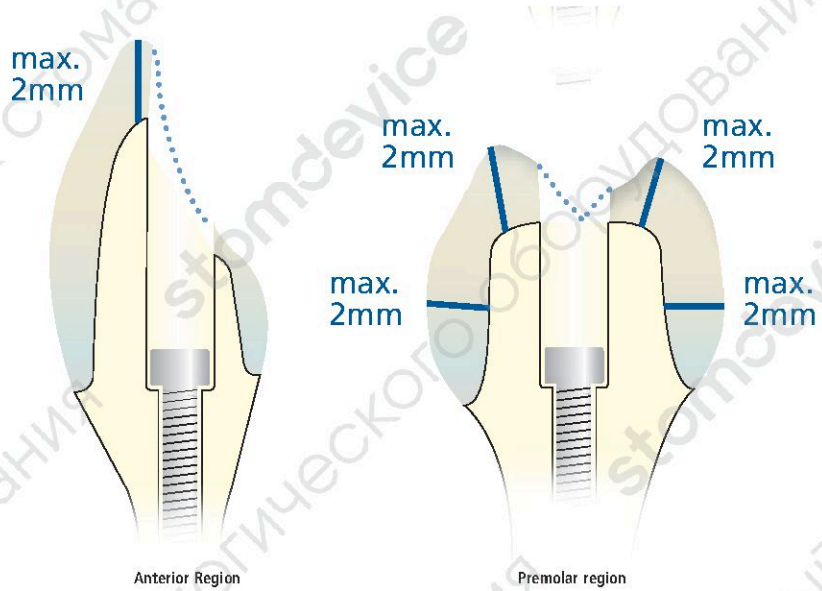
Weigh the abutment with the fired ZirLiner and record the weight.

Contour the restoration in accordance with the desired processing technique (staining, cut-back or layering technique).
Please observe the following basic guidelines:

- Isolate the plaster dies with a commercial plaster-wax separator.
- Use only organic waxes for contouring, since they fire without leaving residue.
- Secure the abutment on the model in the correct position and attach the margins with wax.
- Seal the screw cavity with a placeholder (e.g. plastic tube). Isolate the placeholder before contouring.
- Exact contouring for the restoration
- For fully anatomical restorations, the possible occlusal relief must be taken into consideration as early as during the wax-up, since the application of the Stains and Glaze results in slight increase in vertical dimensions.

Observe the following minimum and maximum layer thicknesses during contouring for pressing over the Straumann Anatomic IPS e.max Abutment with IPS e.max ZirPress.

- In order to ensure the desired **tooth shade** as well as **complete pressing**, a **minimum thickness of 0.7 mm** must be observed.
- The **maximum thickness** of **2.0 mm** must not be exceeded.




Anterior Region

Premolar region



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Design the restoration to full anatomical contour for the staining technique so that is only requires glazing and, if necessary, characterization after pressing.
**Please note**: The screw cavity must be accessible after pressing. For that purpose, a placeholder (e.g. plastic tube) is inserted into the screw cavity before contouring.



Fully anatomical wax-up made of organic wax on the IPS e.max Abutment. Observe the minimum and maximum layer thicknesses! Seal the screw cavity with a placeholder (e.g. plastic tube).

## Sprueing

Please observe the following procedure to sprue the wax-up:
- Always attach the sprues in the direction of flow of the ceramic and at the thickest part of the wax-up so that smooth flowing of the viscous ceramic during pressing is enabled.
- Carefully remove the placeholder from the screw cavity.
- Loosen the screw and remove the abutment from the model
- Secure the sprued abutment with wax on the selected ring base
- For further notes on sprueing, see pages 21ff.

Important: **Areas not to be pressed over (screw cavity, implant connector) must be free of wax in order not to compromise the accuracy of fit!**

We recommend the following procedure to determine the accurate wax weight:
- Weigh the IPS ring base (seal the opening of the ring base with wax)
- Position the objects to be pressed on the ring base and attach them with wax. Weigh again.
- The wax weight is calculated by deducting the weight of the ring base and the weight of the abutment from the total weight.
- Use the respective number of ingots for the calculated wax weight.





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## Investing

- During investing, make absolutely sure that the screw cavity is entirely filled with investment material so that no ceramic material is pressed into it!
- For further notes on investing, see page 24.



**Preheating, Pressing**
For the processing steps **preheating and pressing**, please refer to the pages 25-28.

## Divesting and removal of the reaction layer

For divesting, please observe the notes on page 29. To divest the pressed over abutment, the following additional notes have to be observed:

- Fine divestment is carried out with polishing beads at 2 bar (30 psi) pressure. Blast the exposed areas of the abutment with particular care.
- As soon as the screw cavity is accessible and the abutment/implant interface is free of investment material, the polishing aid is screwed on for protection.
- The removal of the reaction layer in the IPS e.max Press Invex Liquid is also carried out with the polishing aid screwed into place.





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## Finishing

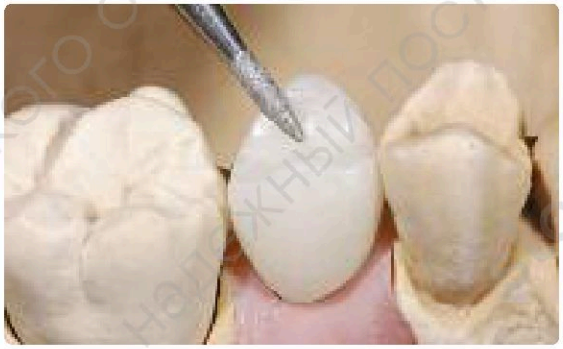
It is of critical importance to use the correct grinding instruments for finishing and adjusting high-strength glass-ceramics. If unsuitable grinding instruments are used, chipping of the edges and local overheating may occur (please observe the Ivoclar Vivadent Flow Chart "Recommended grinding tools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

The following procedure is recommended for finishing pressed-over Straumann Anatomic IPS e.max Abutments:

- The adjustment by grinding of pressed IPS e.max ZirPress restorations is kept to a minimum in the staining technique.
- Separate the sprues with a fine diamond disk under permanent water cooling of the cutting area.
- Overheating of the ceramic must be avoided. Low speed and light pressure is recommended.
- Smooth out the attachment points of the sprue.
- Check the occlusion and articulation and grind in the appropriate adjustments, if necessary.
- Design surface textures.
- To clean the restoration, screw the abutment onto the polishing aid and briefly blast with $Al_2O_3$ at 1 bar (15 psi) pressure and clean with the steam jet. Cover exposed abutment areas with wax!



Use a fine separating disk and continuous water cooling to cut the sprues.



Smooth out the attachment points of the sprue using low speed and light pressure and design a natural surface structure.



Blast the pressed-on IPS e.max ZirPress with Type 1 $Al_2O_3$ at 1 bar (15 psi) pressure with the polishing aid screwed into place.



Before staining and characterization, thoroughly clean the abutment under running water and with a steam jet.



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## Stain and Characterization Firing

Before the Stain and Characterization firing, the restoration must be free of dirt and grease. Any contamination after cleaning must be prevented.

The following procedure is recommended for finishing pressed-over Straumann Anatomic IPS e.max Abutments:

- For better wetting behaviour, the surface of IPS e.max ZirPress may be wetted with a small quantity of IPS e.max Ceram Glaze and Stain Liquid.
- Mix the paste or powder with the IPS e.max Ceram Glaze and Stain Liquids allround or longlife to the desired consistency.
- More intensive shades are achieved by several staining procedures and repeated firing, not by applying thicker layers.
- To imitate the incisal area and translucency in the incisal third, IPS e.max Ceram Shade Incisal may be used.
- The cusps and fissures can be individualized using Essence.
- Conduct the Stain and Characterization firing using the indicated firing parameters.



Coat the surface with a small amount of the IPS e.max Ceram Glaze and Stain Liquid to enhance the wettability of the surface. Apply IPS e.max Ceram Shade Incisal to imitate the incisal area.



Conduct the Stain and Characterization firing on a honey-combed tray using the stipulated firing parameters.



**Firing parameters for the Stain and Characterization firing**

| IPS e.max Ceram on IPS e.max ZirPress | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Stain and Characterization firing | 403/842 | 6:00 | 60/108 | 770/1418 | 1:00-2:00 | 450/842 | 769/1416 | 450/842 |

**Additional Stain and Characterization firing cycles can be conducted with the same firing parameters.**



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## Glaze Firing

Glaze firing is conducted with powder or paste glaze. The following procedure is recommended:

- Mix the glazing material (IPS e.max Ceram Glaze Paste or Powder) with the IPS e.max Ceram Glaze and Stain Liquids all-round or longlife to the desired consistency.
- Apply the glazing material in an evenly covering layer on the restoration in the usual manner.
- If a higher fluorescence is desired in the cervical area, it can be designed with the fluorescing Glaze material (paste or powder).
- If the IPS e.max Ceram Glaze Spray accidentally reached abutment, remove it with a dry short-hair brush before firing. Please observe the Instructions for Use of the IPS e.max Ceram Glaze Spray!
- Conduct the Glaze firing on a honey-combed firing tray using the stipulated firing parameters.
- Remove the restoration from the furnace after completion of the firing cycle (wait for the acoustic signal of the furnace).
- Allow the objects to cool to room temperature in a place protected from draft.
- Do not touch the hot objects with metal tongs.
- If adjustments are required after Glaze firing (e.g. contact points), they may be applied using IPS e.max Ceram Add-On (see page 40).



Apply the Glaze in an even layer.



Conduct the Glaze firing on a honey-combed tray with the stipulated parameters.

### Firing parameters for the Glaze firing

| IPS e.max Ceram on IPS e.max ZirPress | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| Glaze firing | 403/757 | 6:00 | 60/108 | 770/1418 | 1:00–2:00 | 450/842 | 769/1416 | 450/842 |

**If the gloss is unsatisfactory after the first Glaze firing, further Glaze firing procedures may be conducted using the same firing parameters.**





IPS e.max ZirPress on Straumann Anatomic IPS e.max Abutment – fabricated in the staining technique.



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# IPS e.max® ZirPress
## Seating and Follow-Up Care





### Possibilities for Cementation

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

- For the adhesive cementation of IPS e.max ZirPress restorations, Variolink® II, Variolink® Veneer or Multilink® Automix are the ideal composites.
- SpeedCEM is available for the self-adhesive cementation of IPS e.max ZirPress.
- We recommend using the glass ionomer cement Vivaglass® CEM*, for the conventional cementation of IPS e.max ZirPress.

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

#### Short definition of the different cementation methods

- **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 "(overall) strength" of the seated all-ceramic restoration.
- **Self-Adhesive Cementation**
  The cementation material features self-etching properties to the tooth, which is why no additional special conditioning of the tooth surface is necessary. Hence, the adhesion of the restoration is partially achieved by a micromechanical and/or chemical bond. In order to achieve sufficient bonding strength values, retentive preparation is recommended. Self-adhesive cementation does not result in enhanced "(overall) strength" of the seated all-ceramic restoration.
- **Conventional Cementation**
  In the conventional cementation technique, the bond is achieved nearly exclusively through mechanical friction between the cementation material and the restoration as well as between the cementation material and the preparation. In order to obtain the required mechanical friction, a retentive preparation showing a preparation angle of approximately 4–6° is required.

#### Cementation possibilities for the different indications

| | | Adhesive Cementation | Self-Adhesive Cementation | Conventional Cementation |
|---|---|---|---|---|
| IPS e.max ZirCAD/ IPS e.max ZirPress | Veneers | ✓ | | |
| | Inlay-retained bridge | ✓ | | |
| | Anterior and Posterior Crowns | ✓ | ✓ | ✓ |
| | Bridges with/without pressed-on shoulder | ✓ | ✓ | ✓ |



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## Preparing for Cementation

Conditioning of the restoration and preparation depends on the cementation method used as well as the cementation 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 generating a sound bond between the cementation material and the all-ceramic restoration. For the combination of IPS e.max ZirCAD and IPS e.max ZirPress, conditioning must be carried out according to the respective indication.

The following steps must be observed:

- The surface of zirconium oxide-supported restorations may be cleaned with max. 1 bar (15 psi) pressure before cementation.
- High-strength zirconium oxide ceramics are generally not etched with hydrofluoric acid gel (IPS Ceramic Etching Gel), since no etching pattern is produced. In pressed-over inlay-retained bridges – with contact of the glass-ceramic and the tooth structure the pressed-on glass-ceramic must be etched with hydrofluoric acid (IPS Ceramic Etching Gel).
- Thoroughly clean the restoration with water and blow dry.
- For adhesive or self-adhesive cementation, silanize the bonding surface of the restoration using Monobond Plus.

| | IPS e.max ZirCAD / IPS e.max ZirPress | | |
|---|---|---|---|
| **Material** | Zirconium oxide / Nano-fluorapatite glass-ceramic | | |
| **Indication** | **Crowns and bridges w./w.o. pressed shoulder** | | **Inlay-retained bridges** |
| **Cementation method** | adhesive | self-adhesive / conventional * | adhesive |
| **Blasting** | Cleaning with $Al_2O_3$ at max. 1 bar (15 psi) | | — |
| **Etching** | — | | 20 sec with IPS Ceramic Etching Gel |
| **Conditioning/Silanization** | 60 sec with Monobond® Plus | | |
| **Cementation system** | Multilink® Automix | SpeedCEM<br>Vivaglass® CEM | Multilink® Automix |

The range of available products may vary from country to country.
*Do **not** condition with Monobond Plus if conventional cementation is used.

**Please observe the corresponding Instructions for Use.**



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### Conditioning of the preparation

Thoroughly clean the preparation once the temporary has been removed. Before it is conditioned, the restoration is tried-in and the occlusion and articulation checked. If adjustments are required, the restoration may be polished extraorally in these areas before final incorporation.
Conditioning of the restoration and preparation depends on the cementation method used and is carried out according to the respective Instructions for Use.

## Care notes

Same as natural teeth, high-quality IPS e.max ZirPress 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 of 7 (Relative Dentin Abrasion) is a reliable confirmation to use a cleaning paste that is only a little abrasive. Scientific investigations and long-term clinical experience have proved the gentle effect compared with other pastes.










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# IPS e.max® ZirPress

## General Information | Frequently Asked Questions

### Can IPS e.max ZirPress also be pressed on other zirconium oxide frameworks?

*IPS e.max ZirPress can be pressed on zirconium oxide frameworks with a CTE in the range of 10.5–1.0 x $10^{-6}$ $K^{-1}$ (100–500°C).*
*The following zirconium oxide materials were tested:*

- *KaVo – Bio ZS (coloured and uncoloured) and Bio ZH Blanks*
- *Nobel Biocare – Procera Zirconia*
- *DeguDent – Cercon Base*
- *3M/Espe – Lava Frame (coloured and uncoloured)*
- *DCS – DC-Zirkon*
- *Digident – Digizon*
- *Cad.esthetics – Denzir*
- *Vita – In-Ceram 2000 YZ Cubes (coloured and uncoloured)*
- *Diatomic – Diadem/Diazir (coloured and uncoloured)*
- *Wieland – Zeno Zr Disc*

### What are the requirements placed on zirconium oxide ceramics so that IPS e.max ZirPress may be pressed on?



*IPS e.max ZirPress can be pressed on zirconium oxide abutments with a CTE in the range of 10.5–1.0 x $10^{-6}$ $K^{-1}$ (100–500 °C), e.g. Straumann Anatomic IPS e.max Abutment. It must be made sure that the abutment is not designed too small in order to ensure adequate support of the tooth shape and cusps (the instructions of the manufacturer must be observed). The layer thickness of IPS e.max ZirPress of 0.7–2.0 mm must be observed.*

### Can IPS e.max ZirPress also be used to fabricate single crowns without zirconium oxide coping?

*IPS e.max ZirPress has been developed for the press-on technique. The strength of the ingots is not sufficient for crowns without zirconium oxide copings. Therefore, the ingots cannot be used for this indication.*

### Can IPS e.max ZirPress also be pressed onto only a part of a restoration (e.g. on a shoulder or pontic)?

*IPS e.max ZirPress can be pressed onto selected parts of the restoration, if the specifications in the Instructions for Use, the necessary minimum thickness of the ceramics, and the following points are observed. The sprues must be attached directly, for example, to the ceramic shoulder. During sprueing and placement on the IPS Ring Base, adequate stability of the restoration and the wax-up areas must be ensured. Only carefully blast the non-pressed areas (exposed ZirLiner) with $Al_2O_3$ in order to avoid removal of the ZirLiner. Wash firing has to be carried out, even if ceramics are only pressed onto certain areas of the restoration to improve wetting.*

### What alternative is there to a wax-up?



*An IPS AcrylCAD acrylate polymer block that fires without leaving residue can be used instead of modelling wax. An anatomically shaped component is created with the inLab® System (Sirona) and waxed onto the zirconium oxide framework.*

### Can IPS e.max ZirPress also be used to fabricate veneers?

*IPS e.max ZirPress has been developed for pressing onto zirconium oxide and the shades have been adjusted for this purpose. However, from a technical point of view, veneers can be fabricated. For example, if veneers are required in the anterior region for a large restorative case and if the shade of the IPS e.max ZirPress ingot corresponds to the demands of the patient, veneers can be pressed (in the same investment ring). The cut-back technique allow the veneers to be individually characterized with IPS e.max Ceram.*
*Veneers made with IPS e.max ZirPress must be placed with the adhesive technique.*



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### Can IPS e.max ZirPress also be pressed onto inlay-retained bridge frameworks?

*IPS e.max ZirPress HT ingots can be pressed onto zirconium oxide inlay-retained bridges. In the creation of the zirconium oxide framework, the minimum thickness of the connectors and the inlays (min. 0.5 mm) must be observed. All the areas at the preparation margins should be fabricated with IPS e.max ZirPress rather than zirconium oxide ceramic, since the press ceramic can be etched. This allows a sound bond between the press ceramic, the luting composite and the prepared tooth.*

### Can IPS e.max ZirPress also be pressed onto the IPS Empress CosmoPost root canal post?

*IPS e.max ZirPress ingots can be pressed onto IPS Empress CosmoPost root canal posts. An excellent bond is achieved. Because of the large selection of IPS e.max ZirPress ingots, very natural-looking restorations can be fabricated.*

### Can IPS e.max ZirPress be pressed onto glass-ceramic frameworks made of IPS e.max Press or IPS e.max CAD, for example?

*IPS e.max ZirPress can only be pressed onto zirconium oxide materials. The press temperature of 900–910 °C (1652–1670 °F) is too high for glass-ceramic frameworks. Consequently, they would become deformed during the press procedure.*

### What is the purpose of the IPS e.max Ceram ZirLiner?

*IPS e.max Ceram ZirLiners are translucent. Their three major purposes are as follows:*

1. *They enable a strong, homogeneous bond between the zirconium oxide framework and IPS e.max ZirPress.*
2. *They provide the white, unshaded zirconium oxide frameworks with chroma and in-depth effect and a shaded character without increasing their opacity.*
3. *They also provide the non-fluorescent zirconium oxide framework with a natural fluorescence, thus enabling the fabrication of lifelike restorations.*

### Which IPS e.max ZirLiner should be used on shaded zirconium oxide frameworks?

*For shaded zirconium oxide frameworks, use the IPS e.max ZirLiner clear. The transparent character of the IPS e.max Ceram ZirLiner does not affect the framework shade. An outstanding bond as well as lifelike fluorescence is achieved.*

### Can IPS e.max ZirPress be pressed onto zirconium oxide frameworks without the application of IPS e.max ZirLiner?

*A suitably shaded IPS e.max Ceram ZirLiner must always be applied before waxing up. The IPS e.max Ceram ZirLiner generates an outstanding bond and gives the restoration an effect of depth.*

### Why is the IPS e.max Ceram ZirLiner powder green and how should it be applied?

Since zirconium oxide is white and, therefore, shows a poor contrast to tooth-coloured and/or white powders, the IPS e.max Ceram ZirLiner was given an identification colour to render its application more simple and efficient. The IPS e.max Ceram ZirLiner consists of a very fine powder and appears somewhat thick due to the dense packing of the grains. Make sure that the material is applied in an even, greenish coat. If the colour appears too pale, the layer is too thin. After firing, the ZirLiner should exhibit a layer thickness of approx. 0.1 mm.

### How thick should be wax-up be?

*The wax-up should be at least 0.7 mm thick all over. If the wax-up is not at least this thick, the restoration may not be completely covered with the pressed ceramic and deviations in the shade may occur.*



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### Why are the IPS e.max ZirPress ingots available in different levels of translucency?

*The user may select the suitable ingot depending of the desired processing technique. The HT ingot is particularly suitable for the staining technique, the LT ingot for the cut-back technique and the MO ingot for the layering technique.*

### Can IPS Empress Universal Shades, Stains and Glaze be used for IPS e.max ZirPress?

*IPS Empress Universal Shades, Stains and Glaze were specially developed for and coordinated with the IPS Empress System and are therefore* ***not*** *suitable for IPS e.max products.*

### Can IPS Alox plungers also be used for IPS Empress?

*IPS Alox plungers have been exclusively designed for the IPS Investment Ring System. Since the diameter was increased, the IPS Alox plunger does not fit into the IPS Empress investment ring system.*

### Can the IPS Alox Plunger Separator also be used for other pressed ceramics, such as IPS Empress Esthetic?

*The IPS Alox Plunger Separator can only be used for IPS e.max Press and IPS e.max ZirPress ingots, since the press temperature of the IPS Empress Esthetic ingots of 1075 °C (1967 °F) is too high and results in the Separator losing its effect.*

### Can press furnaces other than the ones from Ivoclar Vivadent be used to press IPS e.max ZirPress ingots?

*IPS e.max ZirPress has been especially coordinated with Ivoclar Vivadent press furnaces (e.g. Programat EP3000, EP5000). If other press furnaces are used, the parameters may have to be adjusted accordingly by the user.*

### Can IPS e.max ZirPress restorations also be conventionally cemented?

*IPS e.max ZirPress restorations can be cemented adhesively, self-adhesively or conventionally, depending on the indication. For conventional and/or self-adhesive cementation, 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 cementaion. It is not advisable to use classical phosphate cements, as they would negatively influence the light transmission of the all-ceramic and therefore compromise the esthetic appearance of all-ceramic restorations. Pressed-over inlay-retained bridges and veneers must be placed with the adhesive technique.*



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# IPS e.max ZirPress on IPS e.max ZirCAD MO (unshaded block)

## Staining technique – Crowns and bridges of IPS e.max ZirCAD MO 0 (unshaded) / IPS e.max ZirPress

| Bleach, A-D | | BL1 | BL2 | BL3 | BL4 | A1 | A2 | A3 | A3.5 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 | D2 | D3 | D4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| alterna-tively | IPS e.max Ceram ZirLiner | ZL clear | | | | ZL 1 | | ZL 2 | | ZL 4 | ZL 1 | | ZL 3 | | ZL 1 | ZL 4 | | | | | |
| | IPS e.max ZirCAD Colouring Liquid** + IPS e.max ZirLiner clear | | | | | CL 1 + ZL clear | | CL 2 + ZL clear | | CL 4 + ZL clear | CL 1 + ZL clear | | CL 3 + ZL clear | | CL 1 + ZL clear | CL 4 + ZL clear | | | | | |
| IPS e.max Ceram Intensive ZirLiner | | yellow, orange, brown, incisal | | | | | | | | | | | | | | | | | | | |
| IPS e.max ZirPress HT | | BL1 | BL2 | BL3 | BL4 | A1 | A2 | A3 | A3.5 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 | D2 | D3 | D4 |
| IPS e.max Ceram Shades | | SH 0 | | | | SH 1 | | | | | SH 2 | | | | SH 3 | | | | SH 4 | | |
| IPS e.max Ceram Shades Incisal | | SH I1 | | | | SH I1 | | | SH I2 | | SH I1 | | | | SH I2 | | | | | | |

## Cut-back, layering technique – Crowns and bridges of IPS e.max ZirCAD MO 0 (unshaded) / IPS e.max ZirPress

| Bleach, A-D | | BL1 | BL2 | BL3 | BL4 | A1 | A2 | A3 | A3.5 | A4* | B1 | B2 | B3 | B4* | C1* | C2 | C3* | C4* | D2* | D3 | D4* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| alterna-tively | IPS e.max Ceram ZirLiner | ZL clear | | | | ZL 1 | | ZL 2 | | ZL 4 | ZL 1 | | ZL 3 | | ZL 1 | ZL 4 | | | | | |
| | IPS e.max ZirCAD Colouring Liquid** + IPS e.max ZirLiner clear | | | | | CL 1 + ZL clear | | CL 2 + ZL clear | | CL 4 + ZL clear | CL 1 + ZL clear | | CL 3 + ZL clear | | CL 1 + ZL clear | CL 4 + ZL clear | | | | | |
| IPS e.max Ceram Intensive ZirLiner | | yellow, orange, brown, incisal | | | | | | | | | | | | | | | | | | | |
| IPS e.max ZirPress LT, MO | | BL1 | BL3 | BL3 | BL4 | A1 | A2 | A3 | A3.5 | A4* | B1 | B2 | B3 | B4* | C1* | C2 | C3* | C4* | D2* | D3 | D4* |
| IPS e.max Ceram Dentin | | D BL1 | D BL2 | D BL3 | D BL4 | D A1 | D A2 | D A3 | D A3.5 | D A4 | D B1 | D B2 | D B3 | D B4 | D C1 | D C2 | D C3 | D C4 | D D2 | D D3 | D D4 |
| IPS e.max Ceram Transpa Incisal | | I BL | | | | TI 1 | | TI 2 | | TI 3 | TI 1 | | | TI 2 | TI 1 | TI 3 | | | | | |

* Shades are not available for IPS e.max ZirPress MO
** IPS e.max ZirCAD Colouring Liquids are not available in North America



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# IPS e.max ZirPress on IPS e.max ZirCAD MO 1 and MO 2 (pre-shaded blocks)

Crowns and bridges of IPS e.max ZirCAD MO 1, MO 2 (pre-shaded) / IPS e.max ZirPress

| Bleach, A-D | 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 1 | | MO 2 | MO 2 | | MO 1 | | | | MO 1 | | | | | | |
| IPS e.max Ceram ZirLiner | clear | | | | | | | | | | | | | | | | | | | |
| IPS e.max Ceram Intensive ZirLiner | yellow, orange, brown, incisal | | | | | | | | | | | | | | | | | | | |
| IPS e.max ZirPress HT | | | | | A1 | A2 | A3 | A3.5 | | B1 | B2 | | | C1 | | | | | | |
| IPS e.max Ceram Shades | | | | | SH 1 | | | | | SH 2 | | | | SH 3 | | | | | | |
| IPS e.max Ceram Shades Incisal | | | | | SH I1 | | | SH I2 | | SH I1 | | | | SH I2 | | | | | | |

Cut-back, layering technique – Crowns and bridges of IPS e.max ZirCAD MO 1, MO 2 (pre-shaded) / IPS e.max ZirPress

| Bleach, A-D | 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 1 | | MO 2 | MO 2 | | MO 1 | | | | | | | | | | |
| IPS e.max Ceram ZirLiner | clear | | | | | | | | | | | | | | | | | | | |
| IPS e.max Ceram Intensive ZirLiner | yellow, orange, brown, incisal | | | | | | | | | | | | | | | | | | | |
| IPS e.max ZirPress LT, MO | | | | | A1 | A2 | A3 | A3.5 | | B1 | B2 | | | C1 | | | | | | |
| IPS e.max Ceram Dentin | | | | | D A1 | D A2 | D A3 | D A3.5 | | D B1 | D B2 | D B3 | | D C1 | | | | | | |
| IPS e.max Ceram Transpa Incisal | | | | | TI 1 | | TI 2 | | | TI 3 | | | | TI 1 | | | | | | |

* Please observe the procedure on page 71.



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# Press and Firing Parameters

## Press Parameters for IPS e.max ZirPress

Take the press furnace and the selected investment ring size into account

| Press Furnace | IPS Investment Ring System | B °C/°F | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | A |
|---|---|---|---|---|---|---|---|---|
| EP 500 | 100 g | 700/1292 | 60/108 | 900/1652 | 15 | 500/932 | 900/1652 | Programm 11–20 |
| | 200 g | 700/1292 | 60/108 | 910/1670 | 15 | 500/932 | 910/1670 | Programm 11–20 |
| | 300 g | 700/1292 | 60/108 | 940/1724 | 40 | 500/932 | 940/1724 | Programm 31–51 |
| EP 600/ EP600 Combi | 100 g | 700/1292 | 60/108 | 900/1652 | 15 | 500/932 | 900/1652 | 300 |
| | 200 g | 700/1292 | 60/108 | 910/1670 | 15 | 500/932 | 910/1670 | 300 |
| | 300 g | 700/1292 | 60/108 | 930/1706 | 40 | 500/932 | 930/1706 | 250 µm/min |

Programat EP 3000



Select the press program in accordance with the investment ring size used.



Programat EP 5000



Select the press program in accordance with the investment ring size used.

Note:

Starting with software version V3.3, the IPF (Intelligent Press Function) is available for IPS e.max ZirPress. With this function, the pressing times in the IPS Investment Ring System 300 g can be substantially shortened.



The parameters indicated represent standard values and apply to the Ivoclar Vivadent furnaces EP 3000 and EP 5000. The temperatures indicated also apply to older model furnaces. However, the temperatures may deviate by approx. ± 10 °C/18 °F depending on the age of the heating muffle.
If a non-Ivoclar Vivadent furnace is used, temperature corrections may be necessary.
Regional differences in the power supply or the operation of several electronic devices by means of the same circuit may also render adjustments of the temperatures necessary.



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## Firing Parameters for IPS e.max ZirPress

- Use a honey-combed tray and the corresponding pins for firing.
- Ceramic pins must not be used, since they may fuse to the restoration.
- The processing temperatures must be observed. An increase in the firing temperature results in severe vitrification between the framework and the veneering ceramic, which may lead to cracks later. An descrease in the firing temperature causes the ceramic to be underfired and very brittle, which may lead to delamination.
- The parameters stipulated in the Instructions for Use are coordinated with Ivoclar Vivadent furnaces (tolerance range +/- 10°C/18°F).
- If a non-Ivoclar Vivadent furnace is used, temperature corrections may be necessary.
- Remove IPS e.max ZirPress objects from the furnace after completion of the firing cycle (wait for the acoustic signal of the furnace).
- Allow the objects to cool to room temperature in a place protected from draft.
- Do not touch the hot objects with metal tongs.
- Do not blast or quench the objects.





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

| IPS e.max Ceram on IPS e.max ZirPress *Staining Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C |
|---|---|---|---|---|---|---|---|---|
| ZirLiner firing – before wax-up and pressing | 403/757 | 4:00 | 40/72 | 960/1760 | 1:00 | 450/842 | 959/1758 | 0 |
| Stain and Characterization Firing | 403/757 | 6:00 | 60/108 | 770/1418 | 1:00-2:00 | 450/842 | 769/1416 | 450/842 |
| Glaze Firing | 403/757 | 6:00 | 60/108 | 770/1418 | 1:00-2:00 | 450/842 | 769/1416 | 450/842 |
| Add-On after Glaze Firing | 403/757 | 6:00 | 50/90 | 700/1292 | 1:00 | 450/842 | 699/1290 | 450/842 |





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

| IPS e.max Ceram on IPS e.max ZirPress *Cut-Back and Layering Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| ZirLiner firing – before wax-up and pressing | 403/757 | 4:00 | 40/72 | 960/1760 | 1:00 | 450/842 | 959/1758 | 0 |
| Wash firing (foundation) | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 0 |
| Wash firing (foundation) characterization | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 0 |
| 1st Dentin / Incisal firing | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 0 |
| 2nd Dentin / Incisal firing | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 0 |
| Stain Firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |
| Glaze Firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |
| Add-On with Glaze Firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |
| Add-On after Glaze Firing | 403/757 | 6:00 | 50/90 | 700/1292 | 1:00 | 450/842 | 699/1290 | 450/842 |



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## IPS e.max Ceram on IPS e.max ZirPress/ZirCAD (Gingiva Technique)

| IPS e.max Ceram on IPS e.max ZirPress *Gingiva Technique* | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| ZirLiner firing – before wax-up and pressing | 403/757 | 4:00 | 40/72 | 960/1760 | 1:00 | 450/842 | 959/1658 | 0 |
| Wash firing (foundation) | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 450/842 |
| Wash firing (foundation) characterization | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 450/842 |
| 1st Dentin / Incisal firing | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 450/842 |
| 2nd Dentin / Incisal firing | 403/757 | 4:00 | 40/72 | 750/1382 | 1:00 | 450/842 | 749/1380 | 450/842 |
| Stain Firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |
| Glaze Firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |
| Add-On with Glaze Firing | 403/757 | 6:00 | 60/108 | 725/1337 | 1:00 | 450/842 | 724/1335 | 450/842 |
| Add-On after Glaze Firing | 403/757 | 6:00 | 50/90 | 700/1292 | 1:00 | 450/842 | 699/1290 | 450/842 |



## IPS e.max Ceram on IPS e.max ZirPress/Straumann® Anatomic IPS e.max® Abutment (Staining Technique)

| IPS e.max Ceram on Straumann® Anatomic IPS e.max® Abutment | B °C/°F | S min. | t↗ °C/°F/min | T °C/°F | H min. | $V_1$ °C/°F | $V_2$ °C/°F | L °C/°F |
|---|---|---|---|---|---|---|---|---|
| ZirLiner firing – before wax-up and pressing | 403/757 | 4:00 | 40/72 | 960/1760 | 1:00 | 450/842 | 959/1758 | 0 |
| Stain and Characterization Firing | 403/757 | 6:00 | 60/108 | 770/1418 | 1:00-2:00 | 450/842 | 769/1416 | 450/842 |
| Glaze Firing | 403/757 | 6:00 | 60/108 | 770/1418 | 1:00-2:00 | 450/842 | 769/1416 | 450/842 |
| Add-On after Glaze Firing | 403/757 | 6:00 | 50/90 | 700/1292 | 1:00 | 450/842 | 699/1290 | 450/842 |



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