IPS e.max® Press

Monolithic Solutions

Instructions for Use

CE 0123

ivoclar vivadent® technical

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IPS e.max® System

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

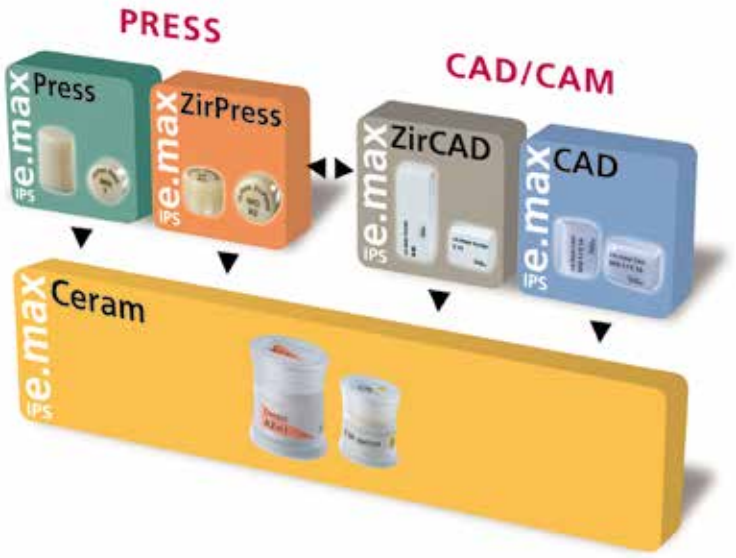
IPS e.max delivers high-strength and highly esthetic materials for the Press and the CAD/CAM technologies. The system consists of innovative lithium disilicate glass-ceramics for smaller restorations and high-strength zirconium oxide for large-span bridges.

The requirements and aims of every case differ. IPS e.max meets these requirements because you obtain exactly what you need thanks to the system components.

– For the **Press technique**, a highly esthetic **IPS e.max Press lithium disilicate glass-ceramic** is available, and for the quick and efficient press-on technique on zirconium oxide, the **fluorapatite glass-ceramic ingot IPS e.max ZirPress** is available.

– For the **CAD/CAM technology, the innovative lithium disilicate block IPS e.max CAD** or the high-strength **zirconium oxide IPS e.max ZirCAD** is used, depending on the case requirements.

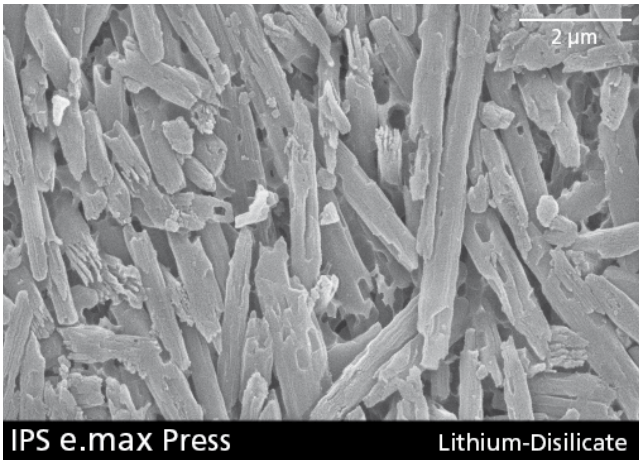
– The **nano-fluorapatite layering ceramic IPS e.max Ceram**, which is used to characterize and/or veneer all IPS e.max components – glass or oxide ceramics – complements the IPS e.max System.



IPS e.max® Press
Product Information

Material

IPS e.max Press are lithium disilicate glass-ceramic ingots for the Press technology. The industrial production process creates absolutely homogeneous ingots in different translucency levels. They demonstrate a strength of 400 MPa. The ingots are pressed to restorations with outstanding accuracy of fit in Ivoclar Vivadent press furnaces. The pressed, tooth-coloured, highly esthetic restorations are stained and/or veneered with IPS e.max Ceram and glazed.



CTE (100–500°C) [10^{-6}/K]	10.5
Flexural strength (biaxial) [MPa]*	400
Fracture toughness [MPa m0.5]	2.75
Chem. solubility [µg/cm²]*	40

* according to ISO 6872

Typical measuring values
Classification: ceramic materials Type 2 / Class 3

Uses

Indications
- Occlusal veneers (table tops)
- Thin veneers
- Veneers
- Inlays
- Onlays
- Partial crowns
- Crowns in the anterior and posterior region
- 3-unit bridges in the anterior region
- 3-unit bridges in the premolar region up to the second premolar as the terminal abutment
- Crown or splinted crown on top of an implant abutment
- 3 unit bridge up to the second premolar placed on top of an implant abutment

IPS e.max Press Abutment Solutions
- Hybrid abutments for single-tooth restorations
- Hybrid abutment crowns for restorations

Note: The fabrication of these IPS e.max Press Abutment Solutions is described in separate Instructions for Use.

Contraindications
- Posterior bridges reaching into the molar region
- 4- and more-unit bridges
- Inlay-retained bridges
- Very deep subgingival preparations
- Patients with severely reduced residual dentition
- Bruxism
- Cantilever bridges / extension units
- Maryland bridges
- Failure to observe the necessary minimum connector dimensions and layer thicknesses
- Any other use not listed in the indications
- Temporary incorporation of IPS e.max Press restorations

Important processing restrictions
Failure to observe the following restrictions may compromise the results achieved with IPS e.max Press:
- The necessary preparation requirements must be observed.
- No extension units
- Layering with a veneering ceramic other than IPS e.max Ceram
- Pressing of several IPS e.max Press ingots in one investment ring
- Pressing of IPS e.max Press in the IPS Investment Ring System 300 g

Side effects
If patients are known to be allergic to any of the components in the materials, IPS e.max Press restorations should not be used.

Composition

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

– **IPS e.max Press ingots**
  Components: SiO_2
  Additional components: Li_2O, K_2O, MgO, ZnO, Al_2O_3, 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: Polymethacrylate, 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

– **IPS Object Fix Flow**
  Components: Oxides, water, thickening agent

– **IPS Ceramic Etching Gel**
  Components: Hydrofluoric acid (approx. 5%)

Warnings

– Do not inhale ceramic dust during finishing – use exhaust air discharge and a face mask.
– IPS Ceramic Etching Gel contains hydrofluoric acid. Contact with skin, eyes and clothing must be prevented at all costs, since the material is extremely toxic and corrosive. The etching gel is intended for professional use only and must not be applied intraorally (inside the mouth).

Scientific data

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

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

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

Ingot concept

IPS e.max Press ingots are offered as **polychromatic Multi ingots** in one size and as **monochromatic ingots** in **five levels of translucency** and in **two sizes**.
From a processing point of view, basically all restorations can be fabricated of any ingot. For reasons of esthetics and the dental-lab protocol, however, the following processing techniques and indications are recommended for the individual ingots (polychromatic, monochromatic, translucency levels):

Translucency	Processing technique			Indications										
	Staining technique	Manual veneering												
		Cut-back technique	Layering technique	Occlusal veneer*	Thin veneer*	Veneer	Inlay	Onlay	Partial crown	Anterior crown	Posterior crown	3-unit bridge [1]	Hybrid abutment	Hybrid abutment crown
														
Multi	✓	✓				✓				✓	✓			✓
HT **H**igh **T**ranslucency	✓	✓		✓	✓	✓	✓	✓	✓					
MT **M**edium **T**ranslucency	✓	✓		✓	✓	✓			✓	✓	✓	✓		
LT **L**ow **T**ranslucency	✓	✓				✓			✓	✓	✓	✓		✓
MO **M**edium **O**pacity			✓							✓	✓	✓	✓	
HO **H**igh **O**pacity			✓							✓	✓	✓		
I **I**mpulse	✓	✓		✓	✓	✓								

* The cut-back technique must not be used for the fabrication of thin veneers and occlusal veneers.
[1] Only up to the second premolar as the distal abutment

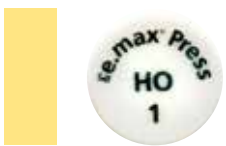
IPS e.max Press Multi (polychromatic ingot)
The Multi ingots are available in **Bleach BL** and **A–D** shades. The ingots are used for the fabrication of highly esthetic veneers, anterior and posterior crowns as well as hybrid abutment crowns with a lifelike shade gradation from the dentin to the incisal. The ingots are ideally suitable for processing in the "staining technique".

IPS e.max Press HT (High Translucency)
The HT ingots are available in **Bleach BL** and **A–D** shades. Given their high translucency, which is similar to that of natural enamel, they are ideally suitable for the fabrication of smaller restorations (e.g. inlays and onlays). Restorations made of HT ingots convince users with their true-to-nature chameleon effect and the exceptional adaptation to the residual tooth structure. HT ingots are particularly suitable for the "staining technique", but also for the "cut-back technique".

IPS e.max Press MT* (Medium Translucency)
The MT ingots are available in selected **Bleach BL** and **A–D** shades and demonstrate medium translucency. The MT ingots are used for restorations that require more brightness than HT restorations and more translucency than LT restorations. Restorations made of MT ingots are ideally suitable for the "staining technique", but also for the "cut-back technique".

IPS e.max Press LT (Low Translucency)
The LT ingots are available in **Bleach BL** and **A–D** shades. Given their low translucency, which is similar to that of natural dentin, they are ideally suitable for the fabrication of larger restorations (e.g. posterior crowns). Restorations made of LT ingots convince users with their lifelike brightness value and chroma. This prevents the incorporated restorations from greying. LT ingots are ideally suitable for processing in the "cut-back technique", but they can also be used in the "staining technique".

IPS e.max Press MO (Medium Opacity)
The MO ingots are available in **group shades MO 0 – MO 4**. Given their opacity, they are ideally suitable for the fabrication of frameworks on slightly discoloured preparations. The anatomical shape is subsequently individually supplemented using IPS e.max Ceram.



IPS e.max Press HO (High Opacity)
The ingots are available in **group shades HO 0 – HO 2**. Given their high opacity, they are ideally suitable for the fabrication of frameworks on severely discoloured preparations. The anatomical shape is subsequently individually supplemented using IPS e.max Ceram.

IPS e.max Press Impulse
The Impulse ingots enable the fabrication of restorations with pronounced opalescent properties. The **opalescent ingots** are available in **two versions with different brightness values (Opal 1, Opal 2)**. The ingots are suitable for veneers in light tooth shades, for which an opalescent effect is needed.

*Product extension: IPS e.max Press MT will be available shortly.

The entire IPS e.max delivery program can be found at www.ivoclarvivadent.com.

Ingot sizes

In general, IPS e.max Press ingots are available in three different sizes. The monochromatic ingots (HT, MT, LT, MO, HO and Impulse) are available as small ingots and "L" ingots. The polychromatic IPS e.max Press Multi ingot is only available in one ingot size.

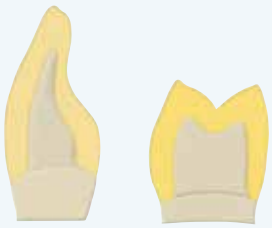
Please note:
Only one ingot per investment ring may be used for pressing. Therefore, the ingot size suitable for the respective wax weight must be selected for pressing.

Polychromatic

Monochromatic

Processing techniques

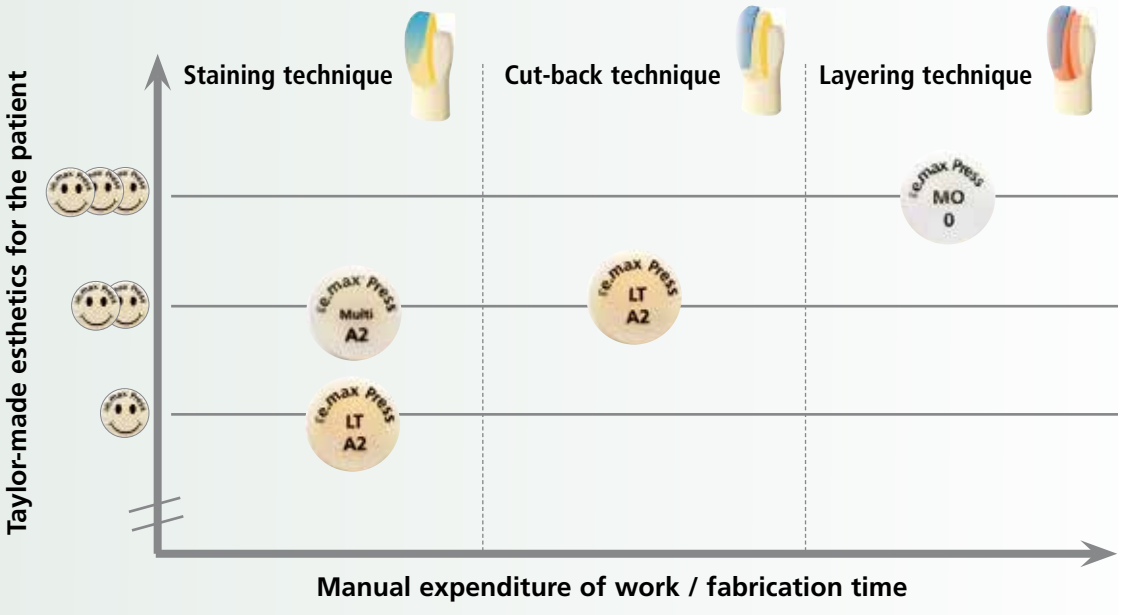
Staining technique
In the staining technique, the full-contour wax-up is invested and subsequently pressed. The restoration is completed with the help of the Stain and Glaze firing.
The use of translucent IPS e.max Press ingots enables the fabrication of very esthetic restorations on only slightly or non-discoloured preparations with minimum effort.



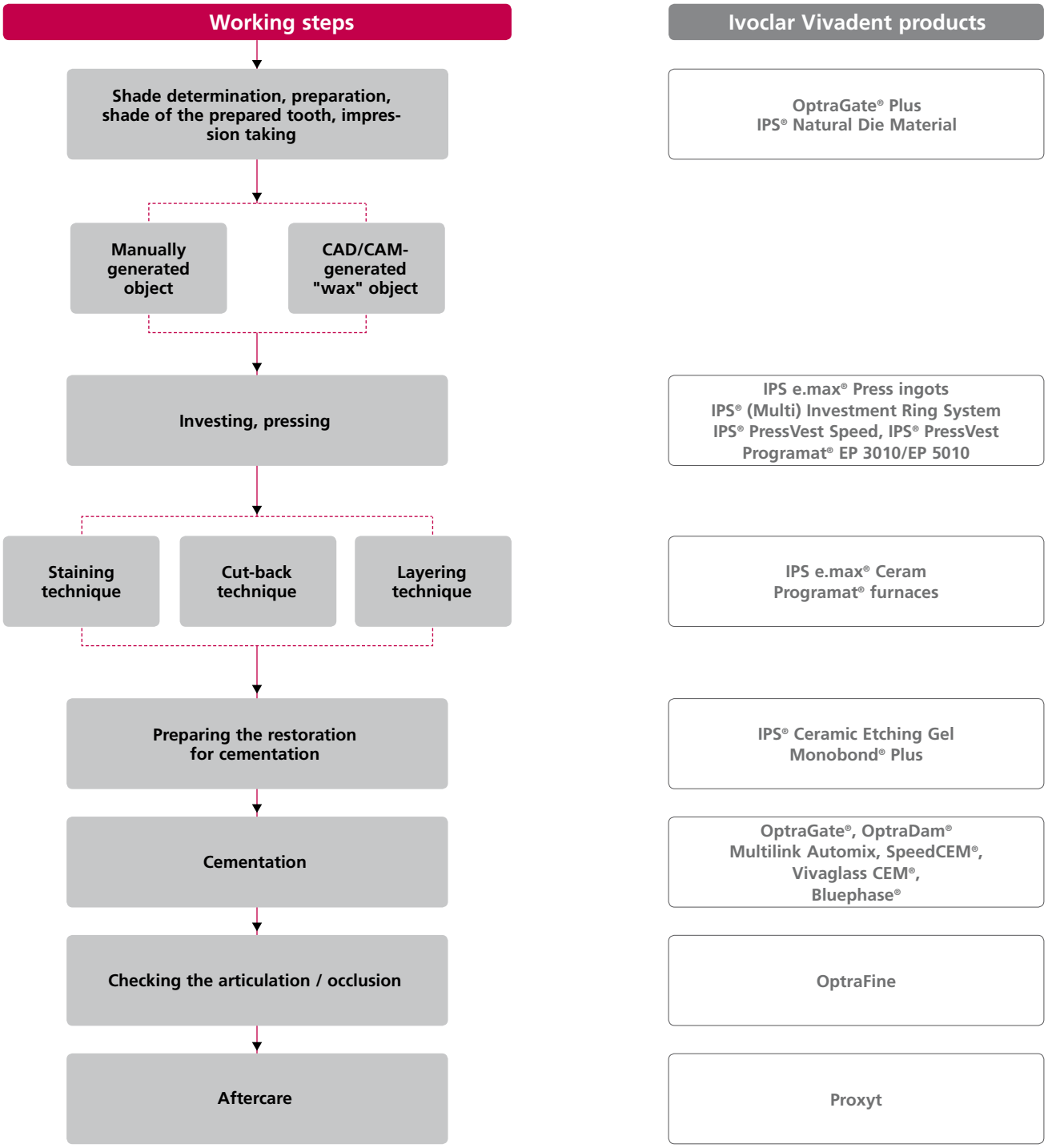
Cut-back technique
In the cut-back technique, the wax-up is reduced in the incisal / occlusal area, invested and subsequently pressed. The reduced, waxed-up restoration is completed with the IPS e.max Ceram layering ceramic. Finally, Stain and Glaze firing is conducted.

Layering technique
In the layering technique, a tooth-shaped supporting framework wax-up is invested and subsequently pressed. The restoration is completed by supplementing the anatomical shape with IPS e.max Ceram layering ceramic. Finally, Stain and Glaze firing is conducted.

Esthetics vs. expenditure of work when using different ingots / processing techniques
(Example: anterior crown)



Overview of the fabrication process



IPS e.max® Press

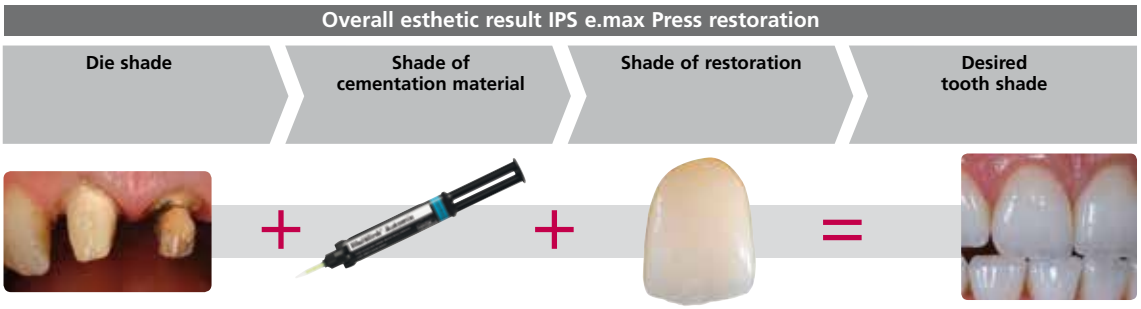
Clinical Steps, Model Preparation, Contouring

Shade determination – tooth shade, preparation shade

Optimum integration in the patient's oral cavity is 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 prepared tooth** (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. Therefore, 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 subsequently communicates it to the laboratory, may the desired esthetics be achieved in a targeted fashion.



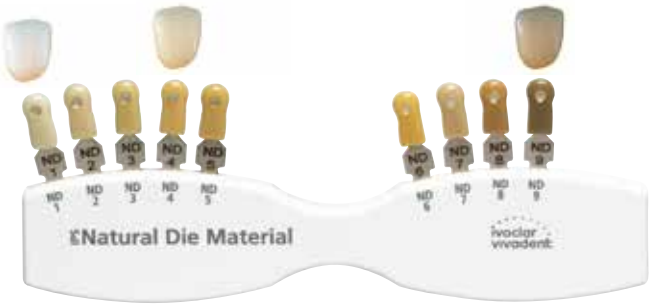
Shade determination of the natural tooth

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.

Shade determination of the prepared tooth

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.

Example of the preparation shade effect
Crown made of IPS e.max Press HT B1 on different preparation shades.

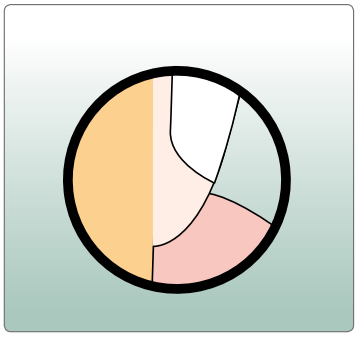


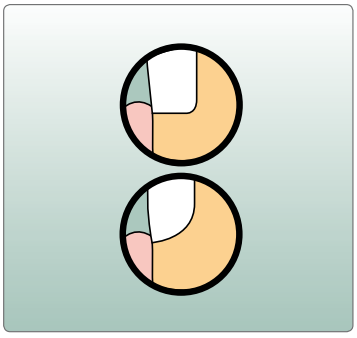
Preparation guidelines

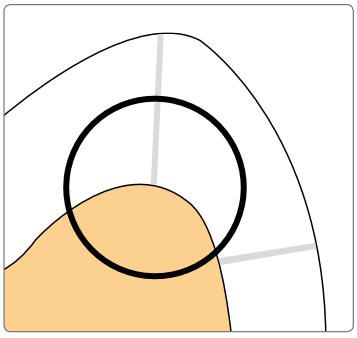
Successful results can only be achieved with IPS e.max Press if the guidelines and minimum layer thicknesses are strictly observed.

Basic preparation guidelines for all-ceramic restorations

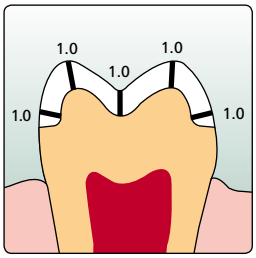
– No angles or edges
– Shoulder preparation with rounded inner edges and/or chamfer preparation
– The indicated dimensions reflect the minimum thickness for IPS e.max Press restorations.





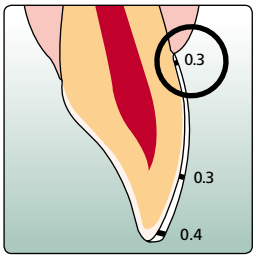


Occlusal veneer (table top)



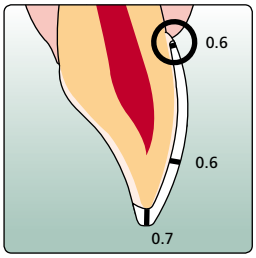
– Reduce the anatomical shape and observe the stipulated minimum thicknesses.
– Prepare a circular shoulder with rounded inner edges or a chamfer at a degree of approximately 10°–30°. Width of the circular shoulder / chamfer at least 1.0 mm.
– Reduce the incisal crown third – in the occlusal area – by approx. 1.0 mm.

Thin veneer



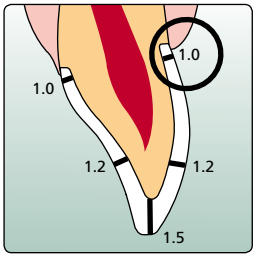
– If possible, locate the preparation in the enamel.
– Do not locate the incisal preparation margins in the area of the abrasion surfaces or dynamic occlusal surfaces.
– The minimum layer thickness of the thin veneer in the cervical and labial area is 0.3 mm. Plan a restoration thickness of 0.4 mm at the incisal edge.
– **If there is enough space, preparation is not necessary**.

Veneer



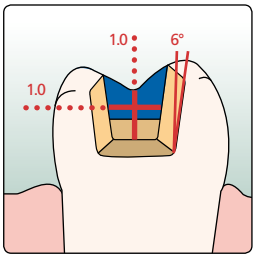
– If possible, do not locate the preparation in the enamel.
– Do not locate the incisal preparation margins in the area of the abrasion surfaces or dynamic occlusal surfaces.
– Reduce the cervical and/or labial area by 0.6 mm, and the incisal edge by at least 0.7 mm

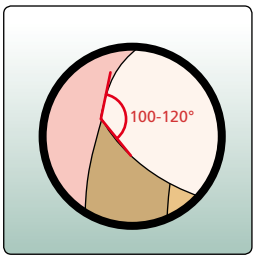
Anterior crown



– Reduce the anatomical shape and observe the stipulated minimum thicknesses. Prepare a circular shoulder with rounded inner edges or a chamfer at an angle of approximately 10°– 30°. Width of the circular shoulder/chamfer at least 1.0 mm.
– Reduce the incisal crown third – in the incisal area – by approx. 1.5 mm.
– Reduce the vestibular and/or oral area by approx. 1.2 mm.
– For conventional and/or self-adhesive cementation, the preparation must demonstrate retentive surfaces and sufficient preparation height.

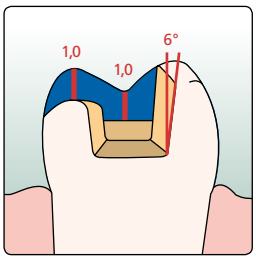
Inlay





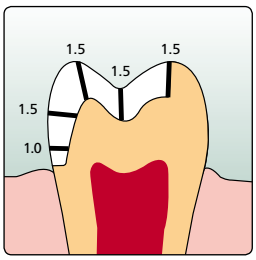
– Take static and dynamic antagonist contacts into consideration.
– Do not locate the preparation margins on centric antagonist contacts.
– Observe a preparation depth of at least 1.0 mm and an isthmus width of at least 1.0 mm in the fissure area.
– Prepare the proximal box with slightly diverging walls and observe an angle of 100°–120° between the proximal cavity walls and the prospective proximal inlay surfaces. For inlays with pronounced convex proximal cavity walls without adequate support by the proximal shoulder, avoid marginal ridge contacts.
– Round out internal edges in order to prevent stress concentration within the ceramic material.
– Do not prepare slice-cuts or feather edges.

Onlay



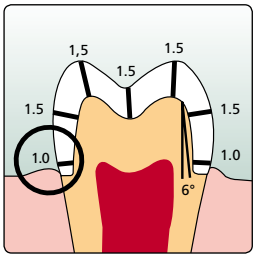
– Take static and dynamic antagonist contacts into consideration.
– Do not locate the preparation margins on centric antagonist contacts.
– Observe a preparation depth of at least 1.0 mm and an isthmus width of at least 1.0 mm in the fissure area.
– Prepare the proximal box with slightly diverging walls and observe an angle of 100°–120° between the proximal cavity walls and the prospective proximal onlay surfaces. For onlays with pronounced convex proximal cavity walls without adequate support by the proximal shoulder, avoid marginal ridge contacts.
– Round out internal edges in order to prevent stress concentration within the ceramic material.
– Do not prepare slice-cuts or feather edges.
– Provide at least 1.0 mm of space in the cusp areas.

Partial crown



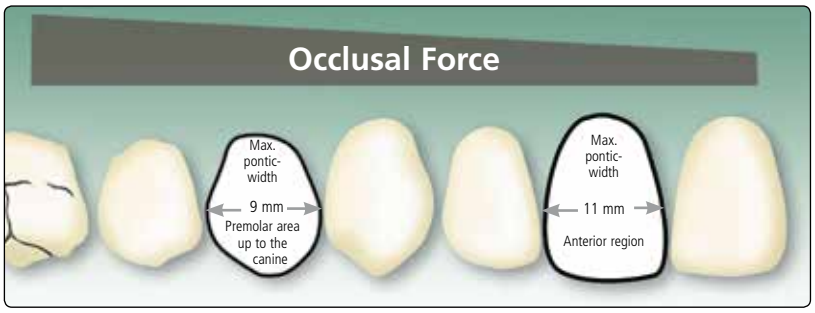
– Take static and dynamic antagonist contacts into consideration.
– Do not locate the preparation margins on centric antagonist contacts.
– Provide at least 1.5 mm of space in the cusp areas.
– Prepare a circular shoulder with rounded inner edges or a chamfer at an angle of approximately 20°– 30°. Width of the shoulder/chamfer at least 1.0 mm.

Posterior crown



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

3-unit bridge



Given the different masticatory forces, the maximum acceptable pontic width is different in the anterior and posterior region.
The pontic width is determined on the unprepared tooth.
– In the anterior region (up to the canine), the pontic width should not exceed 11 mm.
– In the premolar region (canine up to the second premolar), the pontic width should not exceed 9 mm.

Model preparation

Fabricate a working model with removable segments as usual. It is advisable to apply a sealer to harden the surface and to protect the stone die. The sealer must not cause volume changes to the stone die. Subsequently, apply a spacer. Please be aware of the fact that the expansion of the Ivoclar Vivadent investment materials is coordinated with the following procedure.

– For **thin veneers**, **veneers**, **occlusal veneers (table tops)**, **partial crowns** as well as **single crowns**, the spacer is applied in two layers up to max. 1 mm to the preparation margin (spacer application 9–11 µm).
– For inlays and onlays, the spacer is applied in up to 3 layers and up to the preparation margin.
– Also apply two layers for bridge reconstructions. Apply an additional layer at the intercoronal surfaces of the abutments (towards the pontic). This measure helps prevent undesired friction.
– For restorations on abutments, the procedure corresponds with that on natural preparations.

Marking the application / number of spacer layers to be applied:

single application double application triple application

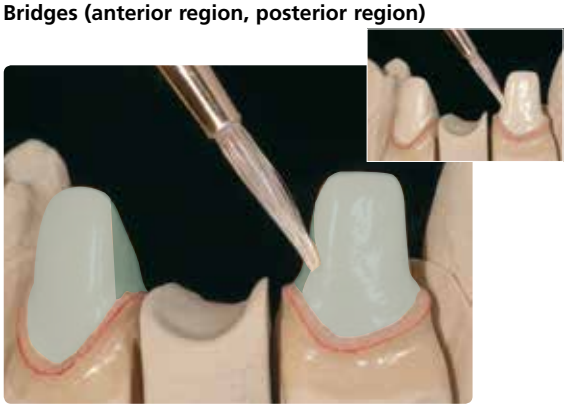
Thin veneer, veneer

Two layers of spacer are applied up to max. 1 mm to the preparation margin.

Partial crown, single crown (anterior tooth, posterior tooth)

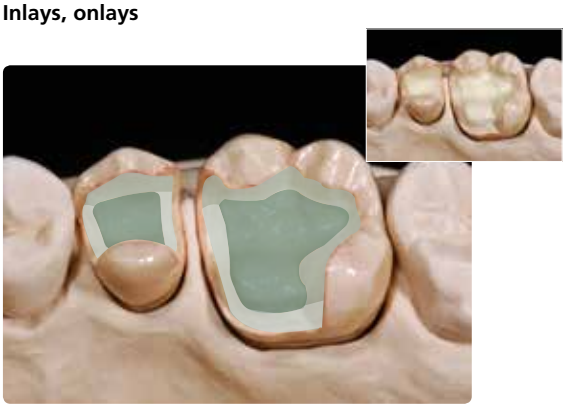
Two layers of spacer are applied up to max. 1 mm to the preparation margin.

Bridges (anterior region, posterior region)



Two layers are applied up to 1 mm to the preparation margin and a third layer is applied on the intercoronal surfaces.

Inlays, onlays



For inlays and onlays, the spacer is applied in up to 3 layers.

Layer thicknesses

The following minimum **layer thicknesses** for the **staining**, **cut-back** and **layering technique** have to be observed to match the tooth colour of the shade guide and to fulfil the requirements of the **preparation guidelines** (pages 13–15).

Note: When using the IPS e.max Press Multi ingot, the minimum wall thickness should be at least 1.0 mm so that the course of the layering (dentin / incisal) is visible in the restoration.

Staining technique

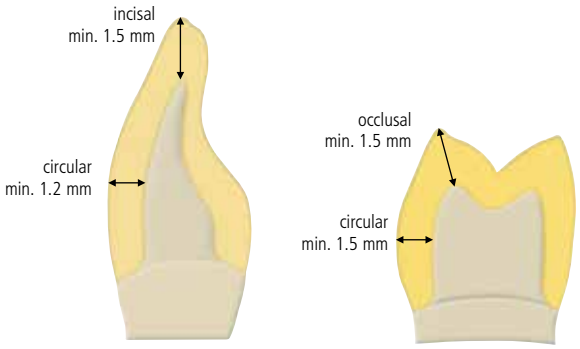
In the staining technique, no layering materials are applied on the IPS e.max Press restoration. The minimum thicknesses thus refer to the layering thickness of IPS e.max Press.

Minimum layer thicknesses of the pressed object in the staining technique (depending on the indication)

		Occlusal veneer	Thin veneer	Veneer	Inlay	Onlay	Partial crown	Crowns		Bridges	
								Anterior tooth	Posterior tooth	Anterior region	Premolar region
 Minimum thickness IPS e.max Press ***staining technique***	circular	1.0	0.3–0.6		1.0 isthmus width	1.0 isthmus width	1.5	1. 2	1.5	1. 2	1.5
	incisal / occlusal	1.0	0.4–0.7		1.0 fissure area	1.0 fissure area	1.5	1.5	1.5	1.5	1.5
	connector dimensions	–	–	–	–	–	–	–	–	16 mm²	16 mm²

Dimensions in mm

Example:
Minimum layer thicknesses for anterior and posterior crowns in the staining technique



Cut-back and layering technique

In the cut-back technique or the layering technique, a reduced tooth shape-supporting framework is pressed, which is subsequently supplemented to the full tooth shape by means of IPS e.max Ceram. When designing the restoration, the following guidelines regarding the IPS e.max Press framework and the IPS e.max Ceram veneer have to be observed:

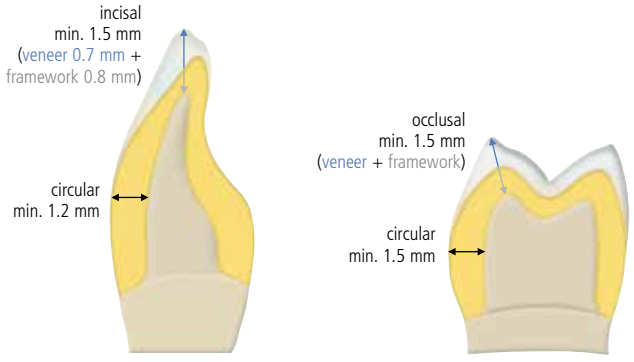
- **In strongly prepared teeth with veneered or partially veneered restorations, the available excess space must be compensated by the corresponding dimensions of the high-strength IPS e.max Press component and not by the IPS e.max Ceram layering material**.
- If possible, the connector design should be extended in the vertical direction rather than in the horizontal direction. Especially in anterior bridges, it is not always possible to establish the necessary connector dimensions in the sagittal (lingo-vestibular) direction. In such cases, the connector dimensions must always be extended in the vertical (incisal-cervical) direction.

Minimum thicknesses of the IPS e.max Press framework in the cut-back and layering technique (depending on the indication)

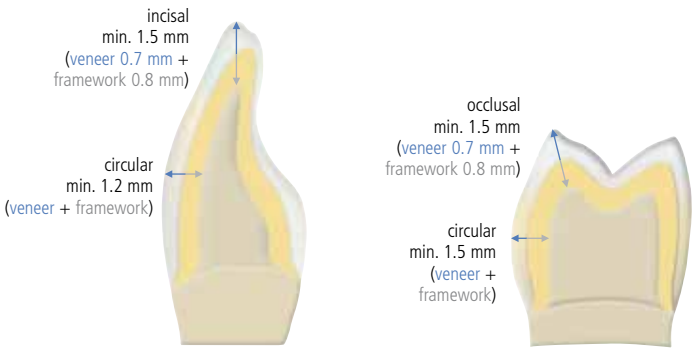
		Occlusal veneer	Thin veneer	Veneer	Inlay	Onlay	Partial crown	Crowns		Bridges	
								Anterior tooth	Posterior tooth	Anterior region	Premolar region
 Minimum thickness IPS e.max Press ***cut-back technique*** (after reduction)	circular	–	–	0.6	–	–	1.5	1.2	1.5	1.2	1.5
	incisal / occlusal	–	–	0.4	–	–	0.8	0.4	0.8	0.8	0.8
 Minimum thickness IPS e.max Press ***layering technique*** (after reduction)	circular	–	–	–	–	–	–	0.6	0.8	0.8	0.8
	incisal / occlusal	–	–	–	–	–	–	0.6	0.8	0.8	0.8
	design type	–	–	–	–	–	–	supporting the tooth shape lingual / palatal fully anatomic design			
	connector dimensions	–	–	–	–	–	–	–	–	16 mm²	16 mm²

Dimensions in mm

Example:
Minimum layer thicknesses for anterior and posterior crowns in the cut-back technique



Example:
Minimum layer thicknesses for anterior and posterior crowns in the layering technique



The pressed material is the high-strength component of the restoration and must, therefore, always make up at least 50% of the total layer thickness of the restoration. The overall thickness of the restoration (depending on the indication) is derived as follows:

Overall thickness of the restoration	**0.8**	**1.0**	**1. 2**	**1.5**	**1.8**	**2.0**	**2.5**	**3.0**
Minimum **framework thickness** IPS e.max Press	0.4	0.5	0.6	0.8	1.0	1.1	1.3	1.6
Maximum layer thickness of the **veneer** with IPS e.max Ceram	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.2**	**1.4**

Dimensions in mm

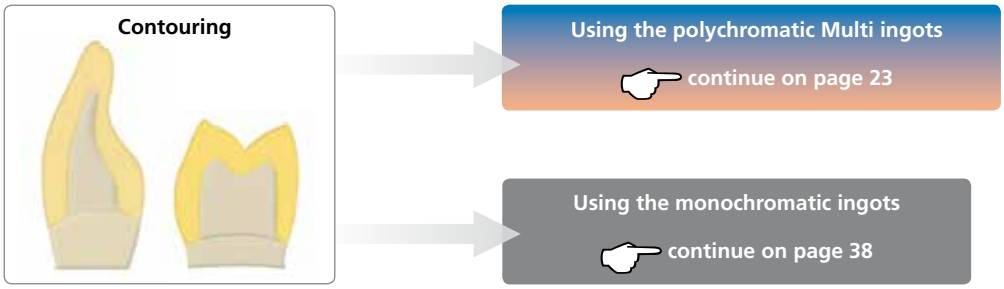
Contouring

After the fabrication of the model with detachable segments and the preparation of the dies, the restoration is contoured. Use only organic waxes for contouring, since they fire without leaving residue. Contour the restoration in accordance with the desired processing technique (staining, cut-back or layering technique).
Please observe the following general notes for contouring:

- Observe the stipulated minimum layer thicknesses and connector dimensions of the respective indication and processing technique.
- 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, 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 increased surface dimensions.

1. Contouring for the staining technique

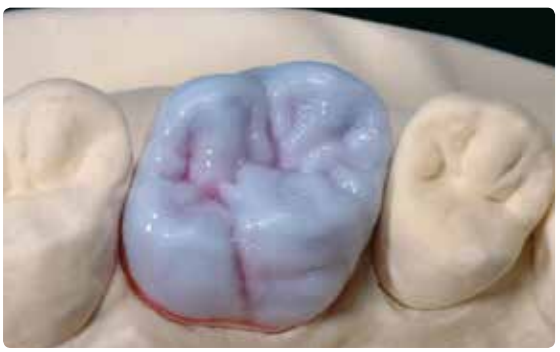
Design the restoration to full anatomical contour so that it only requires characterization and glazing after pressing. The further procedure depends on the choice of ingot.




Full-contour anterior mandibular crown

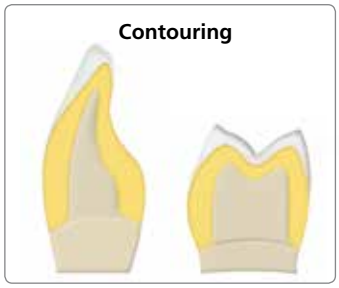

Full-contour anterior maxillary crown


Full-contour inlay and onlay


Full-contour posterior crown

2. Contouring for the (wax) 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. In this way, the cut-back technique enables the fabrication of highly esthetic restorations in a very efficient manner.



Next working step
continue on page 58

Fully anatomical wax-up. To better check the layer thickness, the use of a basic wax of another colour is recommended.

The following points should be observed for the reduction of the wax-up:
- Reduce the wax-up in the incisal third.
- Do not design extreme mamelons (points and edges).
- Check the cut-back with a silicone key.
- Observe the minimum thicknesses (pressed material, layering material).

A silicone key is fabricated for the fully anatomical restoration.

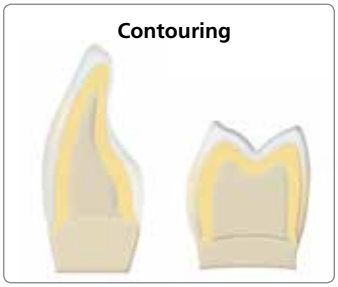
The wax-up is reduced in the incisal third.

Designing extreme contours in mamelons should be avoided.

Reduction of the oral surfaces is not required.

3. Contouring for the layering technique

Design the frameworks in accordance with the available space.
The design must support the shape and the cusps in order to ensure even layer thickness of the veneering ceramic.



Next working step

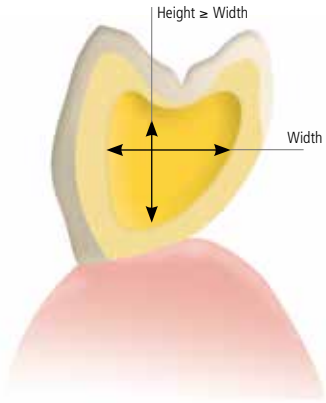
continue on page 65

Single crowns

The wax-up must always support the shape and cusps. The minimum thicknesses must always be observed.

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

Basically, the following applies: Height ≥ Width



The wax-up must always support the shape and cusps. The minimum framework thicknesses must be observed. The palatal / lingual area of the framework is given a fully anatomical design.

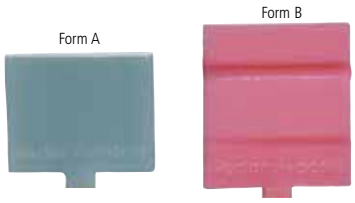
IPS e.max® Press Multi
Using Polychromatic Ingots

IPS e.max Press Multi provides the possibility to fabricate monolithic, polychromatic restorations in an efficient way. The newly developed and patented processing technique with special wax-up method enables the "transfer" of the shade gradation of the ingot to the restoration.

This chapter will describe the processing technique of the IPS e.max Press Multi from the available wax-up to the pressed object.

To process the IPS e.max Press Multi, the respective processing accessories as well as the special press program of the Ivoclar Vivadent Programat® furnaces are to be used.

IPS Multi Wax Pattern Form A and Form B
Prefabricated precision wax patterns for sprueing the wax-up to the IPS Multi Investment Ring Base 200 g.
The special shape of the IPS Multi Wax Pattern is decisive for the correct press procedure of the IPS e.max Press Multi. Form A or Form B is used depending on the restoration.



IPS Multi Investment Ring Base 200 g
Investment ring base for the processing of IPS e.max Press Multi.
To complete the investment ring, the IPS Ring Gauge 200 g and the IPS Silicone Ring 200 g are used.

IPS Multi Sprue Guide 200 g
The IPS Multi Sprue Guide 200 g helps to check the correct sprueing of the objects to be pressed on the IPS Multi Investment Ring Base 200 g.

IPS Multi One-Way-Plunger 200 g
Special one-way plunger, which is used in addition to the IPS Alox plunger for pressing the IPS e.max Press Multi.

Press program for Programat® EP 3000/5000, EP 3010/5010
A specifically developed press program has to be used to press IPS e.max Press Multi.
A corresponding software update that contains the "IPS e.max Press Multi program" is available for the Programat press furnaces.
More information on the software update can be found at www.ivoclarvivadent.com.

Sprueing

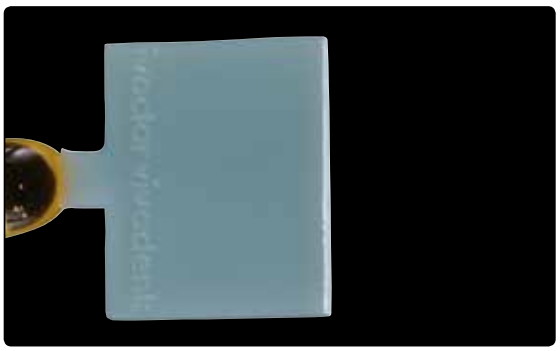
In contrast to the procedure for pressing monochromatic ingots, the waxed-up objects are laterally sprued on the investment ring base. Please observe the following procedure for sprueing the wax-up:

– Select the suitable IPS Multi Wax Pattern depending on the restoration:
  • **IPS Multi Wax Pattern Form A (green)** = for larger restorations, such as maxillary anterior crowns, premolar crowns, molar crowns as well as hybrid abutment crowns
  • **IPS Multi Wax Pattern Form B (pink)** = for delicate restorations, such as mandibular anterior crowns

– Leave the waxed-up restoration on the model die while sprueing to avoid damaging the restoration margins.
– **Important:** In principle, do not alter the geometry of the IPS Multi Wax Pattern by removing or adding wax.
– Apply a small drop of (soft) positioning wax on the side of the IPS Multi Wax Pattern.
– Align the IPS Multi Wax Pattern with its small, conical side towards the occlusal and/or incisal area and press against the wax-up. The Wax Pattern can be secured in the mesial or distal area of the restoration. Observe the following guidelines for further alignment of the IPS Multi Wax Pattern with the wax-up.
  – Align the wax-up vertically with the centre of the IPS Multi Wax Pattern.
  – Align the longitudinal axes of the waxed-up restoration and the IPS Multi Wax Pattern in such a way that they are parallel.
  – Align the sprueing of anteriors and premolars with the labial or buccal surface so that the shade gradation in the visible area is optimal.
  – To achieve a true-to-nature shade gradation for molar crowns, place the sprue on the mesio-buccal surface.
  – Use the pink IPS Multi Wax Pattern Form B for delicate restorations and align it with the labial or buccal surface so that the inflowing ceramic does not impact the die directly.

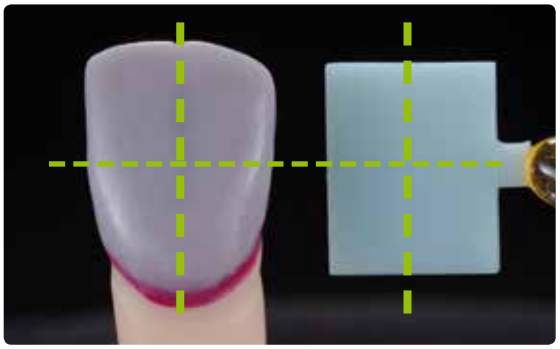
– After aligning the IPS Multi Wax Pattern, close the gap to the wax-up with a little modelling wax in such a way that no "thickened" area results. Attention must be paid to the restoration margin so as not to damage it.
– **Important:** Give the basal transition between the IPS Multi Wax Pattern and the wax-up a rounded design so that no sharp investment material edges are produced during investment. The sharp edges may break when the ceramic flows into the wax-up.

Basic notes on sprueing

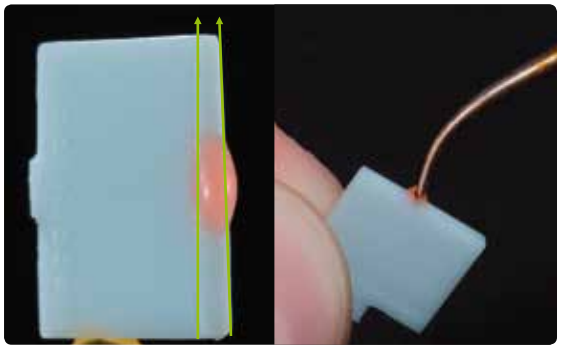


Use the IPS Multi Wax Pattern Form A for veneers, anterior and posterior crowns as well as for hybrid abutment crowns.

Use the IPS Multi Wax Pattern Form B for delicate crowns on very narrow preparations, e.g. mandibular anterior crowns.



Align the wax-up vertically with the centre of the IPS Multi Wax Pattern, irrespective of its size and type. Align the longitudinal axes of the wax-up and the IPS Multi Wax Pattern in such a way that they are parallel.

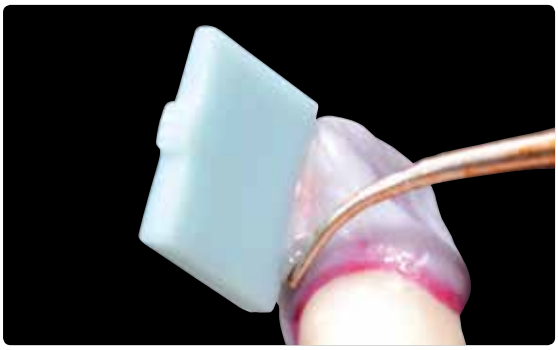


Align the IPS Multi Wax Pattern with its more narrow, conical side with the occlusal and/or incisal area. Apply a small drop of (soft) positioning wax on the side of the IPS Multi Wax Pattern.

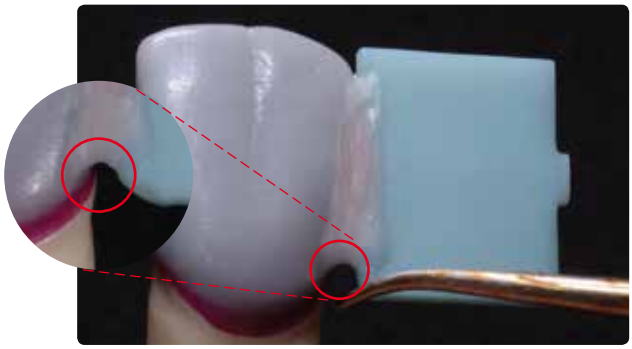
Sprueing may basically be performed from mesial or distal. Apply a small drop of (soft) positioning wax to the side of the IPS Multi Wax Pattern. Press the waxed-up restoration slightly against the soft wax.

Align the IPS Multi Wax Pattern with the labial surface in such a way that the inflowing ceramic does not impact the die directly.

After aligning the IPS Multi Wax Pattern, close the gap to the wax-up with a little modelling wax in such a way that no "thickened" area results.

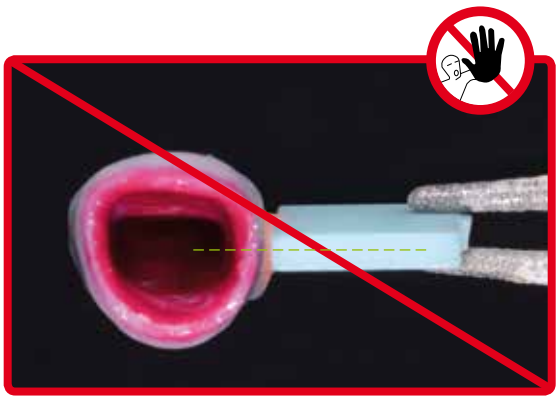


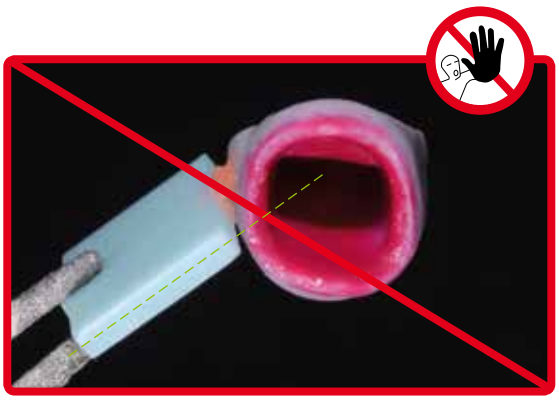
Attention must be paid to the restoration margin so as not to damage it.



Important note: Give the basal transition between the IPS Multi Wax Pattern and the wax-up a rounded design so that no sharp investment material edges are produced during investment. The sharp edges may break off when the ceramic flows into the wax-up.

Close the gap between the IPS Multi Wax Pattern and the wax-up with a little modelling wax in such a way that no "thickened" area results. In exceptional cases, this area of the Wax Pattern may be rounded out.





Do not place the IPS Multi Wax Pattern in such a way that the imagined extension points directly to the die.

Sprueing an anterior tooth

Attach the **IPS Multi Wax Pattern Form A** with its tapered side towards the incisal as an "extension" of the labial surface of the wax-up. Pay attention to the crown margin.

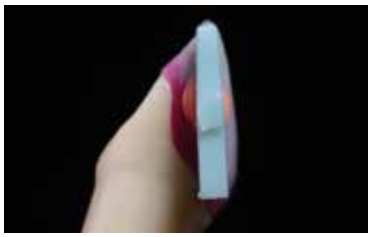
Close the gap between the IPS Multi Wax Pattern and the wax-up with a little modelling wax in such a way that no "thickened" area results. If necessary, round out the basal corner of the Wax Pattern.

Sprueing an anterior tooth with a "delicate die"

Attach the **IPS Multi Wax Pattern Form B** with its tapered side towards the incisal as an "extension" of the labial surface of the wax-up. Pay attention to the crown margin.

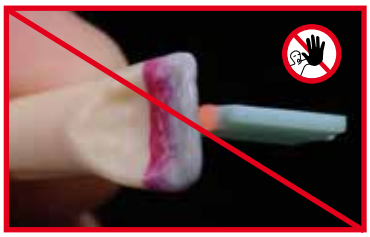
Close the gap between the IPS Multi Wax Pattern and the wax-up with a little modelling wax in such a way that no "thickened" area results.

Sprueing a veneer



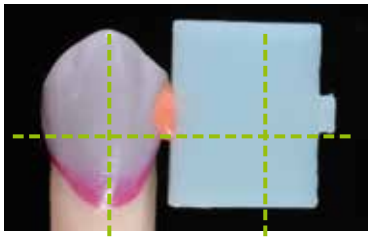
Attach the **IPS Multi Wax Pattern Form A** with its tapered side towards the incisal as an "extension" of the labial surface of the wax-up. Pay attention to the preparation margin.

Close the gap between the IPS Multi Wax Pattern and the wax-up with a little modelling wax in such a way that no "thickened" area results.



Do not sprue the veneer from the labial side.

Sprueing a premolar

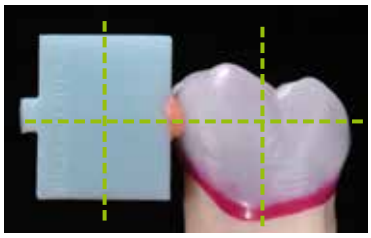


Align the wax-up vertically with the centre of the **IPS Multi Wax Pattern Form A**. Align the longitudinal axes of the waxed-up restoration and the IPS Multi Wax Pattern in such a way that they are parallel.

Attach the IPS Multi Wax Pattern to the proximal area from mesial in alignment with the labial surface.

Close the gap between the IPS Multi Wax Pattern and the wax-up with a little modelling wax in such a way that no "thickened" area results. In exceptional cases, this area of the Wax Pattern may be rounded out.

Sprueing a molar

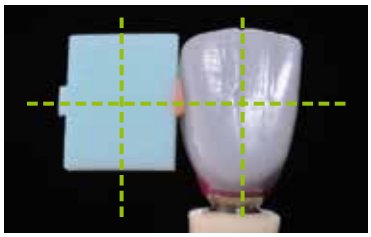


Attach the **IPS Multi Wax Pattern Form A** vertically to the centre of the crown. The narrower side of the Wax Pattern points toward the occlusal.

To achieve a lifelike shade gradation of the buccal surface, attach the IPS Multi Wax Pattern Form A to the mesio-buccal side.

Close the gap between the IPS Multi Wax Pattern and the wax-up with a little modelling wax in such a way that no "thickened" area results. If necessary, round out the basal corner of the Wax Pattern.

Sprueing a hybrid abutment crown



Attach the **IPS Multi Wax Pattern Form A** vertically to the centre of the crown. The narrower side of the Wax Pattern points toward the occlusal.

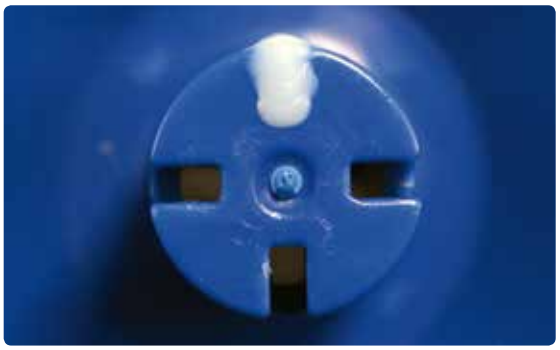
To achieve a lifelike shade gradation of the buccal or labial surface, attach the IPS Multi Wax Pattern Form A to the vestibular side.

Close the gap between the IPS Multi Wax Pattern and the wax-up with a little modelling wax in such a way that no "thickened" area results. If necessary, round out the basal corner of the Wax Pattern.

Preparing for investment

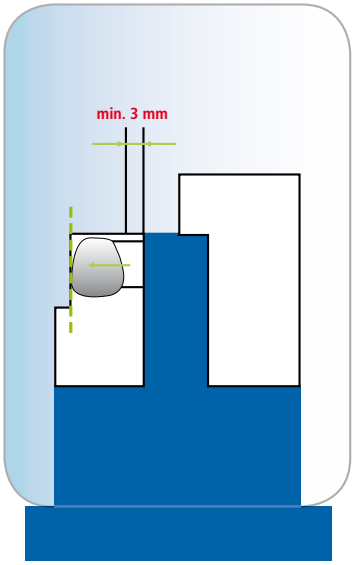
The IPS Multi Investment Ring Base 200 g must be used for investment. Please observe the following notes when attaching the sprued wax-up to the IPS Multi Investment Ring Base 200 g with wax:

- Seal the unused openings in the investment ring base with excessive amount of wax. If too little wax is used, difficulties (cracks) may develop when removing the investment ring base from the set investment material.
- Determine the weight of the IPS Multi Investment Ring Base and note it down.
- Apply a small drop of (soft) positioning wax into the openings of the investment ring base to be used.
- Insert the IPS Multi Wax Pattern with the sprued wax-up in the opening of the investment ring base. The incisal edge and/or occlusal surface of the waxed-up restoration must face the investment ring base.
- Check the position of the sprueing using the IPS Multi Sprue Guide 200 g. The wax-up must be located within the marked area. With large wax objects, it may be necessary to shorten the IPS Multi Wax Pattern. **The length of the IPS Multi Wax Pattern between the wax-up and the IPS Multi Investment Ring Base must be at least 3 mm.**
- **Note:** Restorations with a width of more than 12 mm cannot be positioned in the defined area and can therefore not be pressed using the IPS e.max Press Multi.
- Close the gap between the IPS Multi Wax Pattern and the IPS Multi Investment Ring Base with a little wax to prevent the investment material to flow into the gap.
- Weigh the loaded IPS Multi Investment Ring Base again and calculate the wax weight from the difference between the empty and the loaded investment ring base.
- **The maximum wax weight is 1.0 g**.

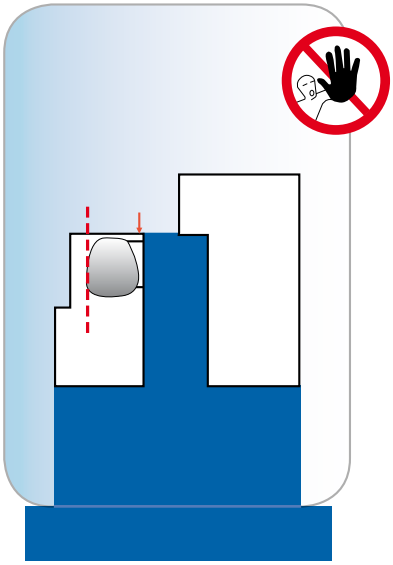


Seal the unused openings in the investment ring base with excessive amount of wax.

Insert the IPS Multi Wax Pattern with the sprued wax-up in the opening of the investment ring base. The incisal edge and/or occlusal surface of the wax-up must face the investment ring base.



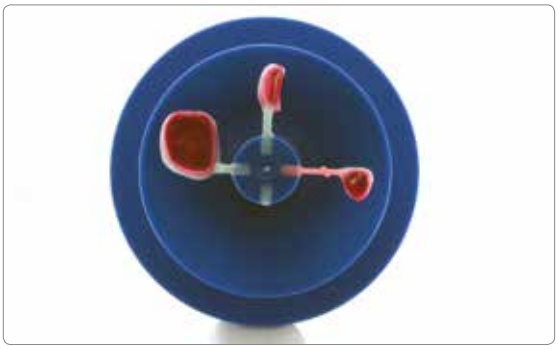
Correct positioning
Align the wax-up with the help of the IPS Multi Sprue Guide 200 g. The length of the IPS Multi Wax Pattern between the wax-up and the IPS Multi Investment Ring Base must be at least 3 mm. Check this with a 3-mm wax wire, for example.



Incorrect positioning
The wax-up is positioned too close to the investment ring base.

Attach the wax-up to the IPS Multi Investment Ring Base 200 g using the IPS Multi Wax Pattern. Check the correct positioning with the IPS Sprue Guide 200 g.

Close the gap between the IPS Multi Wax Pattern and the IPS Multi Investment Ring Base with a little wax in such a way that no "thickened" area results.



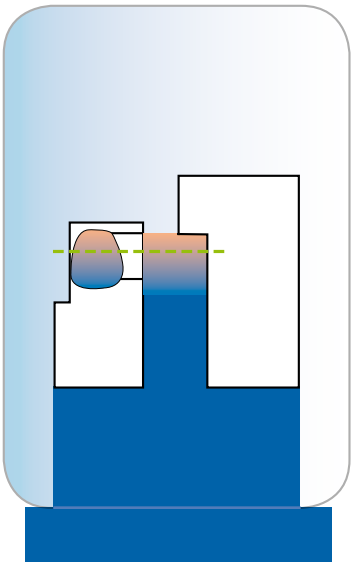
Prepared investment ring base with sprued wax-up and sealed, unused opening.

Optional

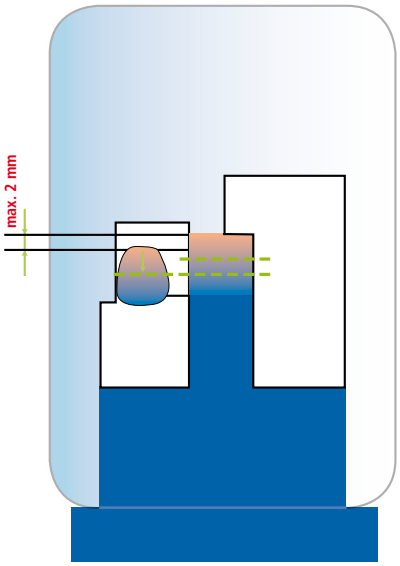
Shifting the sprueing at the investment ring base to increase the incisal area

By shifting the waxed-up restoration connected to the IPS Multi Wax Pattern along the IPS Multi Investment Ring Base, the incisal proportion of the pressed restoration can be increased.

The "more incisal" procedure is explained below using diagrams:



Neutral position



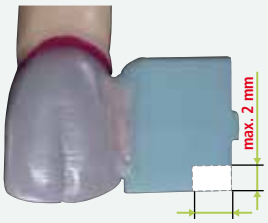
"More incisal"

Neutral position – Course of the incisal / dentin area according to the A-D material shade guide

- Secure the waxed-up restoration with wax at the centre of the IPS Multi Wax Pattern.
- Slide the IPS Multi Wax Pattern into the opening of the IPS Multi Investment Ring Base and secure it with wax.

Restorations with increased incisal proportion

- Secure the waxed-up restoration with wax at the centre of the IPS Multi Wax Pattern.
- Shift the IPS Multi Wax Pattern downward along the IPS Multi Investment Ring Base towards the investment ring base. **Maximum shift: 2 mm**.
- The IPS Multi Wax Pattern has to be cut to size according to the shift.



- Seal the openings in the IPS Investment Ring Base above the IPS Multi Wax Pattern with wax.

Note: If all the restorations are shifted, the acceptable wax weight is *reduced*.

Shift [mm]	Max. wax weight [g]
0	1.0
0.5	0.95
1.0	0.9
1.5	0.85
2.0	0.8

Investing

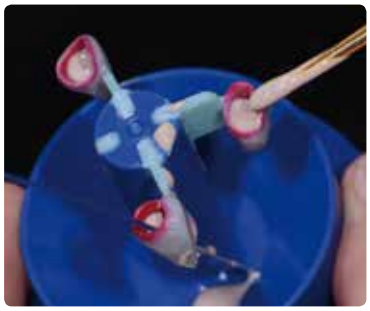
Investing is carried out with either IPS PressVEST (conventional) or IPS PressVEST Speed. The corresponding IPS Silicone Ring 200 g with the matching IPS Ring Gauge 200 g, together with the IPS Multi Investment Ring Base 200 g are used for investment. For further details on the processing of the investment materials, please refer to page 40ff.

Given the position of the waxed-up restoration secured to the investment ring base, there is a risk of air being trapped in the occlusal surface as well as in the screw channel of hybrid abutment crowns. Please observe the following procedure:

– Before mounting the IPS Silicone Ring 200 g, carefully apply a little investment material on the occlusal surface and/or the screw channel using a brush.
– Use a suitable instrument for the fine investment of the cavity (e.g. brush). Make sure that the delicate wax margins are not damaged.
– Carefully place the IPS Silicone Ring 200 g on the IPS Multi Investment Ring Base. Make sure that the ring is flush with the investment ring base
– Pour the investment material slowly into the investment ring so that the material can continuously fill the investment ring.
– Fill the investment ring up to the marking and position the IPS Ring Gauge with a hinged movement.
– Press the ring gauge on the IPS Silicone Ring until it stops. Excess investment material escapes through the opening.
– Allow the investment ring to set without manipulating it.

Prepared IPS Multi Investment Ring Base with wax-attached wax-up

Carefully apply a little investment material on the occlusal surface and/or the screw channel of a hybrid abutment crown using a brush.



Carefully fill the cavities with investment material using a suitable instrument (e.g. brush).

Carefully place the IPS Silicone Ring 200 g on the IPS Multi Investment Ring Base 200 g. Make sure that the ring is flush with the investment ring base.

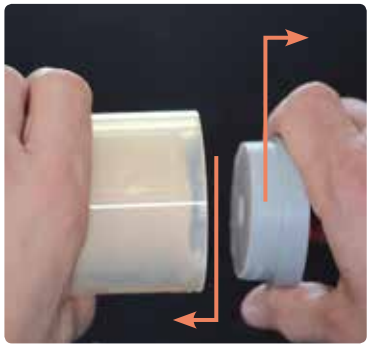
Pour the investment material slowly into the investment ring so that the material can continuously fill the investment ring.

Fill the investment ring up to the marking and position the IPS Ring Gauge with a hinged movement. Press the ring gauge on the IPS Silicone Ring until it stops. Excess investment material escapes through the opening. Allow the investment ring to set without manipulating it.

Preheating

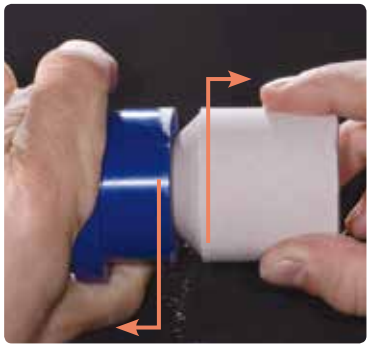
After the stipulated setting time of the respective investment material (IPS PressVEST or IPS PressVEST Speed), the investment ring is prepared for preheating as follows:

– Remove the IPS Ring Gauge with a turning movement.
– Carefully push the investment ring out of the IPS Silicone Ring.
– Remove the IPS Multi Investment 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.
– Place the investment ring in the predrying furnace with the opening facing down.
– Switch on the press furnace in time so that the self test and preheating phase are completed by the time the press procedure is imminent.

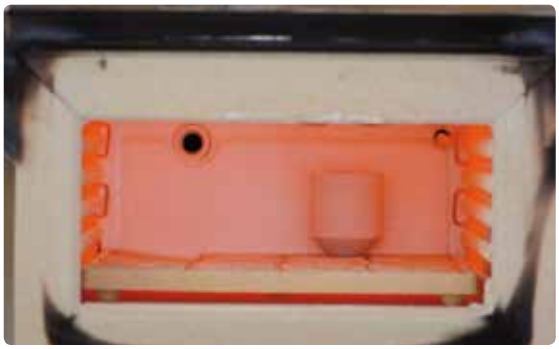


Remove the IPS Ring Gauge with a turning movement.

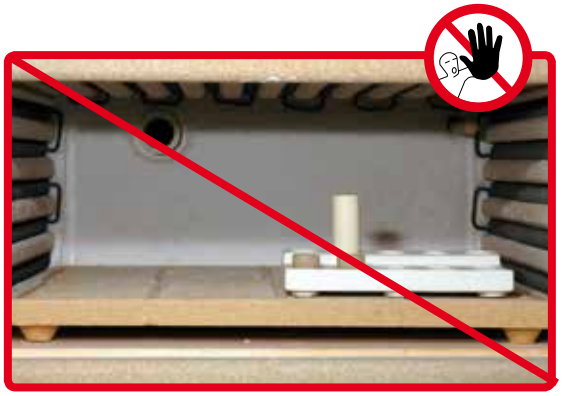
Carefully push the investment ring out of the IPS Silicone Ring.



Remove the IPS Investment Ring Base with a turning movement.



Place the investment ring in the predrying furnace with the opening facing down.



Do not preheat the IPS e.max Press Multi ingot, IPS Alox Plunger and IPS Multi One-Way Plunger.

Switch on the press furnace (e.g. Programat EP 5010) in time so that the preheating phase is completed.

	IPS PressVEST	IPS PressVEST Speed
Setting time	Min. 60 min, max. 24 hrs	Min. 30 min, max. 45 min
Temperature of the preheating furnace when placing the investment ring	Room temperature	850°C / 1562°F; Switch on the preheating furnace in time.
Position of the investment ring in the preheating furnace	With the opening facing down	With the opening facing down
Final temperature for preheating the investment ring	850°C / 1562°F	850°C / 1562°F
Holding time of the investment ring at final temperature	Min. 60 min	Min. 60 min
IPS e.max Press Multi ingot	**No preheating**	
IPS Multi One-Way Plunger		
IPS Alox Plunger		

Pressing

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

- Provide a **cold** IPS Multi One-Way Plunger, a **cold** IPS Alox Plunger and a **cold** IPS e.max Press Multi ingot in the desired shade (observe the IPS e.max Shade Selection Wheel).
- Switch on the press furnace (e.g. Programat EP 5010) in time so that the self-test and preheating phase are completed.
- Select the press program for IPS e.max Press Multi.
- Remove the investment ring from the preheating furnace immediately after completion of the preheating cycle and proceed as follows: This step may take max. 30 seconds to prevent the investment ring from cooling down too much.
- Place the **cold** IPS e.max Press Multi ingot into the **hot** investment ring with the rounded, blank side facing forward. The imprinted side faces upward to check the ingot shade. Then position the **cold** IPS Multi One-Way Plunger and finally the **cold** IPS Alox Plunger in the investment ring.
- Place the completed investment ring in the centre of the **preheated** press furnace.
- Press START to start the selected IPS e.max Press Multi program.

Press parameters for IPS e.max Press Multi

Select the "IPS e.max Press Multi" program (conduct a software update if necessary) for pressing the IPS e.max Press Multi in the Programat EP 3000/EP 5000 or EP 3010/EP 5010.

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.

Provide a **cold** IPS Multi One-Way Plunger, **a cold** IPS Alox Plunger **and a cold** IPS e.max Press Multi ingot in the desired shade and select the press program for IPS e.max Press Multi.

Place the **cold** IPS e.max Press Multi ingot into the **hot** investment ring with the rounded, blank side facing forward. The imprinted side faces upward to check the ingot shade.

Place the **cold** IPS e.max Press Multi One-Way Plunger into the **hot** investment ring with the **chamfered side** facing forward.

Place the **cold** IPS Alox Plunger in the **hot** investment ring.

Place the completed **hot** investment ring in the centre of the **preheated** press furnace using the investment ring tongs. Press START to start the IPS e.max Press Multi 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.

Divesting

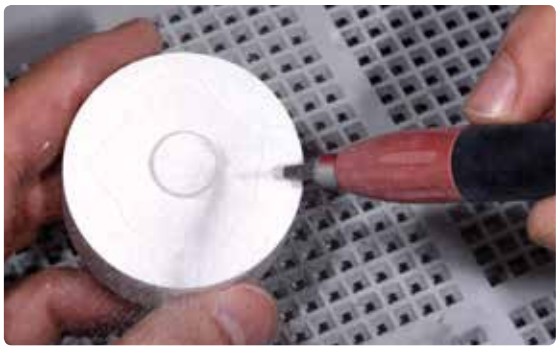
After cooling to room temperature (approximately 60 minutes), the investment ring may show cracks which developed during the cooling phase (directly around the IPS Alox Plunger).

Divest the investment ring as follows:

- Mark the cooled down investment ring at a distance of 30 mm from the bottom surface.
- **Note:** If the restorations were invested with a shift towards "more incisal", the marking has to be placed further towards the Alox plunger.
- Separate the investment ring at the marking using a separating disk. This predetermined breaking point enables reliable separation of the investment ring.
- Break the investment ring at the predetermined breaking point. This step also destroys the IPS Multi One-Way Plunger.
- Always use polishing beads to divest the pressed objects (rough and fine divestment). Do not use Al_2O_3!
- Rough divestment is carried out with polishing beads at 4 bar (58 psi) pressure.
- Fine divestment is carried out with polishing beads at 2 bar (29 psi) pressure.
- Observe the blasting direction and distance to prevent damage to the object margins during divestment.

Separate the investment ring at a distance of at least 30 mm from the bottom surface using a separating disk...

...and break it at the predetermined breaking point.



Rough divesting is carried out with polishing beads at 4 bar (58 psi) pressure until the objects become visible.

Fine divestment is carried out with polishing beads at 2 bar (29 psi) pressure.

Completely divested IPS e.max Press objects

Next working step … **Removing the reaction layer see page 46**

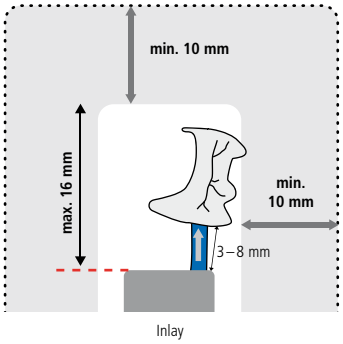
IPS e.max® Press
Using Monochromatic Ingots

Sprueing

Please observe the following notes when attaching the sprues to the wax-up:

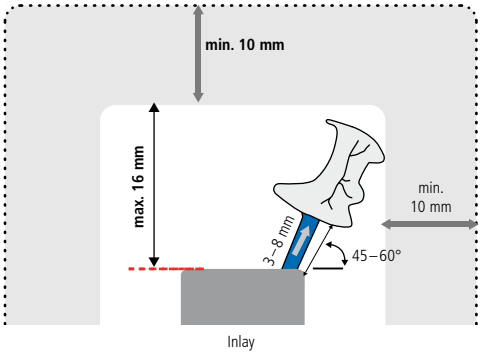
- Depending on the number of objects to be invested, either the 100-g or 200-g IPS Investment Ring System is selected. Bridges must only be pressed in the IPS Investment Ring System 200 g. Before sprueing, weigh the ring base and note it down (seal the opening of the ring base with wax beforehand).
- Please note that the mixing ratio of the investment material is different for the various restoration types, e.g. inlays, crowns). Therefore, not all restorations may be randomly sprued and invested with each other.
- 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 achieved.
- Observe a distance of at least 10 mm between the waxed-up objects and the silicone ring.
- The maximum length (wax objects + sprue) of 16 mm must not be exceeded.
- Sprue the sprued restoration at the "edge" of the investment ring base.
- If the IPS Investment Ring System 100 g is used, a somewhat steeper sprueing angle to the investment ring base must be observed.
- Correct sprueing is checked using the IPS Sprue Guide.
- If only one object is invested and pressed in an EP500 furnace, 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 procedure.

Sprueing with the IPS Investment Ring System 100 g

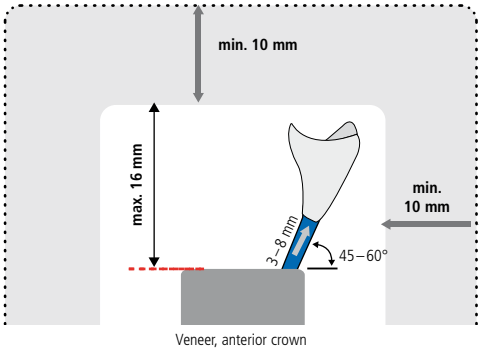


Inlay

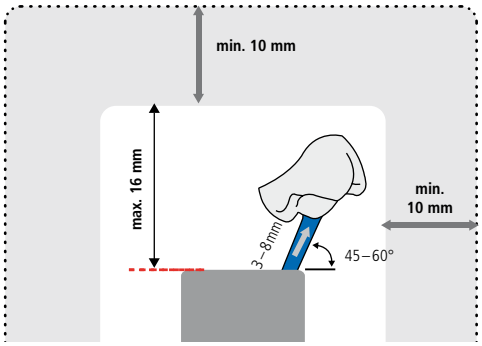
Sprueing with the IPS Investment Ring System 200 g



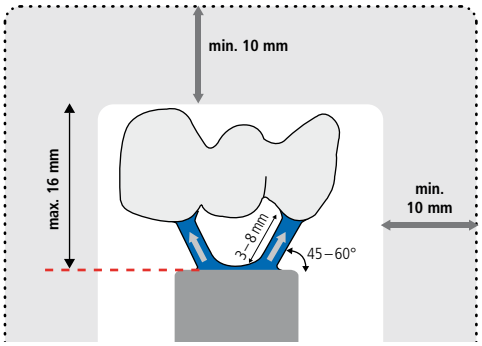
Inlay



Veneer, anterior crown



Onlay, molar crown



Anterior bridge

	Single-tooth restorations	3-unit bridges
Investment ring base	100 g and 200 g	Only 200 g
Wax wire Ø	2.5 – 3 mm	2.5 – 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. 15 – 16 mm	Max. 15 – 16 mm
Sprue attachment point at the waxed-up object	Thickest part of the wax-up	On both bridge abutments, **no** sprue at the 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	Rounded and slightly tapered, no sharp angles or edges	Rounded and slightly tapered, no sharp angles or edges
Distance between the objects	Min. 3 mm	Min. 3 mm
Distance to the silicone ring	Min. 10 mm	Min. 10 mm
Important	If only one object is invested, a second short (blind) sprue must be placed. This ensures that the automatic switch-off function of the press furnace works properly at the end of the pressing procedure.	

Investing

Investing is carried out with either IPS PressVEST (conventional) or IPS PressVEST Speed. The corresponding IPS Silicone Ring with the matching ring gauge is used for investment.
Determine the weight of the wax-up before investing.
– Position the wax objects on the investment ring base, attach them with wax and weigh.
– The difference between the empty and the loaded ring base is the definitive wax weight.

	Small ingot	Large ingot (L)
Wax weight	Up to max. 0.75 g	Up to max. 1.7 g
Investment Ring System	100 g and 200 g	Only 200 g

Please refer to the Instructions for Use of the corresponding investment material regarding the detailed processing parameters. The following basic procedure is recommended:
– Do not use a debubblizer on the wax objects.
– The processing temperature of the investment material is 18°C – max. 23°C / 64°F – max. 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 investment 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 and 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 PressVEST investment material.
– If IPS PressVest Speed is used, make sure that the investment ring is placed in the preheating furnace after a setting time of at least 30 minutes and a maximum setting time of 45 minutes.

Investment material: Liquid concentration and quantity

Indication	IPS PressVEST		IPS PressVEST Speed	
	100-g investment ring Liquid : dist. water	200-g investment ring Liquid : dist. water	100-g investment ring Liquid : dist. water	200-g investment ring Liquid : dist. water
IPS e.max Press				
Single crowns, partial crowns, (thin) veneers	13 ml : 9 ml 15.5 ml : 6.5 ml	26 ml : 18 ml 31 ml : 13 ml	16 ml : 11 ml	32 ml : 22 ml
Inlays	11 ml : 11 ml	22 ml : 22 ml	14 ml : 13 ml	27 ml : 27 ml
3-unit bridges	—	26 ml : 18 ml 31 ml : 13 ml	—	27 ml : 27 ml
Mixing time (under vacuum at approx. 350 rpm)	60 seconds		2.5 minutes If a high-speed mixer is used, the mixing time under vacuum has to be reduced.	

Liquid concentration: The data contained in the table are approximative values. Depending on the geometry of the Ti base and the materials used for the wax-up, these values may be individually changed. However, the concentrated liquid content must not be lower than 50% in relation to distilled water.
Important: The total quantity of liquid (liquid + dist. water) must not be altered!

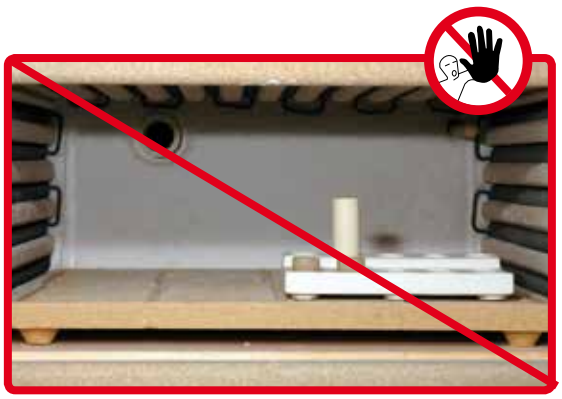
Preheating

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 and ring base with a turning movement.
– Carefully push the investment ring out of the IPS Silicone Ring.
– 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 with the respective ingot shade.

	IPS PressVEST	IPS PressVEST Speed
Setting time	Min. 60 min, max. 24 hrs	Min. 30 min, max. 45 min
Temperature of the preheating furnace when placing the investment ring	Room temperature	850°C / 1562°F; Switch on the preheating furnace in time.
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
Final temperature for preheating the investment ring	850°C / 1562°F	850°C / 1562°F
Holding time of the investment ring at final temperature	Min. 60 min	200-g investment ring – min. 60 min 100-g investment ring – min. 45 min
IPS e.max Press ingots	**No preheating**	
IPS Alox Plunger		
Important		If several Speed investments are to be conducted, they should be invested consecutively and placed into the preheating furnace at an interval of approx. 20 minutes. When placing the investment rings in the preheating furnace, make sure that the furnace temperature does not drop substantially. The stipulated holding time counts from the point when the preheating temperature has been reached again.

Position the investment ring towards the rear wall and with the opening facing down.



Do not preheat the IPS e.max Press ingot and Alox plunger.

In order to ensure smooth working procedures in the laboratory on a daily basis, impeccable functioning of the infrastructure, particularly the preheating furnaces, is essential. This includes their maintenance, cleaning with a vacuum cleaner in a cool state as well as regular checks of the temperature controls and heating elements, etc. by the manufacturer.

Pressing

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

– Provide a **cold** IPS Alox Plunger and a **cold** IPS e.max Press ingot in the desired shade (observe the IPS e.max Shade Selection Wheel).
– Dip the **cold** IPS Alox Plunger into the opening of the IPS Alox Plunger Separator and keep it ready for use.
– Switch on the press furnace (e.g. Programat EP 5010) in time so that the self-test and preheating phase are completed.
– Select the press program for IPS e.max Press with the desired level of translucency and the desired investment ring size.

Remove the investment ring from the preheating furnace immediately after completion of the preheating cycle. This step may take max. 30 seconds to prevent the investment ring from cooling down too much.

– Place the **cold** IPS e.max Press ingot into the **hot** investment ring.
– Insert the ingot into the investment ring with the rounded, non-imprinted side facing down. The imprinted side faces upward to check the ingot shade.
– Place the side of the **cold** IPS Alox Plunger which has been coated with Separator into the **hot** investment ring.
– Use the investment ring tongs to place the loaded investment ring in the centre 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:

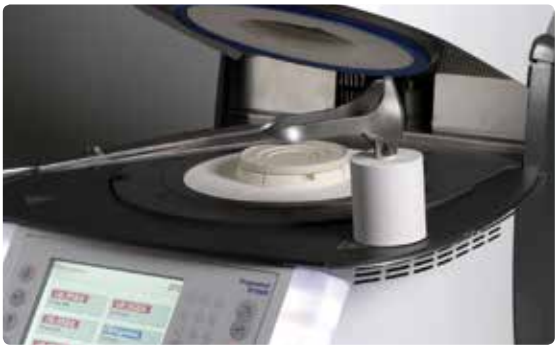
– Remove the investment ring from the press furnace using the investment ring tongs immediately after pressing.
– Place the investment ring on a cooling grid to cool in a place protected from draft.
– Do not speed up cooling, e.g. by blasting with compressed air.

	100-g investment ring	**200-g investment ring**
Single-tooth restorations	1 small ingot	1 small ingot or 1 large ingot
3-unit bridges	~~1 small ingot~~	Max. 1 large ingot
IPS e.max Press Ingots	**Cold plunger**	
IPS Alox Plunger		
IPS Alox Plunger Separator	✓	✓

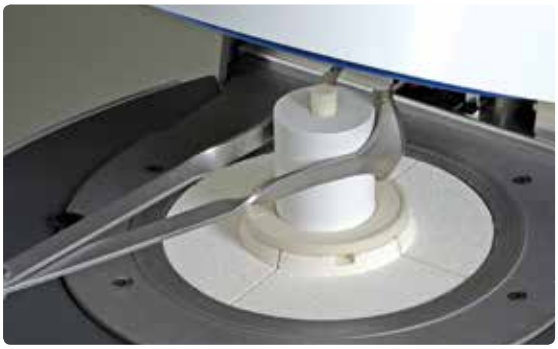
Exclusively press single ingots! Select one large or one small ingot according to the determined wax weight!

Provide a **cold** isolated IPS Alox Plunger and a **cold** IPS e.max Press ingot in the desired shade.

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



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



Place the **hot** and loaded investment ring in the centre of the **hot** press furnace using the IPS Investment 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.

Select the press program in accordance with the desired ingot to be pressed and the investment ring size for the respective furnace. Press parameters see page 84

Divesting

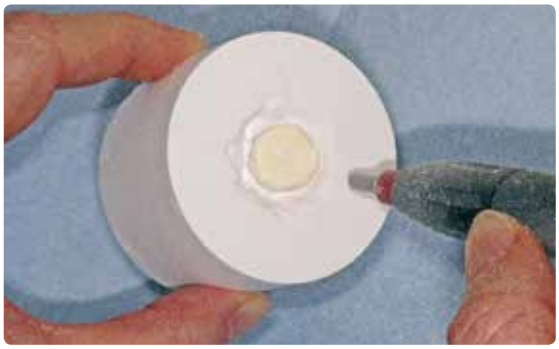
After cooling to room temperature (approximately 60 minutes), the investment ring may show cracks.
These cracks developed during cooling (directly around the Alox plunger), as a result of the different CTEs of the various materials (Alox plunger, investment material, press ingot). They do not compromise the press results.

Mark the length of the Alox plunger.

Divest the investment ring as follows:
- Mark the length of the Alox plunger on the cooled investment ring.
- Separate the investment ring using a separating disc. This predetermined breaking point enables reliable separation of the Alox plunger 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). Do not use Al_2O_3!
- Rough divestment is carried out with polishing beads at 4 bar (58 psi) pressure.
- Fine divestment is carried out with polishing beads at 2 bar (29 psi) pressure.
- Observe the blasting direction and distance to prevent damage to the object margins during divestment.
- Remove possible ceramic residue from the Alox plunger with type 100 Al_2O_3.

Separate the investment ring using a separating disk and break it at the predetermined breaking point.

Tip
Pull out the plunger with pliers from the separated segment using a rotating movement. This also removes any possible ceramic residue from the Alox plunger.




Rough divesting is carried out with polishing beads at 4 bar (58 psi) pressure until the objects become visible.


Fine divestment is carried out with polishing beads at 2 bar (29 psi) pressure.

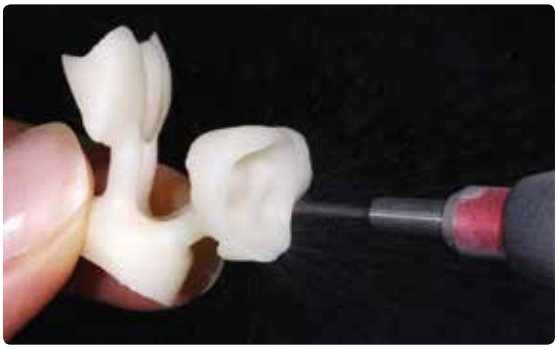
Completely divested IPS e.max Press objects

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 the insert of the PE plastic cup.
– Immerse the pressed object in the Invex Liquid and clean in an ultrasonic cleaner for at least 10 minutes and max. 30 minutes. Make sure that the objects are completely covered with Invex Liquid.
– Use the sieve insert to remove the restoration from the Invex Liquid and clean the object under running water and blow dry.
– Carefully remove the white reaction layer with type 100 Al_2O_3 at max. 1–2 bar (15–29 psi) pressure.
– Make sure that the reaction layer is completely removed, both on the cavity side and on the outer side of the object (repeat the procedure if necessary).
– If the reaction layer is not completely removed, bonding problems between the framework and the layering / glazing materials may occur.
– Replace the IPS e.max Press Invex Liquid after 20 applications or after sedimentation of the liquid.

Remove the reaction layer formed on the pressed objects using the Invex Liquid in an ultrasonic bath.



Completely remove the reaction layer from the contact surfaces using Al_2O_3 at 1–2 bar (15–29 psi) pressure.

Note

Contains: 0.5% hydrofluoric acid

Harmful to health when swallowed. Harmful to health upon skin contact. Causes severe irritation of the eyes. Wear protective gloves / protective clothing / eye protection / face protection. In case of indisposition, call the POISON INFORMATION CENTRE or a physician. Targeted measures: After skin contact: Immediately rub with Ca-gluconate solution or Ca-gluconate gel. Wash contaminated clothes before wearing them again. UPON SKIN CONTACT: Wash with soap and copious amounts of water. UPON EYE CONTACT: Carefully rinse with water for several minutes. Remove contact lenses if possible. Continue rinsing.

Disposal

– Neutralize the Invex Liquid before disposal!
– Use the IPS Ceramic Neutralization Powder to neutralize the Invex Liquid.
– For 50 ml Invex Liquid, approx. 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 of, 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.

Next working step …

Staining technique see page 48
Cut-back technique see page 58

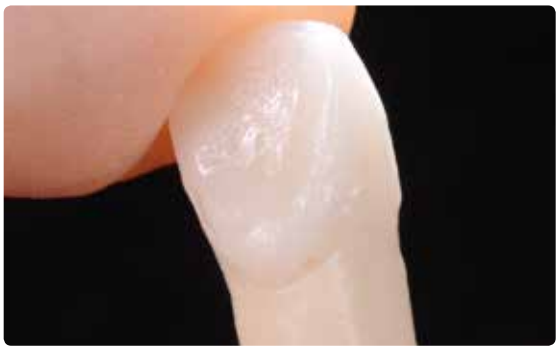
Finishing

Suitable grinding instruments are imperative for adjusting and finishing high-strength glass-ceramic materials (please observe the Ivoclar Vivadent Flow Chart "Recommended grinding tools for IPS e.max glass-ceramics". If unsuitable grinding instruments are used, chipping of the edges and local overheating may occur.

The following procedure is recommended for finishing IPS e.max Press restorations:
- Keep adjustments by grinding pressed IPS e.max Press restorations to a minimum.
- Avoid overheating of the ceramic.
- Observe a low speed and light pressure.
- Separate the sprue using a suitable separating disk. Avoid overheating. Pay attention to the proximal contacts when working on polychromatic restorations.
- Make sure that the minimum layer thickness of the restoration is maintained during finishing.
- Smooth out the attachment point of the sprue.
- Remove the spacer from the die. The restorations are tried in on the dies and carefully finished.
- Do not "post-separate" the 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 outer side of the restoration, briefly blast with type 100 Al_2O_3 at 1 bar (15 psi) pressure and clean with the steam cleaner. Some blasting devices may require different pressure settings to accomplish this procedure.

Separating the sprues in polychromatic restorations using a separating disk

Separating the sprues in monochromatic restorations using a separating disk



Examining the fit of the restoration on the model

Application of surface structures with suitable grinding instruments

Die fabrication with IPS Natural Die Material

The light-curing IPS Natural Die Material simulates the shade of the preparation. Fabricate a die according to the shade information supplied by the dentist (shade selection). This die serves as the optimum basis for a true-to-nature shade reproduction of the given oral situation.

– Coat the inner surfaces of the ceramic restoration with IPS Natural Die Material Separator and allow it to react for a short time.
– Apply the IPS Natural Die Material in the appropriate shade on the inner aspects of the restoration using the IPS Condenser and adapt it in such a way that the entire inner aspect is embraced and filled.
– Completely fill the cavity of the restoration, insert the IPS Die Holder into the material and adapt excess around the die holder. Make sure that the die material is well adapted along the restoration margins and that there is no gap.
– Cure the IPS Natural Die Material die using a customary polymerization device, e.g. Lumamat 100, for 60 seconds.
– If necessary, the die can be further finished and smoothed after polymerization.

Coat the inner surfaces of the ceramic restoration with IPS Natural Die Material Separator and allow it to react for a short time.

Completely fill the restoration cavity, insert the IPS Die Holder into the material, adapt excess around the die holder and cure using a customary polymerization device.

Stain and Characterization firing

The following paragraphs will explain the steps of optional staining and characterizing with IPS e.max Ceram Shades and Essences. The procedure is the same for both polychromatic and monochromatic restorations.

The following materials are required for the Stain and Characterization firing. For more detailed information on the IPS e.max Ceram 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 Essences are intensively shaded stains in powder form, 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.

The following procedure must be observed:

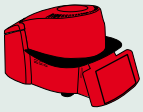
- Clean the pressed object with a steam cleaner to remove any contaminations and grease residue. Any contamination after cleaning must be prevented.
- For better wetting of the stains, the area to be characterized can be wetted with a small quantity of IPS e.max Ceram Glaze and Stain Liquid.
- Mix the pastes or powders with the IPS e.max Ceram Glaze and Stain Liquids (allround or longlife) until the desired consistency is achieved.
- 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 Essences.
- Conduct the Stain and Characterization firing on a honey-comb firing tray using the stipulated firing parameters (see page 84).
- Additional Stain and Characterization firing cycles can be conducted with the same 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.

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

Enhance the chroma on the buccal surface.

Occlusal characterization with IPS e.max Ceram Essence

Conduct the Stain and Characterization firing on a honey-comb firing tray, an accessory of the ceramic furnace.



Conduct the Stain and Characterization firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

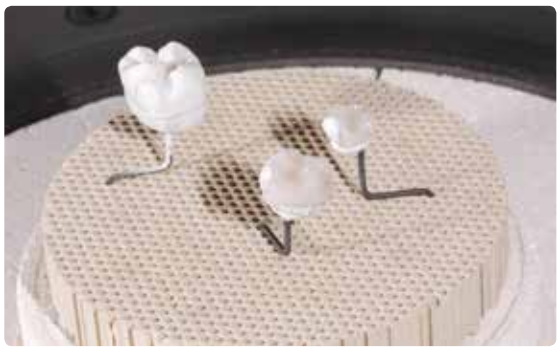
Glaze firing

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

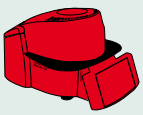
- Mix the glazing material (IPS e.max Ceram Glaze Paste or Powder) with the IPS e.max Ceram Glaze and Stain Liquids allround or longlife to the desired consistency.
- Apply the glazing material in an even layer to the restoration in the usual manner.
- In the staining technique on full-contour restorations, the application of a fluorescent glazing material (paste or powder) is recommended.
- If IPS e.max Ceram Glaze Spray is used, make sure that the inner aspects of the restoration are not sprayed with glaze material. Please observe the Instructions for Use of the IPS e.max Ceram Glaze Spray!
- Conduct the Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters (see page 84).
- 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 71).

Apply the Glaze evenly on the surface.

As an alternative to the Glaze paste, the IPS e.max Ceram Glaze Spray can be used. Spray IPS e.max Ceram Glaze Spray evenly onto the restoration. Protect the inner aspects.



Conduct the Glaze firing on a honey-comb firing tray with the corresponding parameters.



Conduct the Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

Next working step …

Preparing for cementation see page 74

Optional

Combined Stain / Characterization and Glaze firing

If only minor characterizations of the restoration are desired, a combined firing cycle can be conducted.
First, the glaze paste is applied, followed by the characterizations, which are applied directly on the unfired glaze layer.

Step 1 – Application of the glaze material

- Extrude IPS e.max Ceram Glaze from the syringe and thin the material to the desired consistency using IPS e.max Ceram Glaze and Stain Liquid.
- Apply the Glaze material evenly on the restoration in the usual manner.
- Make sure that no Glaze material reaches the inner aspects of the restoration.
- If the Glaze layer is too thin, this may lead to an unsatisfactory gloss.
- Avoid pooling and excessively thick Glaze material layers.

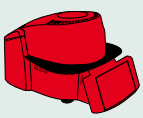
Step 2 – Application of Essences / Shades

- Mix IPS e.max Ceram Essences with IPS e.max Ceram Glaze and Stain Liquid.
- Extrude IPS e.max Ceram Shades from the syringe and thin the material to the desired consistency using IPS e.max Ceram Glaze and Stain Liquid if required.
- Apply mixed Shades and Essences directly into the unfired Glaze material.
- Intensify the corresponding dentin shade in the cervical and medium crown third using Shades.
- To imitate the incisal area and translucency in the incisal third, use IPS e.max Ceram Shade Incisal.

After glazing and staining, Glaze firing is conducted in a compatible ceramic furnace (e.g. Programat P510). When placing the objects into the furnace and setting the firing parameters, please observe the following points:

- Conduct the Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters (see page 84).
- Additional firing cycles can be conducted with the same 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 71).

Completed restoration after the combined Stain and Glaze firing



Conduct the Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

IPS e.max® Press

Thin Veneers, Occlusal Veneers (Table Tops)

Thin veneer

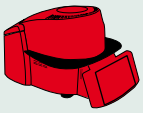
Thin veneers are very thin ceramic veneers (0.3 mm), which are seated using the adhesive technique. Thin veneers are indicated from an esthetic point of view if there is a malposition or differences in length of the incisors, for example. Thin veneers provide the advantage that they allow a preparation that is gentle to the tooth structure. Depending on the clinical situation, no preparation may be required so that tooth structure can be preserved.

Thin veneers are fabricated using the staining technique.
Note: Minimum application of IPS e.max Ceram layering materials (e.g. Impulse) in the incisal area is possible. However, no cut-back must be performed on the restoration.

Use the following procedure for the fabrication of thin veneers:

- Apply the spacer to the preparation or the tooth to be treated according to the veneer preparation guidelines (see page 16).
- With thin veneers without preparation of the tooth, locate the restoration margins in the proximal area as well as along the gingival margin.
- Observe the minimum thickness of the veneer.
- Sprue, invest, press, divest and remove the reaction layer according to the stipulations on page 38ff.
- IPS e.max Ceram layering materials may optionally be applied (do not perform a cut-back).
- Conduct the Stain and Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters (see page 84).
- 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 71).
- Thin veneers must be placed by means of adhesive cementation.

Use the press technology to transform the wax-up into the thin ceramic veneer made of IPS e.max Press.



Conduct the Stain and Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

Next working step … **Preparing for cementation see page 74**

Occlusal veneer (table top)

If the clinical situation requires an increase in vertical dimensions or the reconstruction of function, table tops may be fabricated of IPS e.max Press for the posterior region. Table tops are thin "occlusal" veneers that must be adhesively cemented. The high strength of IPS e.max Press allows the fabrication of such thin restorations. Therefore, the tooth can be prepared in a minimally invasive manner that is very gentle to the tooth structure.

Table tops are fabricated using the staining technique. Use the following procedure for the fabrication of table tops:

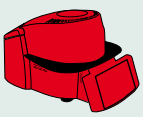
- Apply the spacer to the preparation or the tooth to be treated according to the partial crown preparation guidelines (see page 16).
- Observe the minimum thickness of the table tops.
- Sprue, invest, press, divest and remove the reaction layer according to the stipulations on page 38ff.
- The application of IPS e.max Ceram Incisal or Transpa is possible (do not perform a cut-back).
- Conduct the Stain and Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters (see page 84).
- 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 71).
- Table tops must be placed by means of adhesive cementation.

Starting situation

Minimally invasive preparation for table tops

Table tops in transmitted light

In situ: Table tops after adhesive cementation



Conduct the Stain and Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

Next working step … **Preparing for cementation see page 74**

Completed IPS e.max Press restorations after glaze firing

Molar crowns made of IPS e.max Press LT

Inlay, onlay made of IPS e.max Press HT

Mandibular anterior crown made of IPS e.max Press Multi

Premolar crown made of IPS e.max Press Multi

Thin veneers made of IPS e.max Press HT

Hybrid abutment crown (before cementation on the Ti base) made of IPS e.max Press Multi

Table tops (occlusal veneers) made of IPS e.max Press HT

Veneer made of IPS e.max Press Multi

IPS e.max® Press
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 Press restoration. Due to the limited application of layering materials, highly esthetic restorations can be fabricated in only few working steps.

Finishing

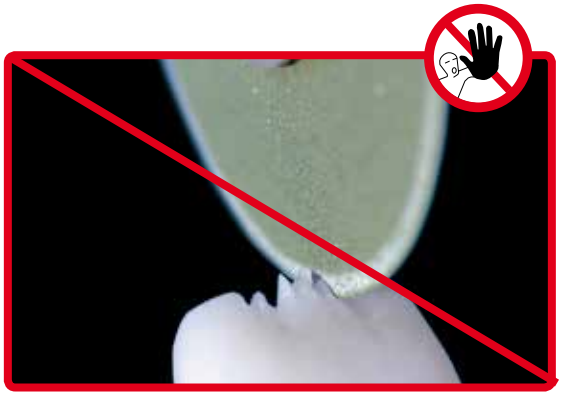
Suitable grinding instruments are imperative for adjusting and finishing high-strength glass-ceramic materials (please observe the Ivoclar Vivadent Flow Chart "Recommended grinding tools for IPS e.max glass-ceramics". If unsuitable grinding instruments are used, chipping of the edges and local overheating may occur.

- Keep adjustments by grinding pressed IPS e.max Press restorations to a minimum.
- Avoid overheating of the ceramic. Observe a low speed and light pressure.
- Separate the sprue using a suitable separating disk. Avoid overheating. Pay attention to the proximal contacts when working on polychromatic restorations.
- Make sure that the minimum layer thickness of the restoration is maintained during finishing.
- Smooth out the attachment point of the sprue.
- Remove the spacer from the die. The restorations are tried in on the dies and carefully finished.
- Do not "post-separate" the bridge connectors with separating disks. This may result in undesired predetermined breaking points, which will subsequently compromise the stability of the all-ceramic restoration.
- Make sure that the minimum thicknesses are maintained even after minor adjustments.
- Before veneering, clean the restoration with type 100 Al_2O_3 at 1–2 bar (15–29 psi) pressure. Some blasting devices may require different pressure settings to accomplish this procedure.
- Thoroughly clean the restoration with a steam jet prior to the wash firing.

Separate the sprues with a thin diamond disk and provide permanent water cooling to the grinding area.

Separated restorations fitted on the model die

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



For mamelons, avoid designing extreme morphologies with undercuts.


Check the cut-back with the silicone key and observe the minimum thicknesses. Restrict the cut-back to the incisal third.


Pressed IPS e.max Press restorations with cut-back after finishing


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.

Die fabrication with IPS Natural Die Material

The light-curing IPS Natural Die Material simulates the shade of the preparation. Fabricate a die according to the shade information supplied by the dentist (shade selection). This die serves as the optimum basis for a true-to-nature shade reproduction of the given oral situation.

Please refer to page 49 for further details about the fabrication 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.

The cut-back is performed in three processing steps:

Wash firing → **Incisal firing** → **Stain and Glaze firing**

The following IPS e.max Ceram materials are used for veneering:

- IPS e.max Ceram layering materials (e.g. Transpa, Incisal, Impulse)
- IPS e.max Ceram Build-Up Liquid allround or soft to mix the layering materials

- IPS e.max Ceram Shades are ready-to-use stains in syringes.
- IPS e.max Ceram Essences are intensively shaded stains in powder form, 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.

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. Wash firing is carried out with IPS e.max Ceram Transpa Incisal, Impulse, or Shades and Essence.

Variant A: Powder

If ideal space is available, 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 allround 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.

The wash is applied using Transpa Incisal and/or Impulse materials…

…and fired according to the indicated firing parameters.

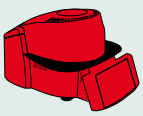
Variant B: Paste

If limited space is available 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.

The wash is applied using Shades and Essence materials ...

…and fired according to 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.



Conduct the Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

Incisal firing

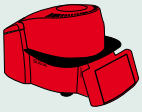
With the IPS e.max Ceram layering materials (Transpa, Transpa Incisal, Impulse), the anatomical shape is completed and the individual esthetic appearance achieved. Use the IPS e.max Ceram Build-Up Liquids allround or soft to mix the materials. If required, conduct a second Incisal firing using the same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

Apply Impulse materials, e.g. Opal Effect.

Complete the restoration with Incisal materials and Opal Effect 3, for example.

Place the restoration on the firing tray and fire it according to the firing parameters for the Incisal firing.

Restoration after Incisal firing



Conduct the Incisal firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

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 polishing wheels.
– If gold and/or silver dust was used to design 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.

The restoration is finished with diamonds and given a true-to-nature shape and surface structure.

Stain and Glaze firing

Stain firing is conducted with IPS e.max Ceram Essence and IPS e.max Ceram Shades, while Glaze firing is carried out with IPS e.max Ceram Glaze powder or paste. 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:

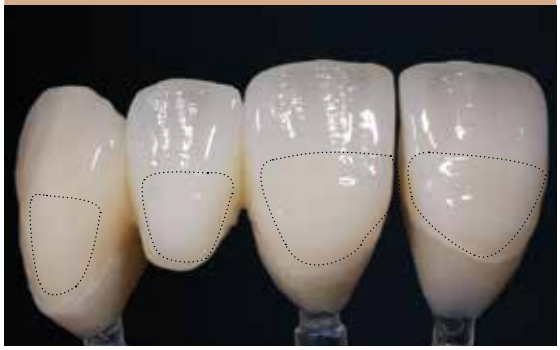
Standard
(high-gloss appearance)

– Prepolish unlayered areas (IPS e.max Press) 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 on the entire restoration.

IPS e.max Ceram Glaze is applied on the entire restoration.

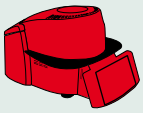
Option
(true-to-nature appearance)

– Prepolish unlayered areas (IPS e.max Press) using rubber wheels.
– Rub the surface with moist ceramic in order to improve the wetting properties of the surface.
– Clean the restoration with steam.
– Use Self-Glaze for veneered areas.
– Apply IPS e.max Ceram Glaze only on unlayered areas and conduct the Glaze firing.
– Subsequently, adjust the level of gloss by manually polishing the restoration.



IPS e.max Ceram Glaze is only applied on unlayered areas.

Observe the following notes for the Stain and Glaze firing:
– Conduct the Stain and Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, 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 71).



Conduct the Stain and Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

Completed IPS e.max Press LT restoration cut-back and pressed and veneered with IPS e.max Ceram

Next working step … **Preparing for cementation page 74**

IPS e.max® Press
Layering Technique

Finishing

Suitable grinding instruments are imperative for adjusting and finishing high-strength glass-ceramic materials (please observe the Ivoclar Vivadent Flow Chart "Recommended grinding tools for IPS e.max glass-ceramics". If unsuitable grinding instruments are used, chipping of the edges and local overheating may occur.

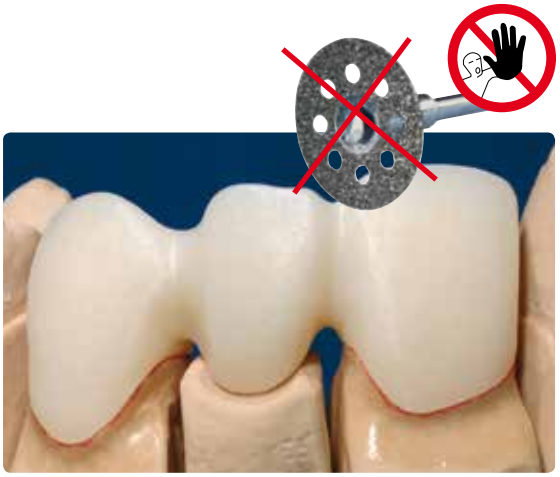
- Keep adjustment by grinding pressed IPS e.max Press restorations to a minimum.
- Avoid overheating of the ceramic. Observe a low speed and light pressure.
- Separate the sprue using a suitable separating disk. Avoid overheating.
- Make sure that the minimum layer thickness of the restoration is maintained during finishing.
- Smooth out the attachment point of the sprue.
- Remove the spacer from the die. The restorations are tried in on the dies and carefully finished.
- Do not "post-separate" the bridge connectors with separating disks. This may result in undesired predetermined breaking points, which will subsequently compromise the stability of the all-ceramic restoration.
- Make sure that the minimum thicknesses are maintained even after minor adjustments.
- Before veneering, clean the outer surfaces of the restoration with type 100 Al_2O_3 at 1–2 bar (15 –29 psi) pressure. Some blasting devices may require different pressure settings to accomplish this procedure.
- Thoroughly clean the restoration with a steam jet prior to the Wash firing

Separate the sprues with a thin diamond disk and provide permanent water cooling to the grinding area.

Try in the framework on the model.

After try-in, excellent accuracy of fit is achieved.

Smooth out the attachment points of the sprue using low speed and light pressure.



Do not "post-separate" the framework connectors with the separating disk and finish the surface.

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.

Veneering requires four processing steps:

Wash firing → **1st Dentin and Incisal firing** → **2nd Dentin and Incisal firing** → **Stain and Glaze firing**

The following IPS e.max Ceram materials are used for veneering:

– IPS e.max Ceram layering materials (e.g. Transpa, Incisal, Impulse)
– IPS e.max Ceram Build-Up Liquid allround or soft to mix the layering materials

– IPS e.max Ceram Shades are ready-to-use stains in syringes.
– IPS e.max Ceram Essences are intensively shaded stains in powder form, 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.

Wash firing

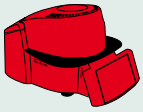
The restoration must be free of dirt and grease before the Wash firing is done. Any contamination after cleaning must be prevented.

Please observe the following procedure for the Wash firing:

- Clean the framework (free of dirt and grease).
- Conduct the Wash firing with Deep Dentin or Dentin materials.
- Use the IPS e.max Ceram Build-Up Liquids allround 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 for mixing the materials.
- Apply the wash in a thin coat to the entire framework.
- Conduct the Wash firing on a honey-comb firing tray, an accessory of the ceramic furnace, 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.

Apply the wash using Dentin and/or Deep Dentin materials…

…and fire according to the indicated firing parameters.



Conduct the Wash firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

1st Dentin and Incisal firing

Perform the layering in accordance with the layering diagram (see IPS e.max Ceram Instructions for Use). Use the IPS e.max Ceram Build-Up Liquids allround or soft to mix the layering materials. If a different consistency is desired, the liquids can also be mixed with one another in any ratio.

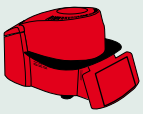
Observe the following notes for the Dentin and Incisal firing:
- Conduct the Dentin and Incisal firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.
- Remove the restoration from the furnace after completion of the firing cycle (wait for the 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.

The tooth shape is contoured with Dentin material. The incisal third is designed using Impulse materials.

The layering procedure is completed with Incisal and Transpa materials.

The interdental area is completely separated down to the IPS e.max Press framework.

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



Conduct the Dentin and Incisal firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

2nd Dentin and Incisal firing (corrective firing)

Completion of the missing areas and shrinkage compensation

Observe the following notes for the Dentin and Incisal firing:

- Conduct the 2nd Dentin and Incisal firing on a honey-comb firing tray, an accessory of the ceramic furnace, 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.

The shrinkage is compensated using Dentin, Transpa and Incisal materials.

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

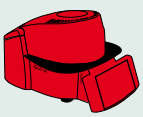
Stain and Glaze firing

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

Observe the following notes for the Stain and Glaze firing:

- Conduct the Stain and Glaze firing on a honey-comb firing tray, an accessory of the ceramic furnace, 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 71).

Completed, fully veneered IPS e.max Press restoration



Conduct the Dentin and Incisal firing on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

Adjustments with IPS e.max Ceram Add-On

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

Variant 1 – Add-On with Glaze firing

This variant is used if minor adjustments are made with Glaze firing.

The procedure is carried out as follows:

– Mix IPS e.max Ceram Add-On Dentin and Incisal with Dentin and Transpa Incisal in a 50:50% ratio.
– 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.

Variant 2 – Add-On after Glaze firing

After completion and try-in with the patient, further adjustments (e.g. contact points) might be necessary.

The procedure is carried out as follows:

– Mix IPS e.max Ceram Add-On Dentin and 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.

Procedure for HO Ingots

If IPS e.max Press HO ingots are used, the shade of the framework requires adjustment, particularly with darker tooth shades (e.g. A4). Use IPS e.max Ceram Shades and Essences to adjust the framework shade.

Materials combination table

Desired tooth shade	BL1, BL2, BL3, BL4	A1, A2, B1, B2, C1	A3, A3.5	B3, B4	A4, C2, C3, C4, D2, D3, D4
IPS e.max Press HO	HO 0	HO 1	HO 2	HO 1	HO 2
Wash firing	Deep Dentin in the respective tooth shade				
Characterization	–	–	–	IPS e.max Ceram Shades and Essence	

Please observe the following procedure:

Step 1: Wash firing with Deep Dentin

– Clean the framework (free of dirt and grease).
– Apply the wash using Deep Dentin materials.
– Use the IPS e.max Ceram Build-Up Liquids allround or soft to mix the materials.
– If a more plastic consistency is desired, IPS e.max Ceram Glaze and Stain Liquid allround or longlife can be used for mixing the materials.
– Apply the wash in a thin coat on the entire framework.
– Conduct the wash firing on a honey-combed tray with the corresponding parameters.

Clinical situation: severely discoloured preparation

Prepared framework made of IPS e.max Press HO 1

The wash is applied using IPS e.max Ceram Deep Dentin in the respective tooth shade.

After Wash firing

Step 2: Characterization with IPS e.max Ceram Shades and Essences

– Apply the characterizations using IPS e.max Ceram Shades and Essences.
– Mix Essences with IPS e.max Ceram Glaze and Stain Liquids allround or longlife to the desired consistency.
– Apply characterizations so that the tone of the framework shade corresponds with the final Dentin shade.
– Conduct the Characterization firing on a honey-combed tray with the corresponding 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.

Characterization with Essences to achieve the final Dentin shade

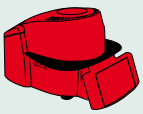
Individualized, shade-adjusted framework after Characterization firing

Step 3: Layering, completion

– The further procedure corresponds to that of the layering technique described on pages 65–71.

The restoration is layered and completed in the usual manner.

Completed IPS e.max Press HO restoration in situ



Conduct the firing cycles on a honey-comb firing tray, an accessory of the ceramic furnace, using the stipulated firing parameters.

Firing parameters see page 84

IPS e.max® Press
Cementation and Aftercare

Cementation Possibilities

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

– For the adhesive cementation of IPS e.max Press restorations, Variolink® II, Variolink® Veneer or Multilink® Automix are the ideal composites.
– SpeedCEM is available for the self-adhesive cementation of IPS e.max Press restorations.
– The glass ionomer cement Vivaglass® CEM is recommended for the conventional cementation of IPS e.max Press restorations.

Short definition of the different cementation methods

- **Adhesive cementation**
  With adhesive cementation, the bond is created by static friction and primarily by the chemical and/or micromechanical 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**
  With conventional cementation, the bond is almost entirely created by static friction between the luting material and the restoration, as well as between the luting material and the preparation. To achieve the necessary static friction, retentive preparation with a preparation angle of approximately 4° – 6° is required. Conventional cementation does not result in enhanced "(overall) strength" of the seated all-ceramic restoration.

Cementation possibilities for the different indications

		Adhesive cementation	Self-adhesive cementation	Conventional cementation
IPS e.max Press	Table tops, thin veneers, veneers	✓	—	—
	Inlays, onlays, partial crowns	✓	—	—
	Anterior and posterior crowns	✓	✓	✓
	3-unit bridges up to the 2nd premolar	✓	✓	✓

Preparing for cementation

Conditioning of the restoration and preparation depends on the cementation method and the cementation material used. 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.

a. 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. The following procedure must be observed:

– Do not blast IPS e.max Press with Al_2O_3 or glass polishing beads before incorporation.
– Ideally, conduct the clinical try-in before etching in order to avoid a contamination of the etched surface.
– Thoroughly clean the restoration with water and blow dry.
– Condition the restoration:
  – Generally etch the bonding surface with 5% hydrofluoric acid gel (IPS Ceramic Etching Gel).
  – For adhesive or self-adhesive cementation, silanize the bonding surface of the restoration using Monobond Plus.

Do **not** blast the IPS e.max Press restoration.

Etch for 20 s with IPS Ceramic Etching Gel.

Allow Monobond Plus to react for 60 seconds and dry with air.

Material	**IPS e.max Press**		
	Lithium disilicate glass-ceramic		
Indication	**Thin veneers, veneers, table tops, inlays, onlays, partial crowns**	**Anterior and posterior crowns, 3-unit bridges up to the 2nd premolar**	
Cementation method	Adhesive	Adhesive	Self-adhesive / conventional
Blasting	–		
Etching	20 s with IPS® Ceramic Etching Gel		
Silanizing	60 s with Monobond® Plus		
Cementation system	Variolink® Veneer, Variolink® II, Multilink® Automix	Variolink® II, Multilink® Automix	SpeedCEM®, Vivaglass® CEM

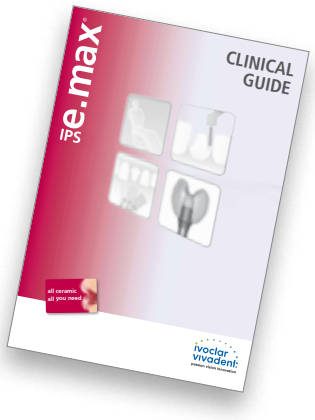
* Silanizing is not necessary for conventional cementation.

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

Please observe the corresponding Instructions for Use.

b. 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 is checked. If adjustments are required, the restoration must 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.

More detailed information on the clinical working steps can be found in the IPS e.max Clinical Guide.



Care notes

Same as natural teeth, high-quality IPS e.max Press restorations require regular professional care. This is beneficial for both the health of the gingiva and teeth as well as the overall appearance. The pumice-free Proxyt pink polishing paste is used to care for the surfaces without causing any wear. The low RDA* value = 7 (Relative Dentin Abrasion) is a reliable confirmation to use a cleaning paste that is only a little abrasive. Scientific investigations and long-term clinical experience have proved the gentle effect compared to other pastes.

Frequently Asked Questions

Why is it important to determine the shade of the preparation?

Depending on the translucency level of the ingot used, the shade of the preparation influences the seated all-ceramic restoration. Therefore, knowing the shade of the preparation is imperative. A corresponding tooth-coloured die is fabricated with the help of IPS Natural Die Material. It is used to achieve an optimum match of the restoration shade to the given clinical situation.

How can it be determined if a contouring wax is organic or inorganic?

Organic waxes turn transparent during melting. Inorganic waxes, however, remain opaque even when molten.

What is the difference between monochromatic and polychromatic ingots?

Monochromatic ingots are single-coloured and have a defined translucency, e.g. HT, LT, MO.
IPS e.max Press Multi is a polychromatic ingot. It demonstrates a shade and translucency gradation.

What is horizontal pressing?

With the patented processing procedure for the IPS e.max Press Multi, the waxed-up restoration is attached with wax to the special IPS Multi Investing Ring Base using prefabricated IPS Multi Wax Patterns. Upon the subsequent press procedures, namely horizontal press procedures, the ceramic is pressed into the restoration from the side, with the dentin / incisal gradation of the ingot being transferred to the restoration.

For what indications can the IPS e.max Press Multi ingot be used?

The Multi ingot can be used for the fabrication of anterior and posterior crowns, hybrid abutment crowns and veneers. Given the processing technique, the Multi cannot be used for bridges. Inlays, onlays and thin veneers would be technically feasible, but given the limited layer thickness (0.3 mm) the incisal / dentin transition is not visible.

Why does an IPS Multi Wax Pattern have to be used for the investment before pressing the IPS e.max Press Multi?

The IPS Multi Wax Pattern was specifically developed for pressing the IPS e.max Press Multi. Its special geometry enables the controlled flow of the polychromatic IPS e.max Press Multi and is thus essential for successful pressing.

What must be observed when fabricating very delicate mandibular anterior crowns using IPS e.max Press Multi?

The IPS Multi Wax Pattern Form B must be used for restorations with delicate dies. The special shape reduces the flow speed of the ceramic and minimizes the risk of the die fracturing during pressing. To prevent die fractures during pressing of very delicate dies, a placement of a ZrO_2 pin in the cavity during investment is recommended.

Can the incisal proportion be varied when using the IPS e.max Press Multi ingot?

By shifting the restoration connected to the IPS Multi Wax Pattern along the IPS Multi Investment Ring Base, the incisal proportion can be increased. The dentin remains in the "dead space" above the sprueing and is not pressed into the restoration.

When is the IPS e.max Press HT ingot used?

The IPS e.max Press HT ingot is used for the fabrication of restorations that are primarily intended to reconstruct natural enamel, e.g. inlays, veneers. For this purpose, the staining technique is particularly suitable. Note: When used for larger restorations, the brightness level of too translucent ingots may decrease. In such cases, an ingot with a lower translucency is recommended.

What are thin veneers?

Thin veneers are very thin ceramic veneers with a thickness of 0.3 – 0.4 mm for the adhesive cementation in the anterior region. They are used for cosmetic adjustments (e.g. malposition, extension of the incisal edge). Thin veneers do not necessarily require preparation.

What are occlusal veneers (table tops)?

Occlusal veneers are thin ceramic veneers with a thickness of min. 1.0 mm to cover occlusal surfaces in the posterior region. They are used for minor adjustments, e.g. malposition, increase in vertical dimensions. Table tops can be seated using minimally invasive preparation. Table tops must be seated using the adhesive cementation technique.

When is the IPS e.max Press LT ingot used?

The IPS e.max Press LT ingot is used for the fabrication of restorations in the staining and cut-back technique. The LT ingot is used for bulky restorations and if the dentin of the natural tooth has to be replaced. If used for the staining technique, IPS e.max Press LT ingots ensure sufficient brightness.

May IPS e.max Press LT ingots also be used to fabricate frameworks for subsequent veneering?

The shading and translucency of the IPS e.max Press LT material is designed for restorations fabricated in the staining and cut-back technique. If frameworks are made of IPS e.max Press LT and subsequently fully veneered with IPS e.max Ceram (Dentin and Incisal materials), the shade and brightness values are slightly mismatched and the tooth shade might differ from the shade guide.

What is the procedure to achieve the desired tooth shade when IPS e.max Press HO ingots are used?

Deep Dentin must be used for the Wash firing. Subsequently, the framework shade is adapted to the (final) dentin shade with a Characterization firing using Shades and Essences.

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 IPS e.max Press also be pressed using the IPS Investment Ring System 300 g?

Since only one single IPS e.max Press ingot (small or large) may be used per press cycle, the IPS Investment Ring System 300 g cannot be used.

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

IPS e.max Press has been especially coordinated with the Ivoclar Vivadent press furnaces. If other press furnaces are used, the parameters may have to be adjusted accordingly by the user.

Which firing tray should be used for the firing of IPS e.max Press restorations?

A honey-combed tray and the corresponding pins, accessories for Programat ceramic furnaces, must be used for firing. The use of any other firing trays may require an adjustment of the firing parameters. Moreover, it cannot be ensured that all furnace functions (e.g. infrared technology of the Programat EP 5010) work flawlessly.

Can IPS e.max Ceram Margin materials be used with IPS e.max Press?

IPS e.max Ceram Margin materials must not be used on glass-ceramics (IPS e.max Press and CAD), since the firing temperatures are too high and the reduction of the shoulder would weaken the restoration. Margin materials are exclusively used on ZrO_2.

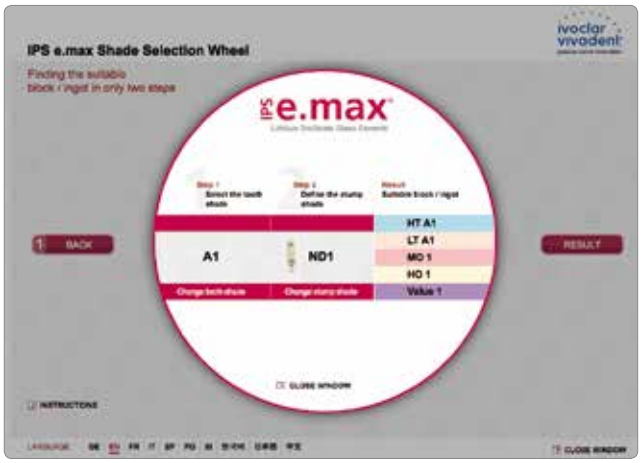
Ingot selection

The ingots are selected on the basis of the desired tooth shade (Bleach BL or A-D), the determined die shade (ND1 – ND9), and/or abutment shade, as well as the desired processing technique. The IPS e.max Shade Selection Wheel is used to determine the recommended ingot.

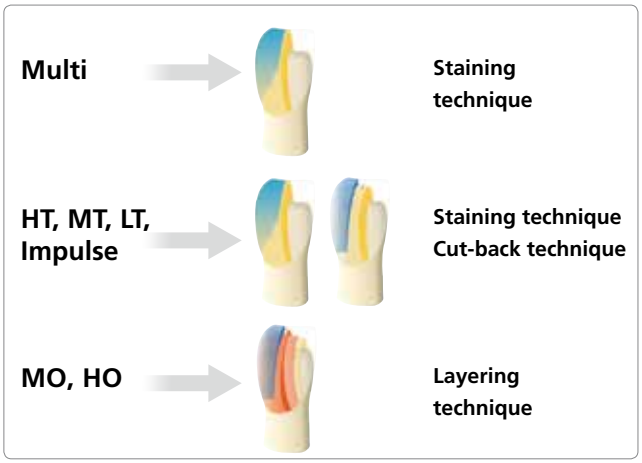
1. input: Determined tooth shade (A-D shade guide)
2. input: Shade of the preparation defined with the IPS Natural Die Material shade guide
3. output: Display of the recommended ingots (levels of translucency)
4. selection: Selection of the suitable ingot (level of translucency) depending on the indication and the desired processing technique

1. input: Determined tooth shade (A-D shade guide)

2. input: Shade of the preparation defined with the IPS Natural Die Material shade guide



3. output: Display of the recommended ingots (levels of translucency)



4. selection: Selection of the suitable ingot (level of translucency) depending on the indication and the desired processing technique

Note:
The IPS e.max Shade Selection is also available as an **online version** from **www.ivoclarvivadent.com** or as **app for iPad**.

– The recommendations for the ingot selection correlate with the indications, as well as the preparation guidelines and minimum layer thicknesses.
– In case of shade deviations to the clinical situation, adjust the restoration shade by means of characterization with IPS e.max Ceram Shades and Essences.
– If (highly) translucent ingots are used, the layer thickness and die shade must be carefully observed.
– With thicker layers, an ingot with a lower translucency must be selected to prevent a loss in brightness (greying).

Clinical pictures:

IPS e.max lithium disilicate veneer cemented with Variolink® Veneer
Dr Lukas Enggist / DT Jürgen Seger, Liechtenstein

IPS e.max lithium disilicate inlay cemented with Multilink® Automix
Dr Ronny Watzke / DT Sandra Sulser, Liechtenstein

IPS e.max lithium disilicate anterior bridge cemented with SpeedCEM®
Dr Ronny Watzke / DT Franz Perkon, Liechtenstein

IPS e.max zirconium oxide anterior bridge cemented with SpeedCEM®
Dr Ronny Watzke / DT Pascal Scherrer, Liechtenstein

44 – 47 Table tops made of IPS e.max Press (staining technique)
Prof. D. Edellhoff / O. Brix

11: Crown made of IPS e.max Press HO (layering technique)
Jürgen Seger, Liechtenstein.

Press and firing parameters

Programat EP 3000 / EP 5000

Select the press program in accordance with the selected ingot to be pressed and the investment ring used.

Note: **The press parameters for the new ingots are integrated starting with software version V7.0.**

Programat EP 3010 / EP 5010

Select the press program in accordance with the selected ingot to be pressed and the investment ring used.

Note: **The press parameters for the new ingots are integrated starting with software version V1.2.**

Firing parameters for IPS e.max Press

- A a honey-combed tray and the corresponding pins, accessories for Programat ceramic furnaces, must be used for firing.
- The firing parameters have to 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 on. A decrease 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 / 50°F).
- If a non-Ivoclar Vivadent furnace is used, temperature corrections may be necessary.
- Remove IPS e.max Press 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.

Note regarding the firing parameters for the IPS e.max Press staining technique

Given the geometry of the restorations, the layer thicknesses of the pressed object may vary considerably. When the objects cool after the firing cycle, the different cooling speeds in the areas with different dimensions may result in internal tensions. In the worst case, these tensile stresses may result in fractures in the pressed ceramic objects. By using slow cooling (long-term cooling L), these tensions can be minimized.

If the layer thickness of the pressed object exceeds 2 mm, long-term cooling L is recommended for monolithic restorations.

IPS e.max Press – Staining Technique

IPS e.max Ceram on IPS e.max Press ***Staining technique***	Stand-by temperature **B** [°C/°F]	Closing time **S** [min]	Heating rate **t** [°C/°F/min]	Firing temperature **T_1** [°C/°F]	Holding time **H** [min]	Vacuum 1 **V_1** [°C/°F]	Vacuum 2 **V_2** [°C/°F]	L* **L** [°C/°F]
Stain and Characterization firing	403/757	6:00	60/108	770/1418	1:00	450/842	769/1416	500/932
Glaze firing	403/757	6:00	60/108	770/1418	1:00-2:00	450/842	769/1416	500/932
Add-On after Glaze firing	403/757	6:00	50/90	700/1292	1:00	450/842	699/1290	500/932

* **Note**: If the layer thickness of the pressed object exceeds 2 mm, long-term cooling L is recommended.

IPS e.max Press – Cut-Back Technique

IPS e.max Ceram on IPS e.max Press ***Cut-back technique***	Stand-by temperature **B** [°C/°F]	Closing time **S** [min]	Heating rate **t** [°C/°F/min]	Firing temperature **T_1** [°C/°F]	Holding time **H** [min]	Vacuum 1 **V_1** °C/°F]	Vacuum 2 **V_2** [°C/°F]
Wash firing (foundation)	403/757	4:00	50/90	750/1382	1:00	450/842	749/1380
Incisal firing	403/757	4:00	50/90	750/1382	1:00	450/842	749/1380
Stain firing	403/757	6:00	60/108	725/1337	1:00	450/842	724/1335
Glaze firing	403/757	6:00	60/108	725/1337	1:00	450/842	724/1335
Add-On with Glaze Firing	403/757	6:00	60/108	725/1337	1:00	450/842	724/1335
Add-On after Glaze firing	403/757	6:00	50/90	700/1292	1:00	450/842	699/1290

IPS e.max Press HO/MO Layering Technique

IPS e.max Ceram on IPS e.max Press ***Layering technique***	Stand-by temperature **B** [°C/°F]	Closing time **S** [min]	Heating rate **t** [°C/°F/min]	Firing temperature **T_1** [°C/°F]	Holding time **H** [min]	Vacuum 1 **V_1** [°C/°F]	Vacuum 2 **V_2** [°C/°F]
Wash firing (foundation)	403/757	4:00	50/90	750/1382	1:00	450/842	749/1380
Wash firing (foundation) characterization	403/757	4:00	50/90	750/1382	1:00	450/842	749/1380
1st Dentin and Incisal firing	403/757	4:00	50/90	750/1382	1:00	450/842	749/1380
2nd Dentin and Incisal firing	403/757	4:00	50/90	750/1382	1:00	450/842	749/1380
Stain firing	403/757	6:00	60/108	725/1337	1:00	450/842	724/1335
Glaze firing	403/757	6:00	60/108	725/1337	1:00	450/842	724/1335
Add-On with Glaze Firing	403/757	6:00	60/108	725/1337	1:00	450/842	724/1335
Add-On after Glaze firing	403/757	6:00	50/90	700/1292	1:00	450/842	699/1290

Crystallization and Firing Parameters **please fold out the page**

Ivoclar Vivadent – worldwide

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

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

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

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

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

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

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

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

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

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

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

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

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

Ivoclar Vivadent Ltd.
12F W-Tower, 1303-37
Seocho-dong, Seocho-gu,
Seoul 137-855
Republic of Korea
Tel. +82 2 536 0714
Fax +82 2 596 0155
www.ivoclarvivadent.co.kr

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

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

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

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

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

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

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

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

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

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

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

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

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