IPS Style® Ceram

Instructions for Use

MAKE IT STYLE YOUR!

ivoclar vivadent®
technical


IPS Style® Press
Ingots
IPS Style® Ceram
One
IPS Style® Ceram
Dentin
IPS Style® Ceram
Incisal
IPS Style® Press
IPS Style® Press
Ingots

IPS Style®

IPS Style® is an innovative ceramic system for the fabrication of metal-ceramic restorations – from anterior crowns to multi-unit bridges.
IPS Style is based on newly developed glass-ceramics containing leucite, fluorapatite and oxyapatite. They enable the fabrication of restorations featuring high firing stability, minimal shrinkage and true-to-nature esthetics.

IPS Style comprises materials for the conventional veneering technique.

– For the **conventional veneering technique** there is **IPS Style Ceram**, a highly esthetic metal-ceramic material with leucite, fluorapatite and oxyapatite for *individualized design possibilities* and *virtually limitless creativity*.

– As a **single-layer ceramic**, **IPS Style Ceram One** offers a suitable option for *quick and uncomplicated layering,* depending on the respective patient requirements.

IPS Style® Ceram

IPS Style® Ceram One

With its universal stains and glazes for the individualized staining and characterization of ceramic materials, **IPS Ivocolor** rounds out the system. The range of products has been coordinated with the layering, press and CAD ceramics from Ivoclar Vivadent and the zirconium oxides from Wieland Dental and offers versatile processing options for a wide range CTE values.

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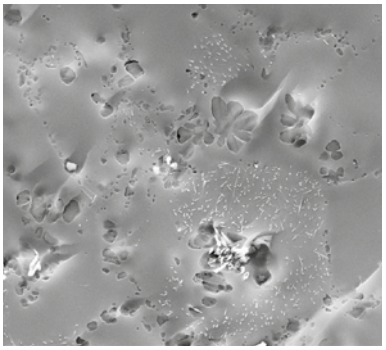

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Practical Procedure

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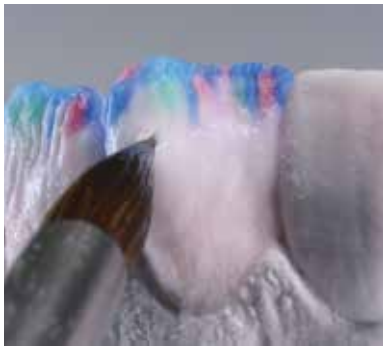


COMPLETION

General Information

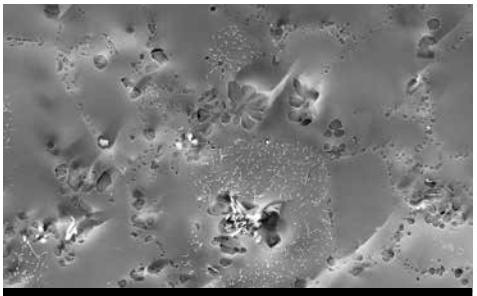
IMPORTANT AND INTERESTING

All about IPS Style®

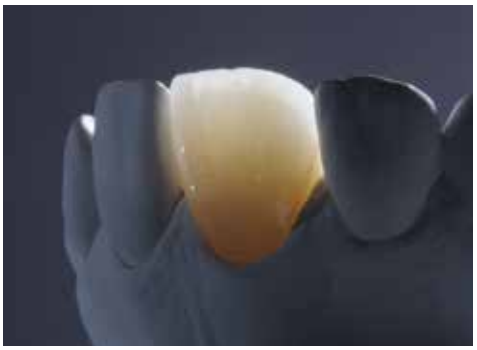
IPS Style® Ceram

Material

IPS Style is a feldspar-free veneering ceramic for the fabrication of dental restorations using both the one-layer procedure and the conventional layering technique on high-gold, reduced-gold, palladium-based alloys and base metal alloy frameworks in the CTE range of 13.8 to 15.2 x 10^{-6}/K (25–500 °C). The main firing cycle for IPS Style Ceram is conducted at 790°C / 1454°F, which is significantly lower than the temperature needed for conventional feldspar ceramics.



IPS Style® Ceram



The chemical basis of IPS Style consists of mixed glass-ceramics containing leucite $KAlSi_2O_6$, fluorapatite $Ca_5(PO_4)_3F$ and oxyapatite $NaY_9(SiO_4)_8O_2$ as crystal phases. The contents and distribution of the crystals in these glass-ceramics, as well as their viscosities are responsible for the physico-chemical properties of IPS Style together with the carefully adjusted grain size distribution in the layering materials. This material principle has been implemented for all materials, from the opaquer to the incisal material, and ensures the optimum build-up of a restoration with regard to adhesion, compatibility and esthetic appearance.

Indications

- Conventional multi-layer veneering ceramic for the most popular dental alloys (including electroplating) in the CTE range of 13.8–15.2 x 10^{-6}/K (25–500°C) (IPS Style Ceram)
- One-layer veneering ceramic for the most popular dental alloys (including electroplating) in the CTE range of 13.8–15.2 x 10^{-6}/K (25–500°C) (IPS Style Ceram One)
- Veneers on refractory die material (only IPS Style Ceram)
- Characterization with IPS Ivocolor Shade and Essence stains
- Glazing with IPS Ivocolor Glaze

Contraindications

- Bruxism
- Veneering of titanium and zirconium oxide frameworks
- Any other uses not listed in the indications.

Important processing restrictions

- Exceeding or falling short of the stipulated veneering layer thicknesses
- Failure to observe the layer thickness ratio between the framework and layering ceramic
- Mixing with and processing in conjunction with other dental ceramics
- Veneering of dental alloys not within the stipulated CTE range
- Failure to observe the necessary minimum connector and framework thicknesses

Side effects

If patients are known to be allergic to any of the components in the materials, IPS Style Ceram restorations should not be used.

Properties of IPS Style Ceram according to ISO 6872:2015 and ISO 9693-1:2012

IPS Style Ceram is classified as a dental ceramic of Type II and Class I. The adhesive bond of the metal-ceramic system is > 25 MPa.

Property	Example value	According to ISO [1]
Flexural strength [MPa]	107	≥ 50
Chemical solubility [µg/m²]	10	< 100

[1] ISO 6872:2015, ISO 9693-1:2012

Mass	CTE 2x (25–500 °C) [10^{-6}/K]	CTE 4x (25–500 °C) [10^{-6}/K]	CTE Ø (25–500 °C) [10^{-6}/K]	TG [°C]
IPS Style Ceram Powder Opaquer 870	13.5 ± 0,5	13.7 ± 0.5	13.6 ± 0.5	540 ± 20
IPS Style Ceram Margin	12.8 ± 0.5	13.1 ± 0.5	13.0 ± 0.5	580 ± 20
IPS Style Ceram veneering materials[1]	12.0 ± 0.5	12.4 ± 0.5	12.2 ± 0.5	525 ± 20
IPS Style Ceram Opal Effect	12.0 ± 0.5	12.4 ± 0.5	12.2 ± 0.5	510 ± 20
IPS Style Ceram One veneering materials	12.0 ± 0.5	12.4 ± 0.5	12.2 ± 0.5	525 ± 20
IPS Style Ceram Add-On Margin [2]	12.7 ± 0.5	13.3 ± 0.5	13.0 ± 0.5	480 ± 20
IPS Style Ceram Add-On Dentin / Incisal / BL [2]	13.0 ± 0.5	13.6 ± 0.5	13.3 ± 0.5	475 ± 20
IPS Style Ceram Add-On 690°C[2]	12.0 ± 0.5	12.4 ± 0.5	12.2 ± 0.5	455 ± 20

CTE 2x: Coefficient of thermal expansion after 2 firing cycles, CTE 4x: Coefficient of thermal expansion after 4 firing cycles, CTE Ø: Average value of CTE 2x and CTE 4x; TG: Glass transition temperature

[1] Deep Dentin, Dentin, Incisal, Transpa, Impulse, Gingiva

[2] For IPS Style Ceram Add-On the expansion values apply for a temperature interval of 25 to 400 °C.

Warnings

- IPS Margin Sealer contains hexane
- Hexane is highly flammable and detrimental to health. Avoid contact of the material with skin and eyes. Do not inhale vapours and keep away from sources of ignition.
- Do not inhale ceramic dust during finishing – use exhaust air discharge and dust mask.
- Observe the Safety Data Sheet (SDS).

Alloy table

Provided the required framework design with metal scallops (see page 20–24) and the ceramic layer thicknesses up to max. 1.5 mm can be achieved, these alloys can be used with standard cooling in the Programat® furnaces. If the requirements cannot be met, long-term cooling may be favourable on base metal alloys as well as alloys with a high CTE. The range of available alloys may vary from country to country.

Alloy	CTE 25–500°C	Oxidation		
		Temperature [°C]	Holding time [min]	Vacuum
High-Gold				
Brite Gold	14.8	925	5	no vac
Brite Gold XH	14.4	980	5	vac
Golden Ceramic	14.6	925	5	no vac
Aquarius Hard	14.5	925	5	no vac
Aquarius	14.6	925	5	no vac
d.SIGN 98	14.3	925	5	no vac
W BioPorta G	14.5	930	5	no vac
Y	14.6	1010	5	no vac
Aquarius XH	14.1	925	5	no vac
Y-2	15.0	1010	5	no vac
W Porta Reflex	14.3	930	5	no vac
W Porta P6	14.0	930	5	no vac
W Porta Geo Ti	14.1	930	5	no vac
Y-Lite	13.9	1010	5	no vac
Sagittarius	14.0	950	1	no vac
Y-1	14.8	1010	5	no vac
d.SIGN 96	14.3	950	5	vac
Reduced-Gold				
W Porta Impuls	14.0	930	5	no vac
d.SIGN 91	14.2	950	1	no vac
W Porta SMK 82	13.9	930	5	no vac
W	14.2	950	1	no vac
W-5	14.0	950	5	no vac
Lodestar	14.1	950	1	no vac
W-3	13.9	950	1	no vac
Leo	13.9	950	1	no vac
W-2	14.2	950	1	no vac
W Euro 45	14.1	930	5	no vac
Palladium Content				
W Simidur S2	14.2	930	5	no vac
Spartan Plus	14.3	1010	5	vac
Spartan	14.2	1010	5	vac
Capricorn	14.1	950	1	no vac
d.SIGN 84	13.8	950	1	no vac
Protocol	13.8	950	1	no vac
Callisto 75 Pd	13.9	900	1	no vac
W Duo Pal 6	14.1	930	5	no vac
Aries	14.7	950	1	no vac
d.SIGN 67	13.9	950	1	no vac
d.SIGN 59	14.5	1010	10	no vac
W Simidur S12	14.8	930	5	no vac
W Simidur Reflex LC	14.8	930	5	no vac
d.SIGN 53	14.8	1010	10	no vac
W-1	15.2	1010	5	vac
Capricorn 15	14.3	950	1	no vac
Callisto CPG	14.2	900	1	no vac

Alloy	CTE 25–500°C	Oxidation		
		Temperature [°C]	Holding time [min]	Vacuum
Implant Alloys				
W Porta Implant	14.2	930	5	no vac
Callisto Implant 78	13.9	950	5	vac
Callisto Implant 33	14.0	925	1	no vac
W Euro 33 Implant	14.3	930	5	no vac
IS-64	14.8	1010	5	no vac
Callisto Implant 60	14.5	950	1	no vac
Non-precious Metals				
Colado NC	14.0	980	1	vac
4all	13.9	950	1	no vac
d.SIGN 30	14.5	925	5	vac
Colado CC	14.2	950	1	vac
For CAD/CAM				
Non-precious Metals				
Colado CAD CoCr4	14.4	980	1	vac

W Original WIELAND Dental Alloy

System components

The following chapter provides a detailed overview of the system components of IPS Style Ceram and the processing accessories.

IPS Style® Ceram Powder Opaquer

Example of use:

Product description

The IPS Style Ceram Powder Opaquers are opaque ceramic materials to mask the metal framework and create the basic shade. They are available with two sinter temperatures, i.e. high-sintering and low-sintering.

Shade range:

IPS Style® Ceram Intensive Powder Opaquer

Example of use:

Product description:

The IPS Style Ceram Intensive Powder Opaquers are opaque, specially shaded ceramic materials for the individualization of the basic opaquer shade. They provide the illusion of increased depth, particularly where space is limited in the labial and occlusal areas.

Shade range:

IPS Style® Ceram Margin

Example of use:

Product description:

The IPS Style Ceram Margin materials demonstrate a somewhat higher opacity and more fluorescence than the IPS Style Ceram Dentin materials and thus enable the design of ceramic margins.

Shade range:

IPS Style® Ceram Intensive Margin

Example of use:

Product description:
The IPS Style Ceram Intensive Margin materials are used for the individualized design of the ceramic margin. They can be mixed with the Margin materials or applied directly.

Shade range:

IPS Style® Ceram Deep Dentin

Example of use:

Product description:
The IPS Style Ceram Deep Dentin materials are opaque, shaded dentin materials to be used in areas with limited layer thicknesses and at the incisal ends of frameworks to mask light optical refractive edges and to achieve true-to-nature results.

Shade range:

IPS Style® Ceram Dentin

Example of use:

Product description:
The shade and translucency of the IPS System Ceram Dentin materials have been adjusted to simulate natural dentin. They permit the correct reproduction of the selected dentin shade.

Shade range:

IPS Style® Ceram Mamelon

Example of use:

Product description:
The IPS Style Ceram Mamelon materials are intensive, opaque effect materials for the accentuation of the incisal third. Depending on the working habits of the user, the material is applied in thin stripes on reduced dentin.

Shade range:

Effect:
See page 15 completed restoration 2

IPS Style® Ceram Opal Effect

Example of use:

Product description:
The IPS Style Ceram Opal Effect materials are specially shaded incisal materials that permit the simulation of the dynamic light-optical capabilities of natural teeth.

Shade range:

Effect:
See page 15 completed restoration 2

IPS Style® Ceram Transpa

Example of use:

Product description:
The IPS Style Ceram Transpa materials are available in different shade nuances. They are suitable to reproduce shaded, transparent areas, particularly in the incisal third.

Shade range:

Effect:
See page 15 completed restoration 1

For better representation, the following layering materials were shaded with pigments that fire without leaving residue.
– IPS Style Ceram Mamelon light – orange
– IPS Style Ceram Opal Effect OE1 – blue
– IPS Style Ceram Opal Effect OE violet – green
– IPS Style Ceram Transpa blue – blue

IPS Style® Ceram Special Incisal

Example of use:

Product description:
The IPS System Ceram Special Incisal materials may either be mixed with the IPS Style Incisal materials to modify and intensify the shade or applied directly. They are especially suitable for restorations for elderly patients with slightly discoloured teeth.

Shade range:

Effect:
See page 15 completed restoration 1

IPS Style® Ceram Inter Incisal

Example of use:

Product description:
The IPS Style Ceram Inter Incisal material is used to increase the brightness value of the incisal third. It is applied directly on the dentin in an implied butterfly shape.

Shade range:

Effect:
See page 15 completed restoration 2

IPS Style® Ceram Cervical Transpa

Example of use:

Product description:
The IPS Style Ceram Cervical Transpa materials reproduce the shades with a more intensive translucency and support the lifelike transition from the gingiva to the veneer.

Shade range:

Effect:
See page 15 completed restoration 2

For better representation, the following layering materials were shaded with pigments that fire without leaving residue.
– IPS Style Ceram Special Incisal yellow – green
– IPS Style Ceram Cervical Transpa yellow – red

IPS Style® Ceram Incisal

Example of use:

Product description:
The IPS Style Ceram Incisal materials are modelled according to the natural incisal material. In combination with the Dentin materials, they help achieve the correct A–D shade.

Shade range:

Effect:
See page 15 completed restoration 2

IPS Style® Ceram Incisal Edge

Example of use:

Product description:
The IPS Style Ceram Incisal Edge material is used to achieve what is known as the halo effect, which occurs in natural teeth by the refraction of light at the incisal edge.

Shade range:

Effect:
See page 15 completed restoration 2

IPS Style® Ceram Occlusal Dentin

Example of use:

Product description:
The IPS Style Ceram Occlusal Dentin materials are used to apply characterizations particularly in the occlusal area. They can also be used in the cervical, palatal and lingual areas.

Shade range:

For better representation, the following layering materials were shaded with pigments that fire without leaving residue.
– IPS Style Ceram Incisal Edge – orange

IPS Style® Ceram One

Example of use:

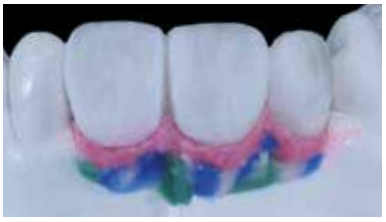
Product description:

The shade and translucency of the IPS Style Ceram One one-layer ceramic materials are especially coordinated to suit the full-contour design in the one-layer technique. They permit quick and uncomplicated layering.

Shade range:

IPS Style® Ceram Gingiva

Example of use:



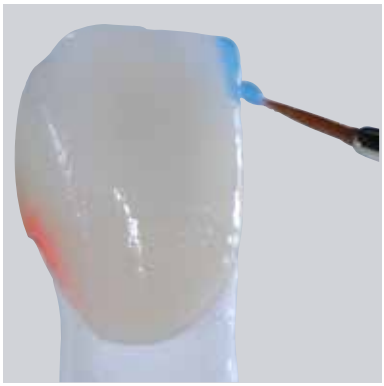
Product description:

The IPS Style Ceram Gingiva materials are specially shaded ceramic materials for the lifelike reconstruction of gingiva components.
They are coordinated with the Gingiva Solution shade concept from Ivoclar Vivadent and permit true-to-nature esthetics due to the comprehensive selection of Gingiva and Intensive Gingiva shades.

Shade range:

IPS Style® Ceram Add-On

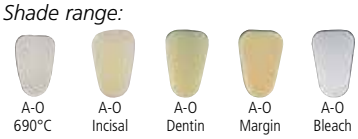
Example of use:



Product description:

The IPS Style Ceram Add-On materials are used for the adjustment of, e.g. contact points, pontic rests or the accuracy of fit of margins. Five add-on materials are available. IPS Style Ceram Add-On Margin, Dentin, Incisal, Bleach are used in conjunction with the Glaze firing with Add-On 690°C after the Glaze firing.

Shade range:



For better representation, certain Gingiva and Add-On materials were shaded with pigments that fire without leaving residue.

Completed restoration 1

Completed restoration 2

IPS® Build-Up Liquid

You can use IPS Build-Up Liquid allround or IPS Build-Up Liquid soft to adjust the stability of your ceramic materials to suit your working habits.

IPS® Build-Up Liquid allround
The IPS Build-Up Liquid allround is suitable for technicians who prefer a long working time and moist material coupled with high stability.

high stability

IPS® Build-Up Liquid soft
The IPS Build-Up Liquid soft is suitable for technicians who prefer a drier working consistency, thus avoiding the need for constant blotting as the liquid evaporates much quicker.

medium stability

Distilled water (H_2O)
Distilled water results in a short processing time and low stability. The firing results are not affected by distilled water.

low stability

Use distilled water to rewet the mixed or even already applied layering material.

IPS Powder Opaquer Liquid

The IPS Powder Opaquer Liquid is used to mix the IPS Style Powder Opaquer ceramic materials.

Distilled water can be used to rewet mixed or already applied powder opaquer.

IPS Margin Build-Up Liquid

The IPS Margin Build-Up Liquid is used to mix the IPS Style Ceram Margin materials.

IPS Model Sealer

The Model Sealer is used to isolate the stone model. It seals the stone pores and thus prevents the moisture of the ceramic from being absorbed by the stone.

IPS Margin Sealer

The Margin Sealer isolates the stone die during the fabrication of a ceramic margin.

IPS Ceramic Separating Liquid

The IPS Ceramic Separating Liquid is used to coat those areas that were impregnated with the IPS Model Sealer or IPS Margin Sealer. A clean separation of the ceramic material and the stone model or stone die is thus possible.

The cornerstone of naturalness

Shade determination – tooth shade, preparation shade, gingiva shade

The accurate tooth shade is the basis for a restoration with a lifelike appearance.

Shade determination of the natural tooth

The tooth shade is determined after tooth cleaning on the non-prepared tooth and/or the adjacent teeth. 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 as lifelike results as possible, shade determination should be carried out at daylight. Furthermore, the patient should not wear bright coloured clothing and/or lipstick.
For a flawless reproduction of the determined tooth shade, an additional digital photograph of the starting situation is recommended.

Another option for shade determination is provided by the Programat® P710. The integrated image processing software DSA (Digital Shade Assistant) compares three preselected shade guide teeth with the tooth to be analyzed and automatically indicates the closest matching tooth shade.
You can find additional information about this topic in the Operating Instructions "Programat P710 with DSA Function". They can be ordered from your Ivoclar Vivadent representative.

Die shade determination

The optical effect of the preparation shade must not be underestimated during the fabrication metal-free restorations (veneers). For that reason, the shade of the preparation should be determined together with the desired tooth shade.

The die shade is determined using the IPS Natural Die material shade guide after preparation. This enables the technician to fabricate a model die similar to the preparation of the patient, on the basis of which the correct shade and brightness values of the all-ceramic restoration may be selected.

Gingiva shade determination

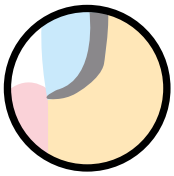
For a lifelike reconstruction of the gingiva, the anatomy, surface texture, shade and individual characteristics must be taken into consideration.

The gingiva shade is determined using the Gingiva Solution shade guide prior to the local anaesthesia or the preparation. Given the comprehensive selection of basic and intensive shades, the Gingiva Solution shade concept enables true-to-nature gingival esthetics.

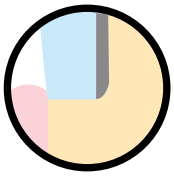
Preparation guidelines and minimum thicknesses

The preparation must provide sufficient space to achieve stable and esthetic metal-ceramic restorations.

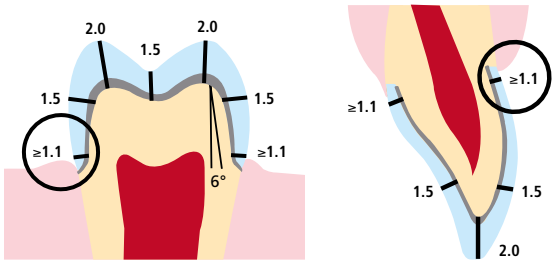
For the IPS Style Ceram veneering ceramic, the usual preparation guidelines for metal-ceramics apply. As usual for metal-supported restorations, dentists may use conventional cementation.



A chamfer preparation is suitable for tapered metal margins.



For esthetically pleasing single crowns and bridge abutment crowns, a ceramic margin should be provided. For that purpose, a shoulder preparation is required. With adhesive cementation, the margin can be designed in the ceramic. However, the margin should not be bevelled in such cases, since thinning, non-metal-supported margins demonstrate a fracture risk.



Example of a preparation
Dimensions in mm

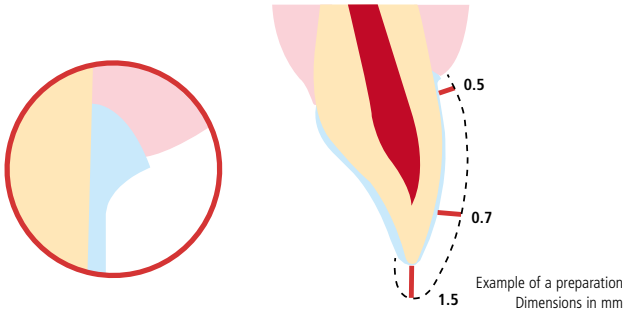
Minimum dimensions for metal frameworks:
- Crowns min. 0.3 mm
- Abutment crowns min. 0.5 mm

Minimum ceramic layer thickness:
- IPS Style Ceram min. 0.8 mm

Maximum ceramic layer thickness:
- IPS Style Ceram max. 1.7 mm

- With conventional cementation, a minimum height of 3 mm of the prepared stump and a convergence angle of approx. 6° must be observed.
- The minimum connector dimensions must be observed for bridge restorations. The connector dimensions depend on the selected alloy and the pontic width (see framework design criteria).

Veneers on refractory dies



Example of a preparation
Dimensions in mm

- If possible, the preparation for veneers should be entirely located in the enamel. The incisal preparation margins should not be located in the area of the abrasion surfaces or dynamic occlusal surfaces. Prepare a chamfer in the cervical area.
- Observe the required minimum layer thickness of 0.5 mm.

Framework fabrication and preparation

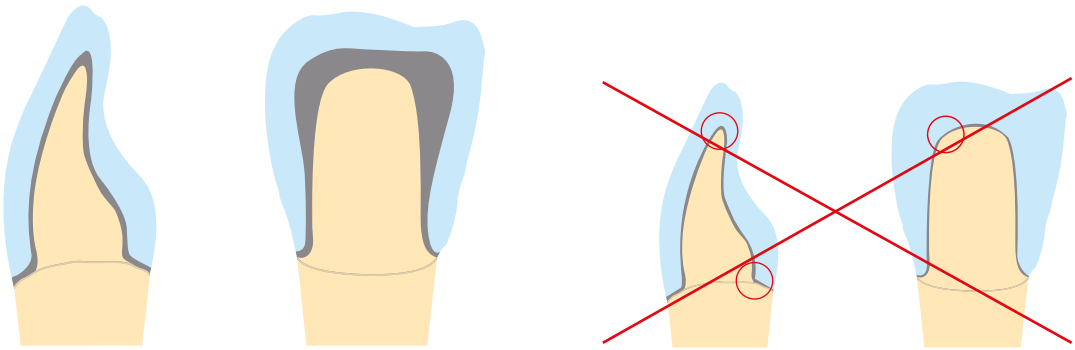
Framework design criteria

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

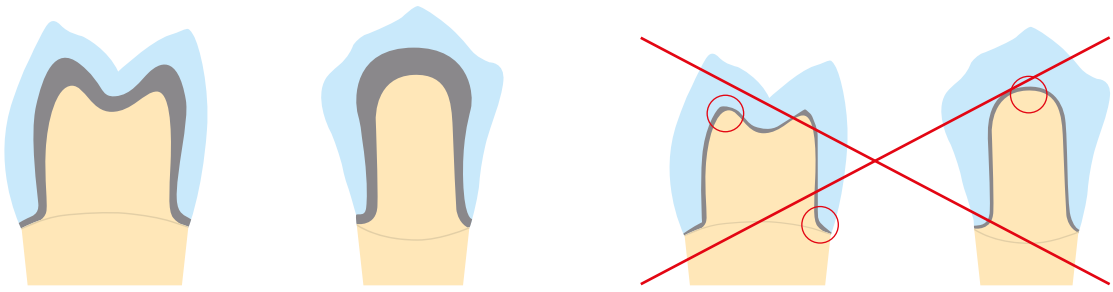
Functional support of the veneering ceramic

The framework reflects the shape of the tooth in a reduced form and should be designed in such a way that it supports the cusps and incisal edges resulting in a virtually even layer thickness of the veneering ceramic. This results in the masticatory forces occurring during functional chewing being exerted on the framework rather than on the veneering ceramic. Moreover, the framework must not show any angles and edges (see diagram) so that the masticatory forces do not result in tension peaks, which may cause delamination and cracks. Any sharp angles or edges should be removed in the wax-up rather than by grinding the metal framework. The wall thickness of the metal framework for single crowns must not be less than 0.3 mm and for bridge abutments 0.5 mm after finishing (see diagram). For further information, please refer to the Instructions for Use of the corresponding alloy.

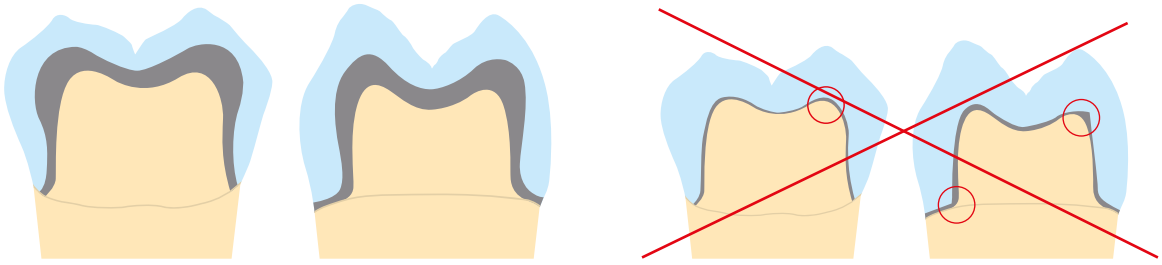
Anterior crowns



Premolar crowns

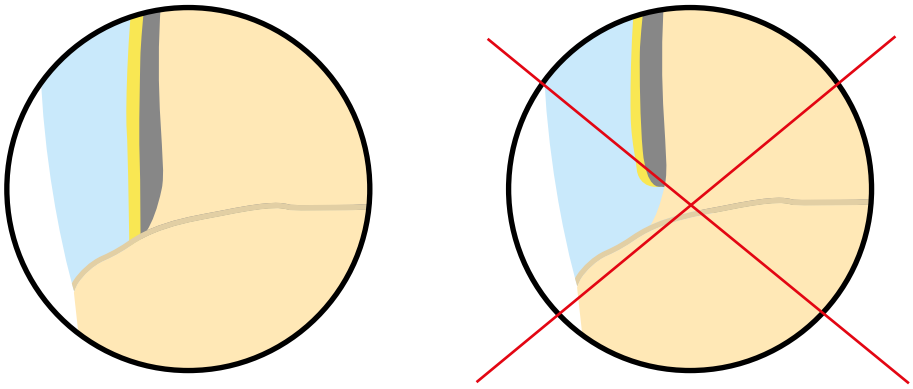


Molar crowns



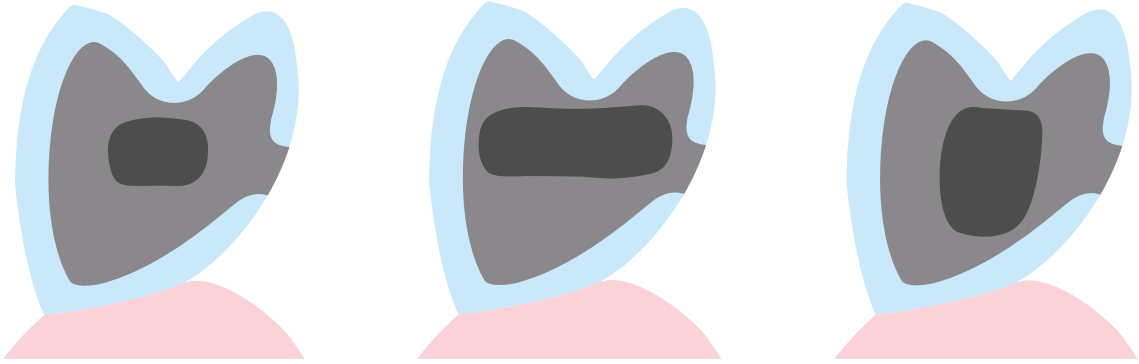
Framework design for fused ceramic margins

With fused ceramic margins, make sure that the framework rather than the veneer is supported by the prepared tooth. The framework is thus reduced exactly to the inner edge of the chamfer or shoulder preparation. In this way, functional support of the framework on the preparation is achieved. Excellent accuracy of fit of the framework on the preparation is essential to ensure that the margin material may not reach the inner aspects of the framework during subsequent application.



Framework stability

The dimensions and shape of the interdental connector surfaces decisively influence the stability of the restoration during processing, as well as the clinical long-term success after insertion. Therefore, the dimensions of the interdental connector surface must be designed in accordance with the alloy used (take the 0.2% proof stress into account)!
The thermal behaviour of the selected alloy during processing has to be considered when designing the framework.



Single connector width
= single stability

Double the width of the connector
= double the stability

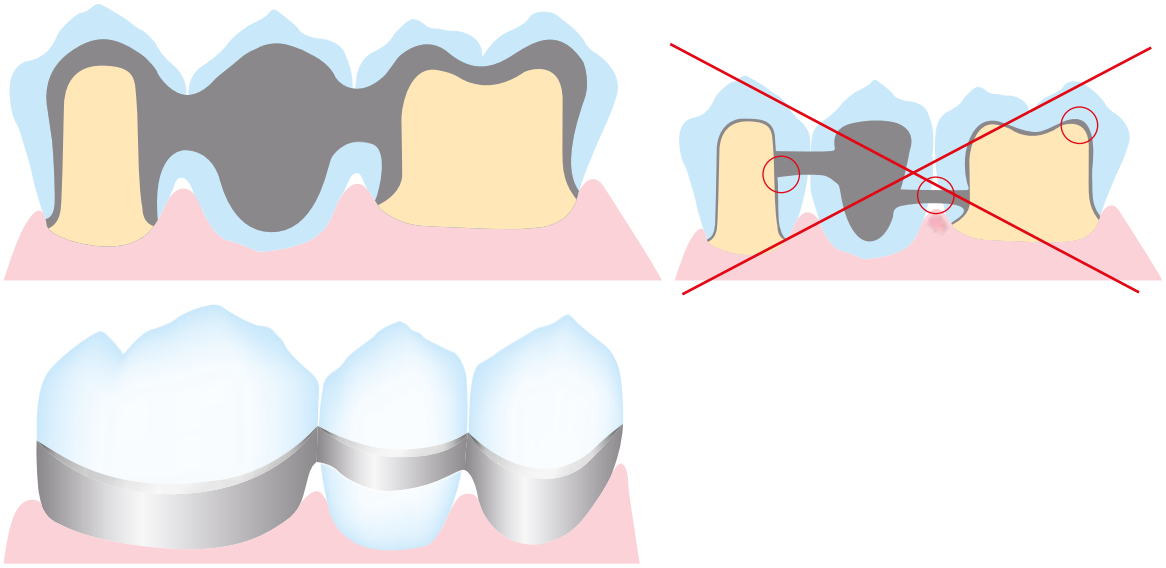
Double the height of the connector with single width
= eightfold stability

Framework design for bridges

Thermal stress during firing and masticatory forces after cementation affect metal frameworks. Therefore, these forces must be transferred to the framework rather than the veneer. Particularly in the connector areas between bridge abutments and bridge pontics in bridge reconstructions, the stability must be ensured with the help of the framework design and adequate framework material thickness. The framework design and framework thickness must therefore meet all the optical and functional requirements, as well as the aspects of periodontal hygiene. A full wax-up with the corresponding reduction of the ceramic provides the best prerequisites.

During veneering with ceramic materials, the bridge framework is exposed to high temperatures several times. With an inappropriate framework design or insufficient framework thickness, the high temperatures during firing may result in distortion or inaccuracy of fit of the framework. A scallop-type design with e.g. interproximal reinforcements, counteracts this development. Additionally, this framework design (e.g. with cooling grooves) ensures more even cooling of the restoration. This is particularly important if high gold alloys are used.

In order to enable optimum oral hygiene with bridge restorations, the design of the interdental spaces should be given special attention. Adequate opening of the interdental area without creating black triangles should be factored in when designing the framework in order to ensure proper periodontal hygiene with interdental brushes and dental floss.

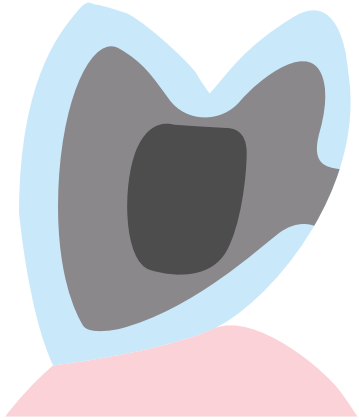


Design of bridge pontics

Bridge pontics are designed taking esthetic and functional aspects into account, as well as oral hygiene. The area of the pontic that contacts the alveolar ridge should ideally be made of ceramic.
In order to ensure adequate stability between the bridge pontic and the bridge abutments, a palatal and/or lingual scallop is recommended. Furthermore, to ensure even cooling of the bridge pontic that absorbs the most heat, additional cooling grooves are advantageous.

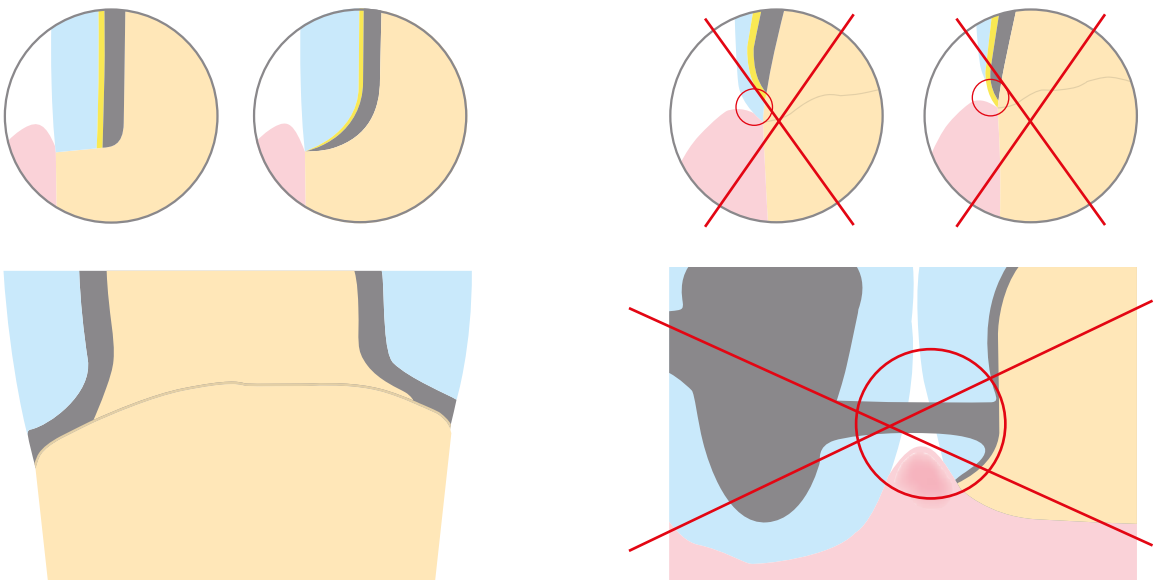
Bridge pontic design – ovate pontic

Bridge pontic design – saddle-type pontic



Interface between metal and ceramic

The interface between the metal framework and the veneering ceramic must be clearly defined. If possible, incorporate a right angle finish line. The junctures between the metal framework and the veneering ceramic must not be located in the contact area nor on surfaces involved in masticatory functions. The interface in the interdental area must be designed in such a way that cleaning of these difficult-to-access areas is possible.



Holding pins

In order not to damage the crown wall during processing, the crown and bridge frameworks are provided with holding pins. They are directly attached to the framework with the help of wax. Dimensions of Ø 0.5–1.0 mm for the holding pins have proven to be useful. They can be used to secure the framework by means of holding clips. Furthermore, the holding pins also act as cooling grooves during casting and firing.

– The holding pins must be placed in such a way that they do not interfere during try-in or in the articulator.
– They should only be removed without causing overheating once the restoration has been completed.

Please refer to the "Framework design guidelines for metal-ceramic restorations" for additional information on framework design. They can be ordered from your Ivoclar Vivadent representative.

Framework fabrication

Framework design

Design the framework with a reduced anatomical shape taking the planned build-up into account. The wall thickness of single crowns should be at least 0.3 mm, that of abutment crowns at least 0.5 mm. Make sure to provide sufficient stability of shape for the framework. Avoid sharp transitions and edges. Design the connector areas between the individual units in such a stable way that they meet the requirements for interdental hygiene and the alloy used.

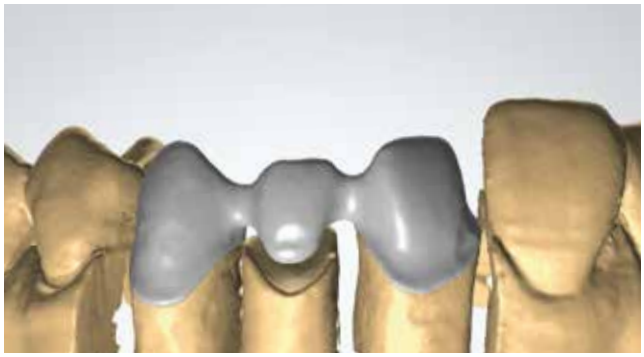
Starting situation: Three-unit anterior bridges in the maxilla (21 X 23 / bridge abutment tooth 22 to be replaced)

Conventional

Taking the above design criteria into account, the framework is contoured either conventionally with wax ...

CAD/CAM technology

... or digitally on the computer.



– Insufficiently dimensioned metal frameworks result in increased shrinkage behaviour of the veneering ceramics and require additional corrective firing cycles.
– If the metal framework is too small, the veneering ceramic is not adequately supported, which may lead to cracks and delamination, particularly in very thick ceramic layers.

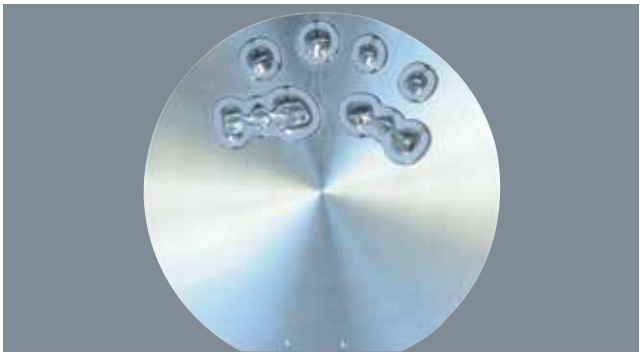
Fabrication process

Conventional

The framework is subsequently fabricated using the conventional casting technique...

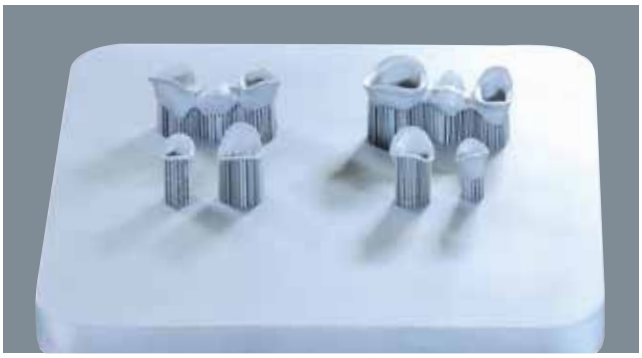
CAD/CAM technology

CNC milling technique



... or the CAD/CAM technology – by means of the CNC milling technique...

Laser sinter procedure



... or the laser sinter procedure.

The CTE range of IPS Style Ceram (see page 6) must be taken into account when selecting an alloy.

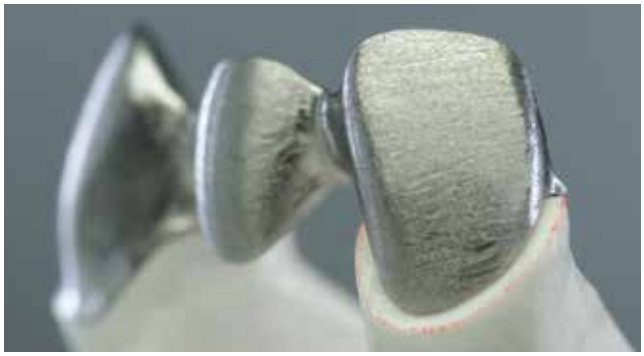
Framework preparation

Finishing the metal framework

The framework is finished using tungsten carbide metal burs or ceramic-bonded grinding instruments.

Further processing to accommodate a ceramic margin

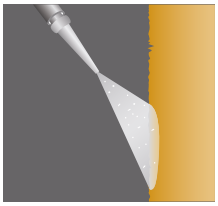
To create a ceramic margin, the marginal area of the framework (labial or circular) is reduced down to the inner edge of the chamfer or shoulder preparation.



– Please also observe the instructions for use of the corresponding alloy.
– Work in one direction only to avoid overlapping and inclusions in the metal surface.
– Do not use diamond grinding instruments. Diamond particles may be trapped in the alloy and cause bubbles in the ceramic material during firing.

Sand-blasting the metal framework

Carefully blast the framework with aluminium oxide Al_2O_3 50–100 µm after finishing.
The blasting pressure depends on the hardness of the framework alloy. Observe the instructions for use of the corresponding alloy.



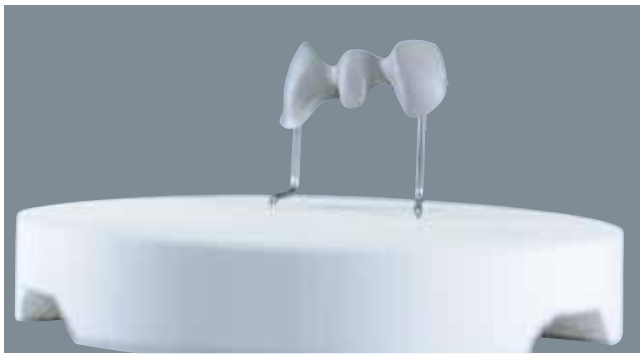
In order to prevent inclusions of jet medium particles, we recommend blasting the alloy with the indicated pressure while keeping the nozzle at a flat angle to the object surface. A contaminated metal surface may result in the formation of bubbles in the ceramic material during firing.

– Use only pure Al_2O_3 disposable jet medium to blast the alloys surface.
– Please also observe the instructions for use of the corresponding alloy.

The surface extension and formation of microretentions generated by blasting enhance the mechanical bond and thus the quality of the restoration.

Oxide firing

After blasting, clean the metal framework with a steam jet and dry with oil-free compressed air.



Conduct the oxide firing according to the manufacturer's instructions (see page 8 for Ivoclar Vivadent alloys).

After oxidation, check the framework for porosities or uneven oxide. If spots appear, the framework must be refinished, blasted and oxidized again. Observe the instructions for use of the corresponding alloy.

After cleaning again with the steam jet, the framework is ready for the ceramic veneer.

Do not touch the framework with your fingers after cleaning. Use tweezers and clips.

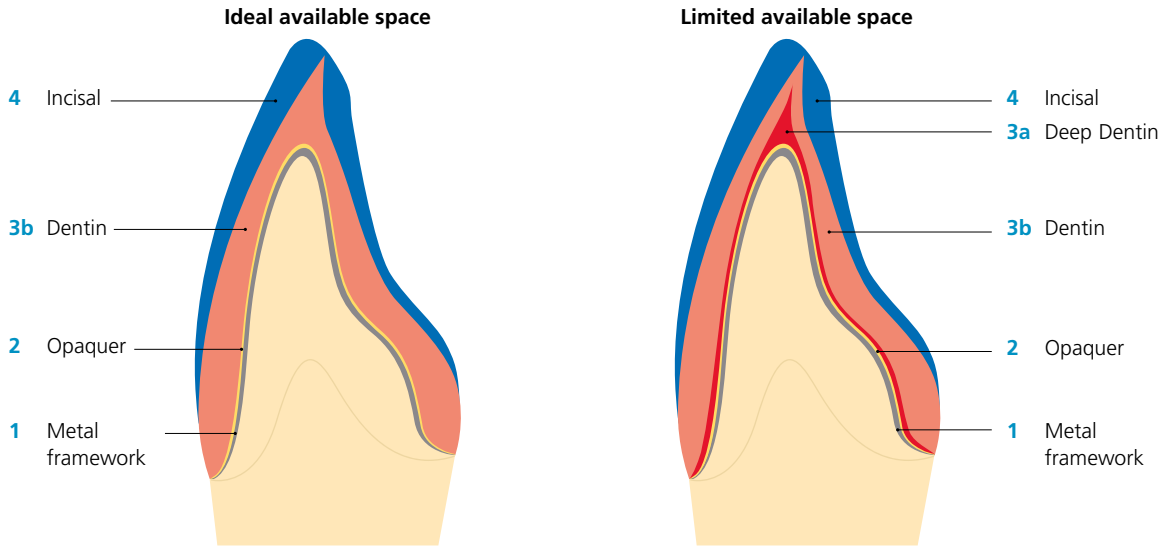
– For wide-span bridges, sufficient and secure support of the framework on the firing tray is recommended.
– Surface conditioning and oxidation of the frameworks is performed in accordance with the instructions for use of the alloy.

– During oxide firing, an oxide layer is formed on the surface of the metal framework. This layer consists of special bonding oxides, which establish a chemical bond to the ceramic and may thus enhance the adhesive bond.
– Not all alloys require an oxide firing. Therefore, carefully observe the instructions for use of the respective alloy.

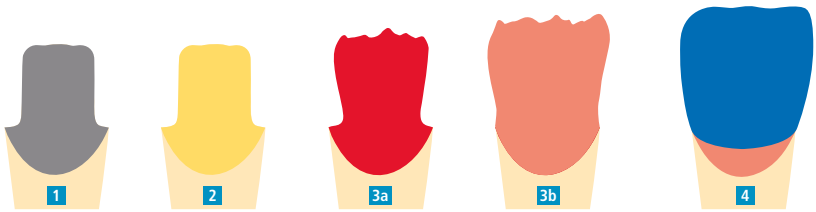
Ceramic layering and adaptation

IPS Style® Ceram – Standard layering technique

Layering example:



Step-by-step:



Layer thicknesses:

	Ideal layer thickness	Limited layer thickness
Framework	0.3–0.5 mm	0.3–0.5 mm
Opaquer	0.1 mm	0.1 mm
Deep Dentin		
Cervical	–	0.3 mm
Incisal	–	0.1 mm
Dentin		
Cervical	1.0 mm	0.5 mm
Incisal	0.6 mm	0.3 mm
Incisal		
Cervical	–	–
Incisal	0.4 mm	0.4 mm

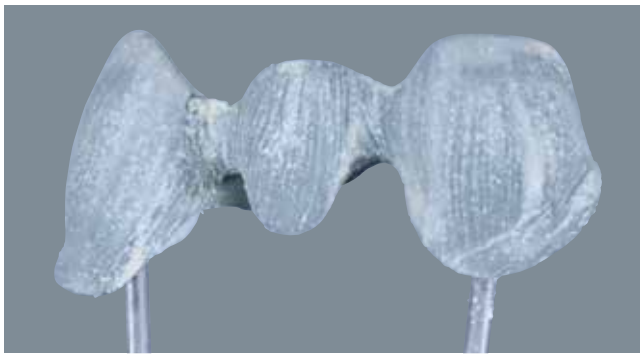
1st Opaquer firing

The IPS Style Ceram Powder Opaquer is selected according to the tooth shade.

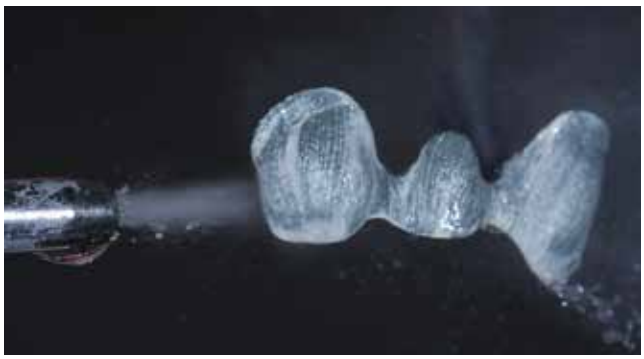
Remove the quantity of powder opaquer required for the wash firing from the jar and mix with IPS Powder Opaquer Liquid to the desired consistency on the mixing pad.

Thinly apply the first opaquer layer (wash) on the clean metal framework using a brush, agitate it into the microretentions and slightly roughen it.

Fire the wash opaquer-covered framework using the **1st Opaquer firing** (see (firing parameters on page 84).



After firing and cooling, clean the opaqued metal framework with the steam jet and subsequently dry with oil-free air. Do not touch the framework with your fingers after cleaning. Use tweezers and clips.



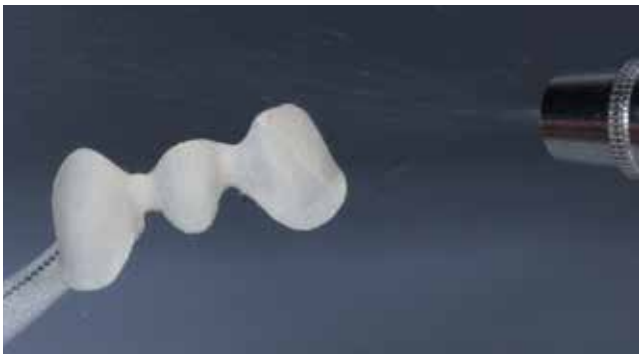
– Mix IPS Style Ceram Powder Opaquer only with the IPS Powder Opaquer Liquid.
– Make sure that no opaquer excess reaches the inner aspects of the crown, as this may lead to inaccuracies of fit.

As the first opaquer firing (wash firing) is the prerequisite for an intact bond between the metal and the ceramic, the opaquer is applied in a thin layer and fired. In this way, the metal is entirely wetted, which leads to a mechanical anchoring and a chemical-atomic bond of the opaquer. In this form, the first opaquer layer (wash) is the adhesion-enhancing layer between the metal and all subsequent ceramic layers.

2nd Opaquer firing

Remove the quantity of powder opaquer required for the covering layer from the jar and add it to the dried "wash opaquer residue" on the mixing pad. Again, mix the Powder Opaquer with the Powder Opaquer Liquid to the desired consistency.

Apply the second opaquer layer in an even, covering layer. Brushes or ball-shaped ceramic instruments are particularly suitable for this purpose.



The IPS Style Ceram Powder Opaquer and the IPS Powder Opaquer Liquid are also ideally suitable for the application with conventional spray-on techniques. The mixture of powder opaquer and powder opaquer liquid should have a rather low-viscosity consistency and should be individually adjusted to the spray-on system used. Observe the instructions of the manufacturer of the respective spray-on system.

Fire the completely opaqued framework using the **2nd Opaquer firing** (see firing parameters on page 84).

After firing, the IPS Style Ceram Powder Opaquer should show a covering, silky-mat surface.
The veneering surfaces of the alloy framework must be entirely covered with opaquer. Thoroughly clean the opaqued metal framework using the steam jet before any other ceramic material is applied.

– The IPS Style Ceram Powder Opaquer can be applied using a glass or ceramic instrument. Brushes or a spray-on system are also suitable for the application of IPS Style Ceram Powder Opaquer.
– If required, shade adjustments may be applied in the desired areas (e.g. in the cervical, incisal, occlusal or palatal areas) using IPS Style Ceram Intensive Powder Opaquer prior to the second Opaquer firing (see page 39).

1st Dentin/Incisal firing

Isolate the model before layering the Dentin/Incisal materials. In this way, the ceramic material is prevented from drying out or sticking to the model respectively. Isolate the stone die and the adjacent model areas using IPS Model Sealer.
Additionally, isolate the area of the pontics with IPS Ceramic Separating Liquid.

To optimize the wetting behaviour of the layering ceramic on the opaquer, applying a little layering ceramic in the cervical, interdental or palatal and occlusal areas and slightly roughening it is recommended for the first layer.

After that, line the basal pontic area with IPS Style Ceram Deep Dentin layering material and reposition the framework on the model.

The application of Deep Dentin in areas with limited layer thickness and at the incisal ends of the framework helps to mask light optical refractive edges and supports the attainment of true-to-nature results.

Layer the dentin core using IPS Style Ceram Dentin layering material either directly outlining a mamelon shape or build-up the material to full contour and subsequently reduce it (cut-back technique). For better verification of the size and position of the tooth, the cut-back technique is recommended.

You can use IPS Build-Up Liquid allround or IPS Build-Up Liquid soft to adjust the stability of your ceramic materials to suit your working habits (see page 16).

To achieve an optimum bond between the ceramic material and the opaquer surface, apply a small amount of IPS Style Ceram Deep Dentin material in the cervical and interdental areas (for bridges) and slightly roughen it.

The reduced area is subsequently supplemented with IPS Style Ceram Inicsal layering material. Make sure that the outlined mamelons are maintained in the dentin and that the restoration is slightly overcontoured so that the actual tooth shape is achieved after firing.

The bridge is lifted off the model to supplement the contact points with Dentin and Incisal materials. Before firing, circularly separate the entire interdental area down to the opaquer.

Also, it is recommended to compact and smooth the ceramic surface in the direction of the cervical margin with a large, dry brush before firing.

Place the completely layered restoration on the firing tray and ensure adequate support. Fire using the **1st Dentin/ Incisal firing** (see firing parameters on page 84).

– Use distilled water to rewet the mixed or already applied layering materials to avoid accumulation of organic components.
– The firing tray with the restoration should only be placed in or removed from the firing chamber once the furnace head is completely open and the acoustic signal has sounded.

2nd Dentin/Incisal firing

Finish and thoroughly clean the restoration. Clean under running water and with the steam jet.

Blasting the restoration with Al_2O_3 (50 µm) at 1 bar (15 psi) pressure is only necessary if there is superficial contamination after cleaning.

Isolate adjacent model components (e.g. adjacent teeth, pontic rests) once again with IPS Ceramic Separating Liquid.

Thoroughly dry the restoration and complete the missing areas using Dentin and Incisal materials. Pay special attention to interdental spaces, as well as contact points. If necessary, slightly separate the interdental spaces.

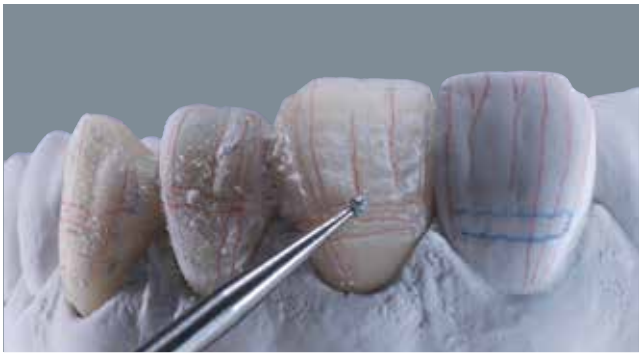
Place the completely layered restoration on the firing tray and ensure adequate support.

Fire the layered restoration using the **2nd Dentin/Incisal firing** (see firing parameters on page 84).

If additional Dentin/Incisal firing cycles are required, they are conducted using the firing parameters of the **2nd Dentin/Incisal firing**.

– Use distilled water to rewet the mixed or already applied layering materials to avoid accumulation of organic components.
– The firing tray with the restoration should only be placed in or removed from the firing chamber once the furnace head is completely open and the acoustic signal has sounded.

Finishing and preparing for the Stain and Glaze firing



Subsequently, the restoration is finished.

Use diamonds to give the restoration a true-to-nature shape and surface structure, such as growth lines and convex/concave areas.

Elevated spots and areas that are to show a stronger gloss after Glaze firing (e.g. pontic rests) can be prepolished using silicone polishers

Finished restoration ...

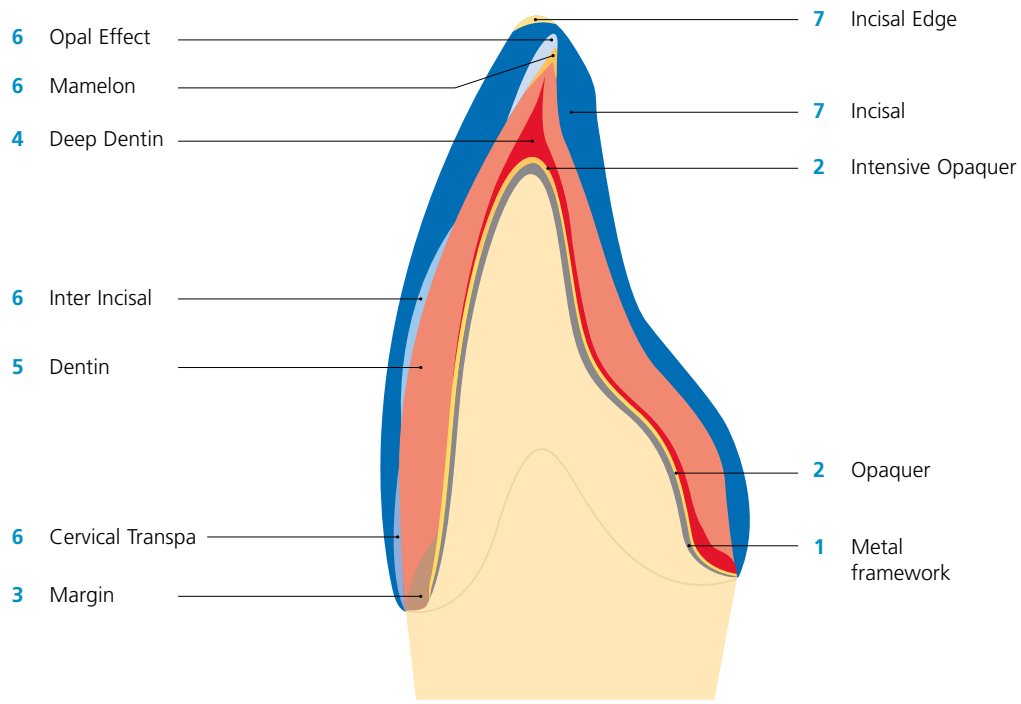
...featuring a true-to-nature surface texture.

The procedure for the Stain and Characterization firing as well as the Glaze firing are described in the chapter on completing the restoration (see pages 69–73).

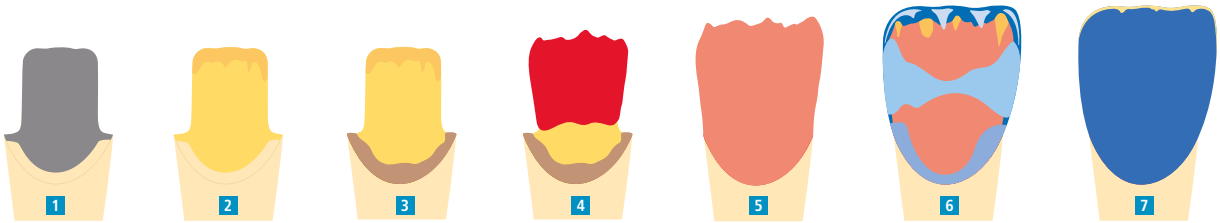
If gold and/or silver dust was used to visualize the surface texture, the restoration has to be thoroughly cleaned with steam. Make sure to remove all gold or silver dust in order to avoid any discolouration after firing.

IPS Style® Ceram – Individual layering technique

Layering example:



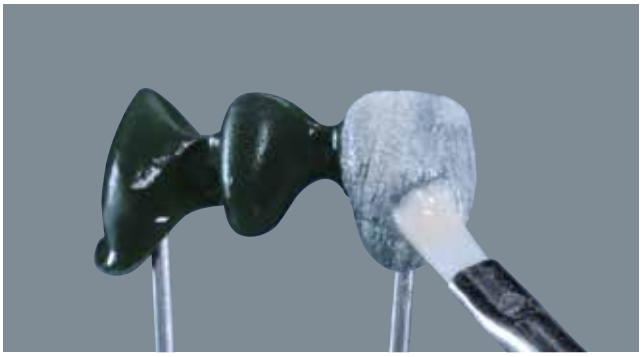
Step-by-step:



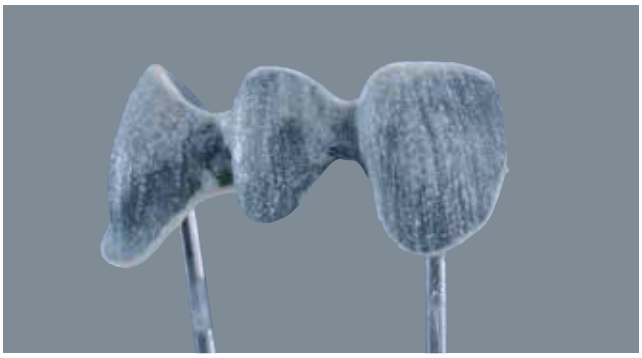
1st Opaquer firing

The IPS Style Ceram Powder Opaquer is selected according to the tooth shade.

Remove the quantity of Powder Opaquer required for the wash firing from the jar and mix with the Powder Opaquer Liquid to the desired consistency on the mixing pad.



Thinly apply the first opaquer layer (wash) on the metal framework using a brush, agitate it into the microretentions and slightly roughen it.



Fire the wash opaquer-covered framework using the **1st Opaquer firing** (see firing parameters on page 84).

After firing and cooling, thoroughly clean the opaqued metal framework with the steam jet and subsequently dry with oil-free air.

– Mix IPS Style Ceram Powder Opaquer only with the IPS Powder Opaquer Liquid.
– Make sure that no opaquer excess reaches the inner aspects of the crown, as this may lead to inaccuracies of fit.

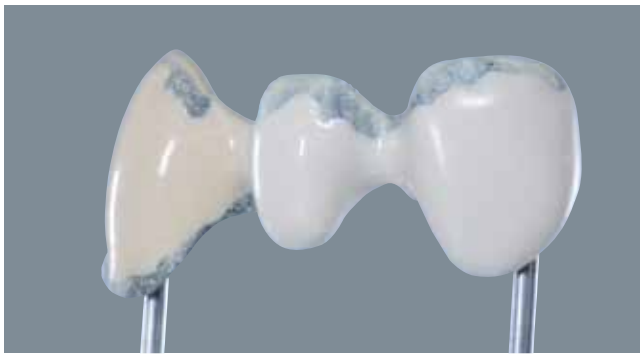
As the first opaquer firing (wash firing) is the prerequisite for an intact bond between the metal and the ceramic, the opaquer is applied in a thin layer and fired. In this way, the metal is entirely wetted, which leads to a mechanical anchoring and a chemical-atomic bond of the opaquer. In this form, the wash is the adhesion-enhancing layer between the metal and all subsequent ceramic layers.

2nd Opaquer firing (individualized)

Remove the quantity of powder opaquer required for the covering layer from the jar and add it to the dried "wash opaquer residue" on the mixing pad. Again, mix the Powder Opaquer with the Powder Opaquer Liquid to the desired consistency.

For individualized characterization also mix the required quantity of IPS Style Ceram Intensive Powder Opaquer with the powder opaquer liquid to the desired consistency.

First, apply IPS Style Ceram Powder Opaquer in an even, covering layer. Leave out areas in which IPS Style Ceram Intensive Powder Opaquer is to be applied (e.g. in the cervical, incisal, occlusal or palatal area).



After that, complete the left-out areas with the respective Intensive Opaquer. Make sure that an even covering layer is achieved. Brushes or ball-shaped ceramic instruments are particularly suitable for this purpose.

Fire the completely opaqued framework using the **2nd Opaquer firing** (see firing parameters on page 84).

After firing, the opaquer should show a covering, silky-mat surface.
The veneering surfaces of the alloy framework must be entirely covered with opaquer. Thoroughly clean the opaqued metal framework using the steam jet before any other ceramic material is applied.

– The IPS Style Ceram Powder Opaquer can be applied using a glass or ceramic instrument. Brushes are also suitable for the application of IPS Style Ceram Powder Opaquer.
– The shade intensity of the IPS Style Ceram Intensive Powder Opaquer can be adjusted by adding tooth-shaded IPS Style Ceram Powder Opaquer.

1st Margin firing

A ceramic margin can be fabricated on the metal framework after the opaquer firing in the space provided by reducing the metal-framework in the cervical area during finishing. Before applying the ceramic, seal the stone dies and the adjacent model components (adjacent teeth, pontic rest surfaces) with IPS Model Sealer. Before creating the ceramic margin, additionally seal the shoulder area of the stone die with IPS Margin Sealer and then, after drying, isolate it with IPS Ceramic Separating Liquid.

After that, the IPS Style Ceram Margin material in the respective shade is generously applied in drop-shaped increments in the cervical area (i.e. the outer surface of the ceramic is given a convex design) and dried.
A hair dryer with a warm air stream is suitable to dry the ceramic materials.

Then, carefully remove the framework with the dried margin material from the die.

Subsequently fire the restoration using the **1st Margin firing** (see firing parameters on page 84).

Thoroughly clean the restoration using the steam jet before any other ceramic material is applied.

– When designing a ceramic margin (particularly for bridges), the Margin material may be applied slightly higher up in the proximal area. This will reduce the interdental shrinkage during the subsequent Dentin and Incisal firings.
– IPS Style Ceram Intensive Margin materials are used to design individualized characteristics in the cervical area.

IPS Style Ceram Margin materials are exclusively intended to build-up the margin. They must not be used to line pontic rests.

2nd Margin firing

After firing, the margin may have to be slightly adjusted by grinding in order to remove any interfering areas. Then, the accuracy of fit of the margin has to be optimized with a 2nd Margin firing. For that purpose, the same Margin materials are used as for the 1st Margin firing.

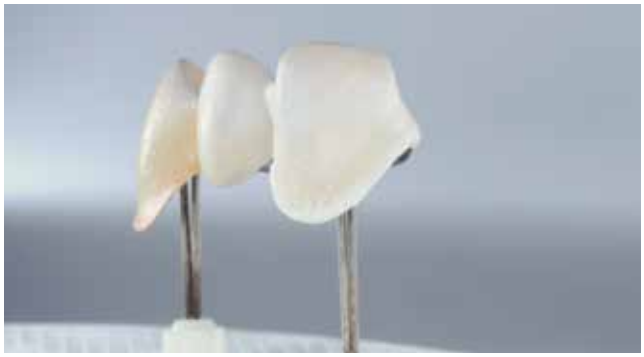
First, however, the shoulder areas of the model dies must again be sealed with IPS Margin Sealer and, after drying, isolated with IPS Ceramic Separating Liquid.

Then, supplement the gap caused by the 1st Margin firing between the fired ceramic margin and the stone die with margin material. This results in optimum accuracy of fit of the ceramic margin.

Complete the margin, dry, and carefully remove the framework with the completed and dried margin material from the die and place it on the firing tray.
A hair dryer with a warm air stream is suitable to dry the ceramic materials.

Subsequently fire the restoration using the **2nd Margin firing** (see firing parameters on page 84).

Thoroughly clean the restoration using the steam jet before any other ceramic material is applied.



Framework with fired ceramic margin

After the 1st Margin firing

After the 2nd Margin firing

Subsequent adjustments of the margin area can be carried out with the IPS Style Add-On Margin. You can find the information about processing IPS Style Add-On Margin on page 74, corrective firings (Add-On).

1st Dentin/Incisal firing

Before the dentin and incisal layering, the model areas already sealed with IPS Model Sealer are coated with IPS Ceramic Separating Liquid. In this way, the ceramic material is prevented from drying out or sticking to the model respectively.

To optimize the wetting behaviour of the layering ceramic on the opaquer, applying a little layering ceramic in the cervical, interdental or palatal and occlusal areas and slightly roughening it is recommended for the first layer.

After that, line the basal pontic area with IPS Style Ceram Deep Dentin layering material and reposition the framework on the model.

The application of IPS Style Ceram Deep Dentin in areas with limited layer thickness and at the incisal ends of the framework helps to mask light optical refractive edges and supports the attainment of true-to-nature results.

To achieve an optimum bond between the ceramic material and the opaquer surface, apply a small amount of IPS Style Ceram Deep Dentin material in the cervical and interdental areas (for bridges) and slightly roughen it.

Layer the dentin core with Dentin material either directly outlining a mamelon shape or build-up the material to full contour and subsequently reduce it (cut-back technique). For better verification of the size and position of the tooth, the cut-back technique is recommended.

Now, the individual build-up of the incisal area is performed.

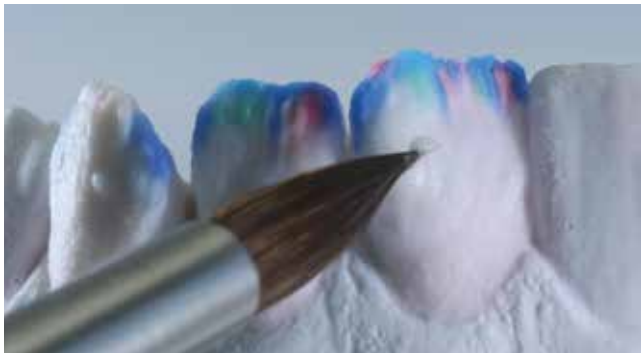
In a first step, design the incisal area using Incisal or Opal Effect materials (e.g. OE2).

After that, the Mamelon materials are placed on the incisal third of the labial surface outlining a mamelon shape (e.g. light and yellow-orange).

Opal Effect materials (e.g. OE1) are individually layered to achieve a true-to-nature translucency along the incisal margin just below the incisal edge.

For better representation, certain layering materials were shaded with pigments that fire without leaving residue.

To increase the brightness in the central incisal region, a thin layer of Inter Incisal white-blue is applied.



To achieve a higher shade intensity (chroma) in the cervical area, apply Cervical Transpa materials (e.g. orange-pink).

Then, the labial area is completed using incisal materials, ...

... thereby slightly over-contouring the labial and incisal aspects.

In order to achieve a lifelike shade gradation, thinning out the Incisal material towards the cervical is recommended.

For better representation, certain layering materials were shaded with pigments that fire without leaving residue.

The palatal fossa of the restoration is covered with Occlusal Dentin material (e.g. orange).

The marginal areas are lined with Dentin material ...

... and the cingulum and the marginal ridges are covered with Incisal and Transpa materials.

After lifting the bridge off the model, supplement the contact points with the corresponding layering materials. Before firing, circularly separate the entire interdental area down to the opaquer.

You can use IPS Build-Up Liquid allround or IPS Build-Up Liquid soft to adjust the stability of your ceramic materials to suit your working habits (see page 16).

Also, it is recommended to compact and smooth the ceramic surface in the direction of the cervical margin with a large, dry brush before firing.

Place the completely layered restoration on the firing tray and ensure adequate support.

Fire the individually layered restoration using the **1st Dentin/Incisal firing** (see firing parameters on page 84).

Restoration after the 1st Dentin/Incisal firing

– Use distilled water to rewet the mixed or already applied layering materials to avoid accumulation of organic components.
– The firing tray with the restoration should only be placed in or removed from the firing chamber once the furnace head is completely open and the acoustic signal has sounded.

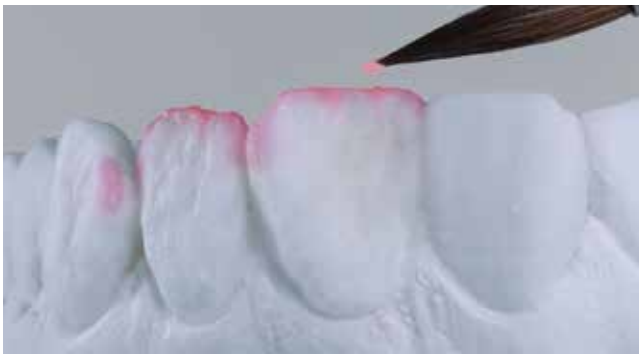
2nd Dentin/Incisal firing

Finish and thoroughly clean the restoration. Clean under running water and with the steam jet.

Blasting the restoration with Al_2O_3 (type 50) at 1 bar (15 psi) pressure is only necessary if there is superficial contamination after cleaning.

Isolate adjacent model components (e.g. adjacent teeth, pontic rests) once again with IPS Ceramic Separating Liquid.

Thoroughly dry the restoration and complete the missing areas using the corresponding layering materials. Pay special attention to interdental spaces, as well as contact points. If necessary, slightly separate the interdental spaces.



To achieve what is known as the halo effect, apply a small quantity of Incisal Edge material along the inisal edge.

Place the completely layered restoration on the firing tray and ensure adequate support.

For better representation, certain layering materials were shaded with pigments that fire without leaving residue.

Fire the layered restoration using the **2nd Dentin/Incisal firing** (see firing parameters on page 84).

If additional Dentin/Incisal firing cycles are required, they are conducted using the firing parameters for the **2nd Dentin/Incisal firing**.

The firing tray with the restoration should only be placed in or removed from the firing chamber once the furnace head is completely open and the acoustic signal has sounded.

Finishing and preparing for the Stain and Glaze firing

Finally, design a lifelife shape and surface texture, such as growth lines and convex/concave areas, using diamonds.

Elevated spots and areas that are to show a stronger gloss after Glaze firing (e.g. pontic rests) can be prepolished using silicone polishers.

Visualization of the true-to-nature surface texture using gold or silver dust.

Finished restoration ...

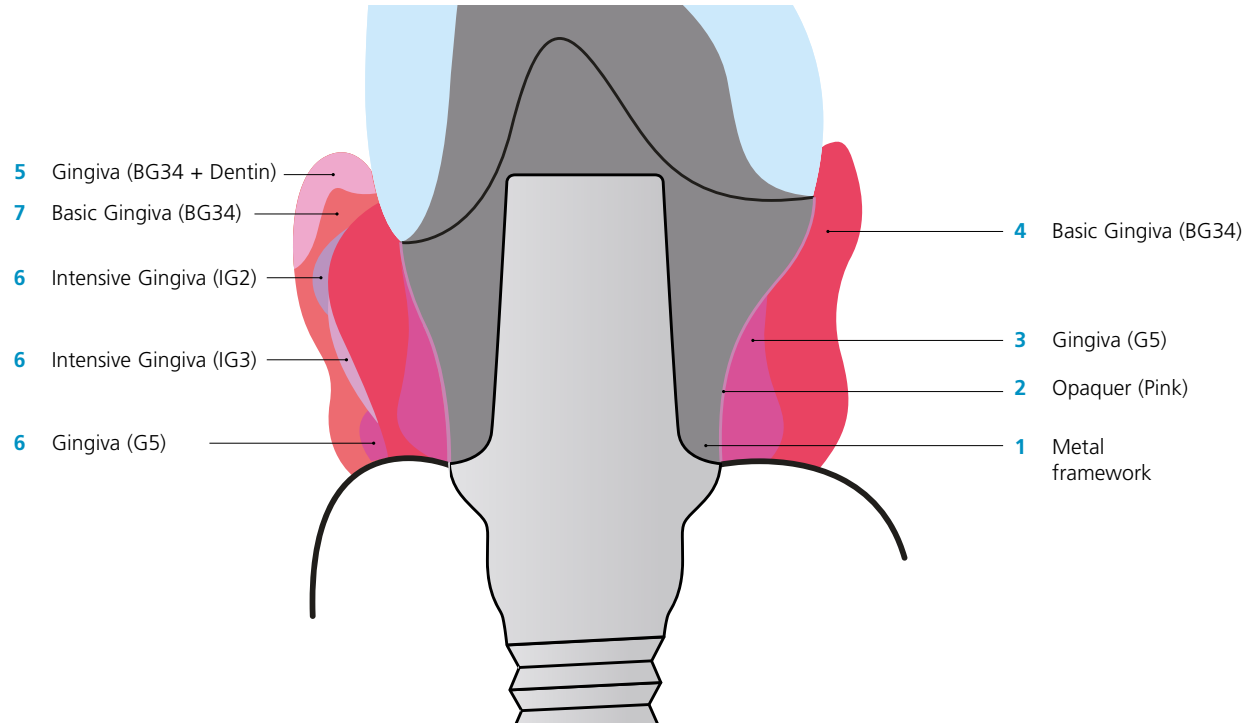
...featuring a true-to-nature surface texture.

The procedure for the Stain and Characterization firing as well as the Glaze firing are described in the chapter on completing the restoration (see page 69–73).

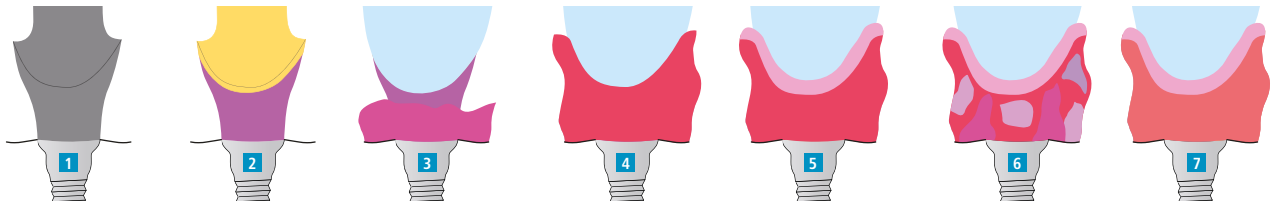
If gold and/or silver dust was used to visualize the surface texture, the restoration has to be thoroughly cleaned with steam. Make sure to remove all gold or silver dust in order to avoid any discolouration after firing.

IPS Style® Ceram – Gingiva

Layering example:



Step-by-step:



1st Opaquer firing

The IPS Style Ceram Powder Opaquer is selected based on the tooth shade. IPS Style Ceram Powder Opaquer Pink is used for the gingiva components.

Remove the quantities of Powder Opaquer required for the wash firing from the jars and mix with the Powder Opaquer Liquid to the desired consistency on the mixing pad.

Thinly apply the first opaquer layer (wash) on the clean metal framework using a brush, agitate it into the microretentions and slightly roughen it. It is recommended to start with coating the tooth-coloured areas with opaquer, followed by the gingiva-coloured areas.
Make sure that the tooth-coloured opaquer extends approximately 1 mm beyond the actual build-up to prevent the gingiva-coloured opaquer from bleeding into the cervical area of the veneer.

Fire the wash opaquer-covered framework using the **1st Opaquer firing** (see firing parameters on page 84).

After firing and cooling, clean the opaqued metal framework with the steam jet and subsequently dry with oil-free air.

– Mix IPS Style Ceram Powder Opaquer only with the IPS Powder Opaquer Liquid.
– Make sure that no opaquer excess reaches the inner aspects of the crown, as this may lead to inaccuracies of fit.

As the first opaquer firing (wash firing) is the prerequisite for an intact bond between the metal and the ceramic, the opaquer is applied in a thin layer and fired. In this way, the metal is entirely wetted, which leads to a mechanical anchoring and a chemical-atomic bond of the opaquer. In this form, the first opaquer layer (wash) is the adhesion-enhancing layer between the metal and all subsequent ceramic layers.

2nd Opaquer firing

Remove the quantities of Powder Opaquer required for the covering layer from the jars and add them to the dried "wash opaquer residue" on the mixing pad. Again, mix the Powder Opaquers with the Powder Opaquer Liquid to the desired consistency.

Apply the 2nd opaquer layer in an even, covering layer. To achieve a clear demarcation, it is recommended to begin with the application of the tooth-coloured areas, followed by the gingival components.
Make sure that the tooth-coloured opaquer extends approximately 1 mm beyond the actual build-up to prevent the gingiva-coloured opaquer from bleeding into the cervical area of the veneer.

Fire the completely opaqued framework using the **2nd Opaquer firing** (see firing parameters on page 84).

After firing, the opaquer should show a covering, silky-mat surface.
The veneering surfaces of the alloy framework must be entirely covered with opaquer.

Thoroughly clean the restoration using the steam jet before any other ceramic material is applied.

– The IPS Style Ceram Powder Opaquer can be applied using a glass or ceramic instrument. Brushes are also suitable for the application of IPS Style Ceram Powder Opaquer.
– If required, shade adjustments may be applied in the desired areas (e.g. in the cervical, incisal, occlusal or palatal areas) using IPS Style Ceram Intensive Powder Opaquer prior to the second Opaquer firing (see page 39).

1st Dentin/Incisal firing

Seal and isolate the model before layering the Dentin/Incisal materials. In this way, the ceramic material is prevented from drying out or sticking to the model. Isolate the stone die and the adjacent model areas using IPS Model Sealer. Additionally, apply a layer of IPS Ceramic Separating Liquid in the area of the pontics and on the gingiva components.

First, the basal area is lined with IPS Style Ceram Gingiva layering material (e.g. G5).

Then, the tooth-coloured areas are individually layered.
Now, complete the gingiva-coloured areas using IPS Style Ceram Gingiva layering material (e.g. BG34).

After lifting the bridge off the model, supplement the contact points with the corresponding layering materials. Before firing, cleanly separate the tooth-coloured interdental areas down to the opaquer.

Also, it is recommended to compact and smooth the ceramic surface with a large, dry brush before firing.

You can use IPS Build-Up Liquid allround or IPS Build-Up Liquid soft to adjust the stability of your ceramic materials to suit your working habits (see page 16).

To achieve an optimum bond between the ceramic material and the opaquer surface, apply a small amount of IPS Style Ceram Deep Dentin material in the cervical and interdental areas (for bridges) and slightly roughen it.

Place the completely layered restoration on the firing tray and ensure adequate support. Fire using the **1st Dentin/ Incisal firing** (see firing parameters on page 84).

Restoration after the 1st Dentin/Incisal firing

– Use distilled water to rewet the mixed or already applied layering materials to avoid accumulation of organic components.
– The firing tray with the restoration should only be placed in or removed from the firing chamber once the furnace head is completely open and the acoustic signal has sounded.
– Same as tooth-coloured layering materials, the gingiva components made of IPS Style Ceram must also be sufficiently supported by the corresponding metal framework design.

2nd Dentin/Incisal firing

Finish and thoroughly clean the restoration. Clean under running water and with the steam jet.

Blasting the restoration with Al_2O_3 (type 50) at 1 bar (15 psi) pressure is only necessary if there is superficial contamination after cleaning.

Isolate adjacent model components (e.g. adjacent teeth, pontic rests) once again with IPS Ceramic Separating Liquid.

Completely dry the restoration and, in a first step, complete the missing gingiva-coloured areas with IPS Style Ceram Gingiva layering material (e.g. BG34).
Subsequently, supplement the missing tooth-coloured areas with the respective layering materials. Pay special attention to interdental spaces, as well as contact points. If necessary, slightly separate the tooth-coloured interdental spaces.

Then individual characterization are applied to the gingival margin (e.g. mixture of Dentin and BG34) and ...

... the labial and cheek frenula using IPS Style Ceram Intensive Gingiva layering materials (e.g. IG2, IG3 and G5).

Now, the gingiva-coloured areas are covered with thin layers of IPS Style Ceram Gingiva layering material (e.g. BG34).

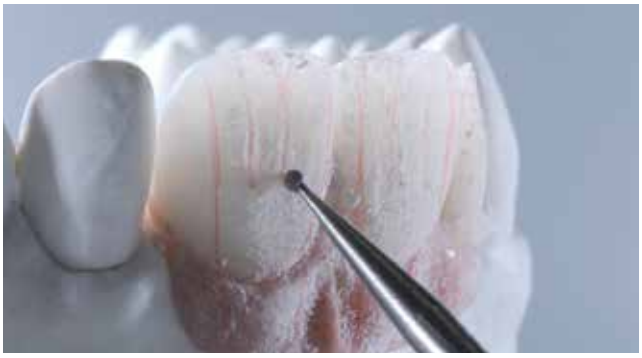
Place the completely layered restoration on the firing tray and make sure it is sufficiently supported.

Fire the layered restoration using the **2nd Dentin/Incisal firing** (see firing parameters on page 84).

If additional Dentin/Incisal firing cycles are required, they are conducted using the firing parameters for the **2nd Dentin/Incisal firing**.

– Use distilled water to rewet the mixed or already applied layering materials to avoid accumulation of organic components.
– The firing tray with the restoration should only be placed in or removed from the firing chamber once the furnace head is completely open and the acoustic signal has sounded.
– Same as tooth-coloured layering materials, the gingiva components made of IPS Style Ceram must also be sufficiently supported by the corresponding metal framework design.
– For better representation, certain layering materials were shaded with pigments that fire without leaving residue.

Finishing and preparing for the Stain and Glaze firing



Finally, the tooth- and gingiva-coloured areas are finished.

Use diamonds to design the true-to-nature shape and surface texture of the tooth-coloured regions (with growth lines and convex/concave areas) as well as the gingiva-coloured areas (with orange peel structure).

Elevated spots and areas that are to show a stronger gloss after Glaze firing (e.g. basal area) can be prepolished using silicone polishers.

Finished restoration ...

...featuring a true-to-nature surface texture.

The procedure for the Stain and Characterization firing as well as the Glaze firing are described in the chapter on completing the restoration (see pages 69–73).

If gold and/or silver dust was used to visualize the surface texture, the restoration has to be thoroughly cleaned with steam. Make sure to remove all gold or silver dust in order to avoid any discolouration after firing.

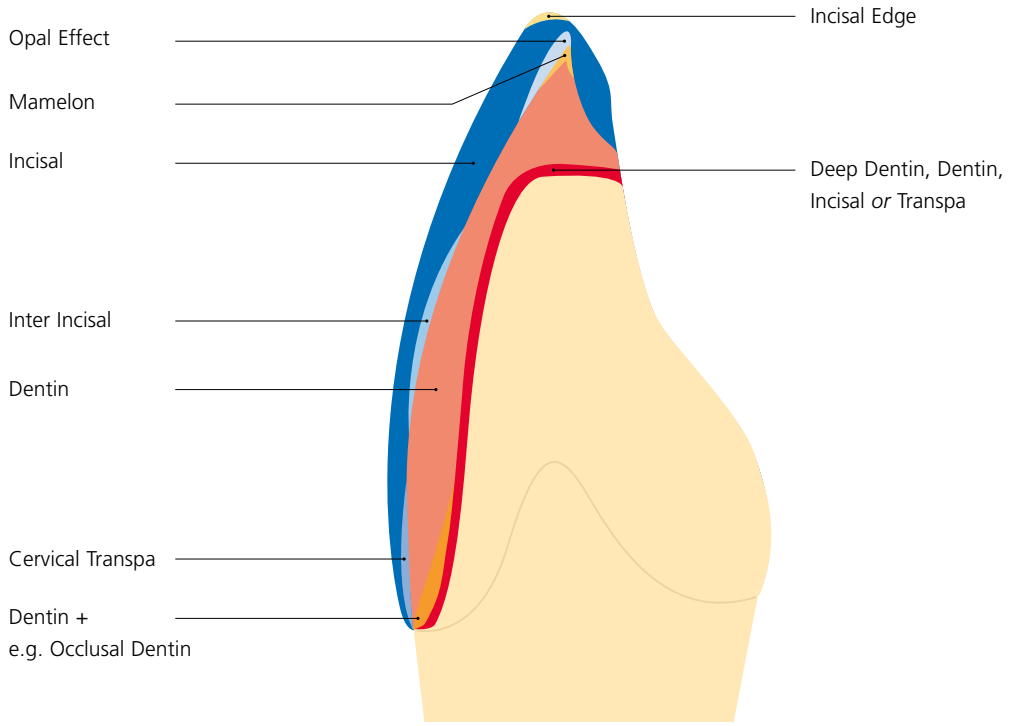
IPS Style® Ceram – Veneers

The following chapter shows the step-by-step layering of veneers on refractory dies.

– The refractory die model must be soaked in distilled water for approximately 5–10 minutes before each working step.
– For better representation, certain layering materials were shaded with pigments that fire without leaving residue.

For veneer fabrication, smaller working steps and several intermediate firing cycles are recommended.

Layering example:



Model fabrication

The working model, or the individual dies, respectively, is/are duplicated and subsequently poured with a commercial refractory die material, e.g. BegoForm® from Bego, Cosmotech VEST from GC (the instructions of the respective manufacturer must be observed).

– Design the refractory dies as small as possible to minimize their effect on the firing cycles.
– Correct processing and properly conditioned refractory dies are an important prerequisite for accurately fitting veneers.

Wash firing

After degassing, the refractory dies are soaked in water. The main materials Deep Dentin, Dentin, Incisal or Transpa may be used for the Wash firing. Mix the IPS Style ceramic materials with the IPS Build-Up Liquid allround/soft or IPS Ivocolor Mixing Liquid allround/longlife. Then apply a very thin, but covering layer on the prepared areas and fire.

Firing parameters **Veneer Wash firing** see page 84.

Cervical firing

Build up the cervical areas using a mixture of IPS Style Ceram Dentin and, for example, Occlusal Dentin brown mixed with IPS Build-Up Liquid allround/soft.

Firing parameters **Veneer Cervical firing** see page 84.

Dentin/Impulse firing

The internal build-up is modelled on the natural characteristics and consists of a dentin build-up and various effects. Individual layering of the Impulse materials enables mamelons, opalescence and translucent effects to be created.

Firing parameters **Veneer Dentin/ Impulse firing** see page 84.

Incisal firing

Subsequently, build up the outer enamel layer and fire.
If necessary, additional corrective firing cycles using the same parameters may be conducted.

Firing parameters **Veneer Incisal firing** see page 84.

Finishing for the Stain and Glaze firing

After that, the natural shape and surface texture are designed with diamonds.
Use gold or silver dust for better visualization of the surface texture.

Stain and Glaze firing

Thoroughly clean the surface with the steam jet before applying the Glaze.
After drying the restoration, cover the ceramic surface with IPS Ivocolor Glaze and fire (see page 72–73). If desired, additional characterizations may be applied using IPS Ivocolor Essence/Shade (see page 70–71).
You may also conduct a Stain firing before the Glaze firing.

Firing parameters **Veneer Stain and Glaze firing** see page 84.

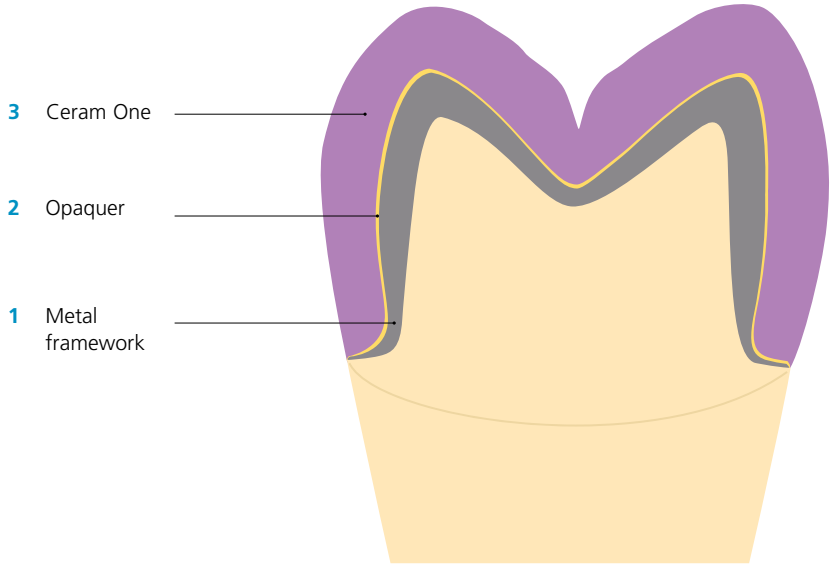
Divesting the veneers

Remove large amounts of die material using a grinding disc. After that, blast the inner aspect of the veneer with polishing jet medium at max. 1 bar (15 psi) pressure to remove all traces of die material.

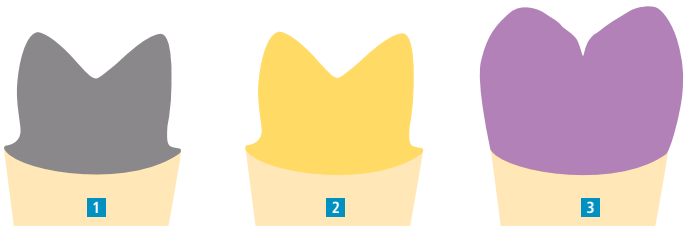
Conditioning of the veneers for adhesive cementation is described on page 80.

IPS Style® Ceram One – One-Layer Technique

Layering example:



Step-by-step:



1st Opaquer firing

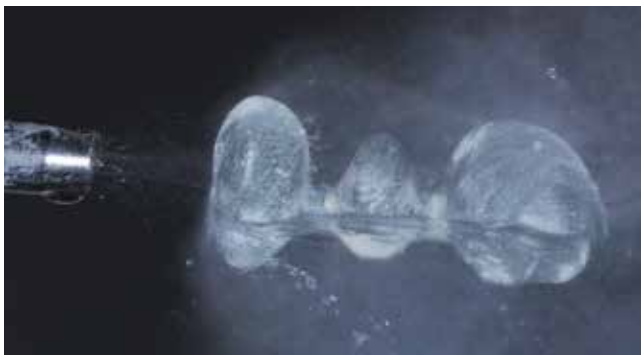
The IPS Style Ceram Powder Opaquer is selected based on the tooth shade.

Remove the quantity of powder opaquer required for the wash firing from the jar and mix with IPS Powder Opaquer Liquid to the desired consistency on the mixing pad.

Thinly apply the first opaquer layer (wash) on the clean metal framework using a brush, agitate it into the microretentions and slightly roughen it.

Fire the wash opaquer-covered framework using the **1st Opaquer firing** (see (firing parameters on page 84).

After firing and cooling, clean the opaqued metal framework with the steam jet and subsequently dry with oil-free air.



– Mix IPS Style Ceram Powder Opaquer only with the IPS Powder Opaquer Liquid.
– Make sure that no opaquer excess reaches the inner aspects of the crown, as this may lead to inaccuracies of fit.

As the first opaquer firing (wash firing) is the prerequisite for an intact bond between the metal and the ceramic, the opaquer is applied in a thin layer and fired. In this way, the metal is entirely wetted, which leads to a mechanical anchoring and a chemical-atomic bond of the opaquer. In this form, the first opaquer layer (wash) is the adhesion-enhancing layer between the metal and all subsequent ceramic layers.

2nd Opaquer firing

Remove the quantity of powder opaquer required for the covering layer from the jar and add it to the dried "wash opaquer residue" on the mixing pad.
Again, mix the Powder Opaquer with the Powder Opaquer Liquid to the desired consistency.

Apply the second opaquer layer in an even, covering layer. Brushes or ball-shaped ceramic instruments are particularly suitable for this purpose.

The IPS Style Ceram Powder Opaquer and the IPS Powder Opaquer Liquid are also ideally suitable for the application with conventional spray-on techniques. The mixture of powder opaquer and powder opaquer liquid should have a rather low-viscosity consistency and should be individually adjusted to the spray-on system used. Observe the instructions of the manufacturer of the respective spray-on system.

Fire the completely opaqued framework using the **2nd Opaquer firing** (see firing parameters on page 84).

After firing, the IPS Style Ceram Powder Opaquer should show a covering, silky-mat surface.
The veneering surfaces of the alloy framework must be entirely covered with opaquer.

Thoroughly clean the restoration using the steam jet before any other ceramic material is applied.

– The IPS Style Ceram Powder Opaquer can be applied using a glass or ceramic instrument. Brushes or a spray-on system are also suitable for the application of IPS Style Ceram Powder Opaquer.
– If required, shade adjustments may be applied in the desired areas (e.g. in the cervical, incisal, occlusal or palatal areas) using IPS Style Ceram Intensive Powder Opaquer prior to the second Opaquer firing (see page 39).

1st One firing

Isolate the model before applying the One layer. In this way, the ceramic material is prevented from drying out or sticking to the model respectively. Isolate the stone die and the adjacent model areas using IPS Model Sealer.
Additionally, isolate the area of the pontics with IPS Ceramic Separating Liquid.

To optimize the wetting behaviour of the layering ceramic on the opaquer, applying a little layering ceramic in the cervical, interdental or palatal and occlusal areas and slightly roughening it is recommended for the first layer.

After that, line the basal pontic area with IPS Style Ceram One one-layer material and reposition the framework on the model.

Now completely layer the restoration using the one-layer material.
Make sure that the restoration is slightly overcontoured so that the actual tooth shape is achieved after firing.

After lifting the bridge off the model, supplement the contact points with one-layer material. Before firing, circularly separate the entire interdental area down to the opaquer.

You can use IPS Build-Up Liquid allround or IPS Build-Up Liquid soft to adjust the stability of your ceramic materials to suit your working habits (see page 16).

To achieve an optimum bond between the ceramic material and the opaquer surface, apply a small amount of IPS Style Ceram One material in the cervical and interdental areas (for bridges) and slightly roughen it.

Also, it is recommended to compact and smooth the ceramic surface in the direction of the cervical margin with a large, dry brush before firing.

Place the completely layered restoration on the firing tray and ensure adequate support.

Fire the restoration layered with IPS Style Ceram One using the **1st One firing** (see firing parameters on page 84).

– Use distilled water to rewet the mixed or already applied layering materials to avoid accumulation of organic components.
– The firing tray with the restoration should only be placed in or removed from the firing chamber once the furnace head is completely open and the acoustic signal has sounded.

2nd One firing

Finish and thoroughly clean the restoration. Clean under running water and with the steam jet.

Blasting the restoration with Al_2O_3 (type 50) at 1 bar (15 psi) pressure is only necessary if there is superficial contamination after cleaning.

Isolate adjacent model components (e.g. adjacent teeth, pontic rests) once again with IPS Ceramic Separating Liquid.

Thoroughly dry the restoration and complete the missing areas. Pay special attention to interdental spaces, as well as contact points.
If necessary, slightly separate the interdental spaces.

Place the completely layered restoration on the firing tray and ensure adequate support.

Fire the layered restoration using the **2nd One firing** (see firing parameters on page 84).

If additional One firing cycles are required, they are conducted using the firing parameters for the **2nd One firing**.

– Use distilled water to rewet the mixed or already applied layering materials to avoid accumulation of organic components.
– The firing tray with the restoration should only be placed in or removed from the firing chamber once the furnace head is completely open and the acoustic signal has sounded.

Finishing and preparing for the Stain and Glaze firing

Subsequently, the restoration is finished.

Use diamonds to give the restoration a true-to-nature shape and surface structure, such as growth lines and convex/concave areas.

Elevated spots and areas that are to show a stronger gloss after Glaze firing (e.g. pontic rests) can be prepolished using silicone polishers

Finished restoration ...

...featuring a true-to-nature surface texture.

The procedure for the Stain and Characterization firing as well as the Glaze firing are described in the chapter on completing the restoration (see pages 69–73).

If gold and/or silver dust was used to visualize the surface texture, the restoration has to be thoroughly cleaned with steam. Make sure to remove all gold or silver dust in order to avoid any discolouration after firing.

Practical Procedure

Completion

IPS Ivocolor

IPS Ivocolor is the **universal stains and glaze assortment** for the **individualized staining** and **characterization** of ceramic materials. The range of products has been coordinated with the layering, press and CAD ceramics from Ivoclar Vivadent and the zirconium oxides from Wieland Dental and enables processing irrespective of the CTE of the ceramic. The optimized sintering temperature of the newly developed glass ensures that optimum esthetic results can be achieved irrespective of the ceramic substrate.

The newly developed composition of the pastes was optimized with regard to the application behaviour and firing results. The gel-type structure of the pastes can be optimally adjusted to the desired consistency for the application by way of the degree of dilution. It thus provides endless possibilities with regard to the surface texture and the degree of gloss of the restoration.

From surface staining to the shading of layering materials – IPS Ivocolor offers a solution for any technique.

Mixing ratios: IPS Ivocolor Essence powders are intensively shaded. When used to modify layering powders it must only be added in small amounts (max. 5%) to the respective layering materials.

You can find detailed information about the application of IPS Ivoclar Shades and Essences in the IPS Ivocolor Instructions for Use.

Stain and Characterization firing

IPS Ivocolor Shade

The IPS Ivocolor Shade pastes are used to characterize the materials. They are preferably used for surface applications.

Thoroughly clean the restoration with the steam jet and dry with oil-free air.

Dispense the desired quantity of IPS Ivocolor Shade and slightly dilute it and mix it with the IPS Ivocolor Mixing Liquid allround or longlife.

Apply IPS Ivocolor Shade in the cervical and dentin area and verify the shade match with the help of the shade guide.

If only minor shade adjustments are required, they can be directly applied with the Glaze firing. A Stain firing before the Glaze firing is recommended for major shade adjustments.

IPS Ivocolor Essence

The IPS Ivocolor Essence powders are used for individualized characterizations. This chapter describes the surface staining with IPS Ivocolor Essence. You can find detailed information about the application of IPS Ivoclar Essence powders in the IPS Ivocolor Instructions for Use.

Thoroughly clean the restoration with the steam jet and dry with oil-free air.

Dispense the desired quantity of Essence and mix it with the IPS Ivocolor Mixing Liquid allround / longlife or Essence Fluid, depending on the intended consistency.

After that, use IPS Ivocolor Essence to apply individualized characterizations to the ceramic surface, e.g. discolourations or...

...white spots.

These stains can be cured in place with a separate **Stain firing** (see firing parameters on page 84).

Minor shade adjustments and individual characterizations may also be fired together with the glaze material.

– Pooling should be avoided and the material must not be applied too thickly.
– More intensive shades are achieved by several staining procedures, not by applying thicker layers.
– If the desired shade is not achieved, an additional stain firing cycle is conducted using the same firing parameters.
– IPS Ivocolor Shade and IPS Ivocolor Essence can be mixed with each other. To adjust the consistency, use only the IPS Ivocolor Mixing Liquids allround / longlife.

Glaze firing

For the Glaze firing, you can
– Glaze **with slightly diluted** IPS Ivocolor Glaze material for restorations featuring a high gloss
– Glaze **with highly diluted** IPS Ivocolor Glaze material for restorations featuring a silky-mat surface
– Glaze firing with simultaneous adjustment using IPS Style Ceram Add-On (see page 74–75).

– The degree of gloss of the glazed surface is controlled via the consistency of the glazing material and the applied quantity, not by means of the firing temperature. For a higher degree of gloss, the glazing material has to be applied in a correspondingly thicker layer.
– Additional Glaze firing cycles can be conducted with the same firing parameters.
– The ceramic surface must not be too smooth to prevent the glazing paste from running off.

Version 1 – Glaze firing with slightly diluted glazing material

Thoroughly clean the restoration with the steam jet and dry with oil-free air.

Remove IPS Ivocolor Glaze Powder/FLUO or Glaze Paste/FLUO from its container and slightly dilute and mix it with the IPS Ivocolor Mixing Liquid allround or longlife.

Next, apply the Glaze material in a generous layer using a brush.

Subsequently apply the minor shade adjustments, if required, using IPS Ivocolor Shade and/or Essence on the already applied glazing material, and fire using the **Glaze firing** (see firing parameters on page 84).

Result: High-gloss surface with little surface texture.

IPS Ivocolor Essence Fluid is not suitable for dilution.

Version 2 – Glaze firing with highly diluted glazing material

Thoroughly clean the restoration with the steam jet and dry with oil-free air.

Remove IPS Ivocolor Glaze Powder/FLUO or Glaze Paste/FLUO from its container and dilute and mix it with the IPS Ivocolor Mixing Liquid allround or longlife.

Then, wet the restoration with a thin layer of glazing material and, if required, apply shade adjustments and/or individualized characterizations.

Place the restoration on the honeycomb firing tray and fire using the **Glaze firing** (see firing parameters on page 84).

After firing, the degree of gloss of the restoration may be adjusted to meet the patient's individual requirements by polishing with rubber polishers, felt wheels, and pumice.

Result: Lifelike, silky-mat surface with a pronounced surface texture.

IPS Ivocolor Essence Fluid is not suitable for dilution.

Corrective firings (Add-On)

Before or after the completion of a restoration, minor adjustments, such as contact points, pontic rests and/or margin adjustments, are often required. You can choose between five add-on materials to suit the different requirements:
– IPS Style Ceram Add-On Margin – together with the Glaze firing, firing temperature 750°C / 1382°F
– IPS Style Ceram Add-On Dentin – together with the Glaze firing, firing temperature 750°C / 1382°F
– IPS Style Ceram Add-On Incisal – together with the Glaze firing, firing temperature 750°C / 1382°F
– IPS Style Ceram Add-On Bleach – together with the Glaze firing, firing temperature 750°C / 1382°F
– IPS Style Ceram Add-On 690°C – after the Glaze firing, firing temperature 690°C / 1274°F

Margin adjustment with Glaze firing (Add-On Margin)

IPS Style Ceram Add-On Margin is an add-on material with a slight chromatic shading for any possible margin adjustments. It can be fired with the Glaze firing.

Before the final adjustment of the ceramic margin, the shoulder area of the model die must again be isolated using IPS Marin Sealer and IPS Ceramic Separating Liquid.

Mix IPS Style Ceram Add-On Margin with IPS Margin Build-Up Liquid and apply it on the missing margin areas. After drying, carefully lift the restoration off the die.

Then, position the restoration on the honey-comb tray and fire using the **Glaze firing** (Add-On with Glaze firing) (see firing parameters on page 84).

– **After corrective firing, the Add-On ceramic must be finished and polished with polishing instruments suitable for this purpose (e.g. rubber polishers).**
– For better representation, the add-on material was shaded with pigments that fire without leaving residue.

Corrective firing with Glaze firing (Add-On Dentin, Add-On Incisal, Add-On Bleach)

For any possible corrective firing, e.g. contact points or pontic rests, you can choose from three special add-on materials with different opacity levels, i.e. IPS Style Ceram Add-On Dentin, IPS Style Ceram Add-On Incisal and IPS Style Ceram Add-On Bleach, that you may fire using the Glaze firing (with slightly diluted or highly diluted glazing material).

Mix IPS Style Ceram Add-On Dentin, Add-On Incisal or Add-On Bleach with the IPS Build-Up Liquid allround or soft and apply on the missing areas after the application of the glazing material. If adjustments are applied in areas that come into direct contact with the stone surface, isolate these areas with IPS Ceramic Separating Liquid beforehand.

Then, position the restoration on the honey-comb tray and fire using the **Glaze firing** (Add-On with Glaze firing) (see firing parameters on page 84).

– **After corrective firing, the Add-On ceramic must be finished and polished with polishing instruments suitable for this purpose (e.g. rubber polishers).**
– For better representation, the add-on material was shaded with pigments that fire without leaving residue.

Corrective firing after Glaze firing (Add-On 690°C)

For any corrective firing after Glaze firing, e.g. contact points, IPS Style Ceram Add-On 690°C is available, a specially low sintering, transparent add-on material that is fired at 690°C/1274°F.

Mix IPS Style Ceram Add-On 690°C with the IPS Build-Up Liquid allround or soft and apply it on the missing areas.

After that, fire the restoration using the **Add-On after Glaze firing** (see firing parameters on page 84).

After corrective firing, the Add-On ceramic must be finished and polished with polishing instruments suitable for this purpose (e.g. rubber polishers).

IPS Style Ceram – **Standard Layering Technique**

IPS Style Ceram – **Individual Layering Technique**

IPS Style Ceram – **Gingiva**

IPS Style Ceram – **Veneers**

IPS Style Ceram One – **One-Layer Technique**

Important and Interesting

Frequently Asked Questions

Can IPS Style Ceram be used to veneer frameworks fabricated in the electroplating technique?

Yes. *IPS Style Ceram can be used to veneer frameworks fabricated in the electroplating technique.*
Low-fusing IPS Style Opaquers with a firing temperature of 870°C/1598°F are used for this purpose.

Important: *The instructions of the manufacturer of the respective electroplating system must be observed.*

How can the wetting properties of the restoration be improved before the Stain and Glaze firing?

The wetting properties of the surface can either be improved by slight blasting with Al_2O_3 (Type 100µm/ max. 1 bar) or by rubbing with moist ceramic powder or pumice. Good wetting properties are important for a homogeneous application of the Shades, Essence and Glaze materials.

Can the Glaze firing be conducted without glazing material (self-glazing technique)?

In general, the Glaze firing should be conducted with at least a little IPS Ivocolor Glaze material.

Depending on the desired surface gloss, you can choose between the following two versions:

- *Version 1 – Glaze firing with glazing material, for a high-gloss surface with little surface texture.*
- *Version 2 – Glaze firing with little glazing material, for a lifelike silky-mat shiny surface with pronounced surface texture.*

Is IPS Style Ceram suitable for the veneering of alloys from other manufacturers, apart from Ivoclar Vivadent alloys?

Yes. *IPS Style Ceram can be used to veneer alloys of other manufacturers, provided their CTE is in the range of 13.8–15.2 x 10^{-6}/K (25–500 °C).*

Important: *Alloys of other manufacturers must be processed in accordance with the respective manufacturer's instructions.*

Is IPS Style Ceram also suitable for the veneering of metal-supported inlays, partial crowns or inlay-retained bridges?

Yes. *Provided the minimum layer thicknesses are observed.*

Important: *The restoration margins (e.g. inlays/partial crowns) to the natural tooth structure must always be designed in metal.*

Can IPS Style Ceram Add-On materials be mixed with IPS Style Ceram layering material?

The necessity of mixing add-on materials and layering materials will not arise due to the comprehensive range of IPS Style Ceram Add-On materials – Add-On Margin, Add-On Dentin, Add-On Incisal, Add-On Bleach and Add-On 690°C.

Important: *Mixing add-on materials into the layering materials will result in an uncontrolled change in the firing temperature and might affect the firing stability in case of multiple firing cycles.*

Is mechanical polishing of the ceramic surface necessary before Glaze firing?

No. *Mechanical polishing of the ceramic surface is not necessary, provided the Glaze firing is conducted with IPS Ivocolor Glaze material according to the Instructions for Use.*

What must be taken into consideration when furnaces of other manufacturers are used?

Ceramic furnaces of other manufacturers may feature a different mode of operation (programming) compared to the Programat furnaces from Ivoclar Vivadent (e.g. predrying time, heating rate, etc.). The firing parameters may have to be adjusted accordingly for these ceramic furnaces.

Important: *The instructions of the respective furnace manufacturer must be observed.*

Which liquid should be used to rewet IPS Style Ceram layering materials?

To rewet layering materials on the mixing plate, distilled water must be used. The renewed application of build-up liquid results in an accumulation of organic components and may lead to grey discolouration of the veneer if fired incompletely.

How can the shrinkage of the ceramic be prevented particularly in large bridges and implant superstructures?

Basically, generous available space should be balanced with the framework design. If there is too much available space, it is recommended to conduct an intermediate firing cycle with Deep Dentin or Dentin material to distribute the overall shrinkage to two firing cycles. Additionally, this secures the position of the Impulse materials after the second firing.

Is it advantageous to apply a bonder when base metal alloys are used?

No. *The IPS Style Ceram Powder Opaquers, if processed correctly, provide an optimum adhesive bond between the metal and ceramic, irrespective of the alloy composition.*

When is long-term cooling recommended?

If the stipulated framework design and ceramic layer thicknesses up to max. 1.5 mm are observed, the IPS Style ceramic may be fused to dental alloys with a CTE of 13.8–15.2 x 10^{-6}/K (25–500 °C) without long-term cooling. If ceramic layers up to 1.7 mm or, non-compliant with the Instructions for Use, even thicker ceramic layers are applied on metal frameworks, long-term cooling on base metal alloys and alloys with a high CTE can be favourable.

Are there differences in the firing results between the powder opaquer depending of the application technique?

No. *Both powder opaquers can be conventionally applied with a brush or instrument or applied using the spray-on technique. The firing result remains the same: excellent masking capability, silky-mat surface and identical shade reproduction.*

Cementation and Aftercare

Cementation

Your dentist can apply either a conventional or adhesive cementation protocol for placing the metal-supported IPS Style restorations.
The following materials are recommended for cementation:

	Esthetic luting composite		Universal luting composite	Self-adhesive composite cement	Glass ionomer cement
Material	**Variolink® Esthetic**		**Multilink® Automix**	**SpeedCEM® Plus**	**Vivaglass® CEM**
Curing	Light-curing	Dual-curing	Self-curing with light-curing option	Self-curing with light-curing option	Self-curing
Cementation method	**Adhesive:** Adhese® Universal or Syntac®	**Adhesive:** Adhese® Universal or Syntac®	**Adhesive:** Multilink® Primer A/B	**Self-adhesive**	**Conventional**
IPS Style Ceram Metal-supported	–	–	✓	✓	✓
IPS Style Veneers All-ceramics	✓	✓	–	–	–

Please observe the corresponding instructions for use

✓ Recommended product combinations
– Not recommended

Conditioning of the metal-ceramic restoration

- Blast the inner aspects of the crown with Al_2O_3 until an even mat surface has been achieved.
- If necessary, clean the restoration in an ultrasonic unit for about 1 minute.
- Thoroughly rinse the restoration with water spray and dry with oil-free air.
- **Important:** In order to create a strong bond, do not clean the metal surfaces with phosphoric acid.
- Apply Monobond® Plus with a brush or a Microbrush to the pre-treated surfaces, let it react for 60 s and then disperse it with a strong stream of oil-free air.

Conditioning of the veneers

Version 1 with Monobond Plus

- Thoroughly rinse the veneer with water spray and dry with water- and oil-free air.
- Etch the inner aspect of the veneer with IPS Ceramic Etching Gel for 60 seconds.
- Thoroughly rinse the veneer with water spray and dry with oil-free air.
- Apply Monobond Plus to the pre-treated surfaces with a brush or Microbrush, leave it to react for 60 s and then disperse it with a strong stream of air.

Version 2 with Monobond Etch & Prime

- Thoroughly rinse the veneer with water spray and dry with water- and oil-free air.
- Apply Monobond Etch & Prime on the adhesive surface using a Microbrush and agitate into the surface for 20 seconds. After that, allow it to react for another 40 seconds.
- Then thoroughly rinse off Monobond Etch & Prime with water and dry the restoration with a strong jet of water- and oil-free air for approximately 10 seconds.

Care notes

Same as natural teeth, high-quality IPS Style restorations require regular professional care. This is beneficial for both the health of the gingiva and teeth, as well as for 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) gives the reliability of using a cleaning paste that is only slightly abrasive.
Its gentle effect compared to other pastes has been proven in scientific investigations and by long-term clinical experience.

Combination Table

IPS Style Ceram

A–D	BL1	BL2	BL3	BL4	A1	A2	A3	A3.5	A4
IPS Style Ceram Opaquer 870	O BL1/BL2		O BL3/BL4		O A1	O A2	O A3	O A3.5	O A4
IPS Style Ceram Intensive Opaquer						IO white		IO violet	
IPS Style Ceram Margin	M BL				M 1	M 2	M 3	M 4	M 7
IPS Style Ceram Intensive Margin						IM yellow		IM orange-pink	
IPS Style Ceram Deep Dentin	DD BL1/BL2		DD BL3/BL4		DD A1	DD A2	DD A3	DD A3.5	DD A4
IPS Style Ceram Dentin	D BL1	D BL2	D BL3	D BL4	D A1	D A2	D A3	D A3.5	D A4
IPS Style Ceram Incisal	I BL				I 1	I 2	I 3	I 4	I 5
IPS Style Ceram Add-On	A-O BL					A-O 690°		A-O Incisal	
IPS Style Ceram Impulse	Occlusal Dentin: OD orange, OD brown; Mamelon: MM light, MM yellow-orange, MM salmon								
	Transpa: T neutral, T clear, T blue; T brown-grey, T orange-grey; Special Incisal: SI yellow, SI grey								
IPS Style Ceram Gingiva	Gingiva Opaquer: GO pink		Basic Gingiva: BG34				Gingiva: G1, G2		
IPS Ivocolor Essence	E 01 white	E 02 cream	E 03 lemon	E 04 sunset	E 05 copper	E 06 hazel	E 07 olive	E 08 khaki	E 09 terracotta
	E 21 basic red								
IPS Ivocolor Shade	Shade 0				Shade 1	Shade 2			Shade 3
	Shade Incisal 1								

IPS Style Ceram One

A–D	BL1	BL2	BL3	BL4	A1	A2	A3	A3.5	A4
IPS Style Ceram Opaquer 870	IO white	O BL1/BL2	O BL3/BL4		O A1	O A2	O A3	O A3.5	O A4
IPS Style Ceram One	One BL				One 1	One 2	One 3	One 4	One 7

B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
O B1	O B2	O B3	O B4	O C1	O C2	O C3	O C4	O D2	O D3	O D4
IO brown		IO incisal								
M 1	M 2	M 4	M 4	M 5	M 6	M 6	M 7	M 5	M 3	M 6
IM orange		IM opaque								
DD B1	DD B2	DD B3	DD B4	DD C1	DD C2	DD C3	DD C4	DD D2	DD D3	DD D4
D B1	D B2	D B3	D B4	D C1	D C2	**D C3**	D C4	D D2	D D3	D D4
I 1	I 2	I 3	I 4	I 2	I 3	I 4	I 5	I 2	I 3	I 4
A-O Dentin		A-O Margin								

Opal Effect


OE 1


OE 2


OE 3


OE 4


OE 5


OE violet

Incisal Edge


Incisal Edge

Inter Incisal


II white-blue

Cervical Transpa


CT yellow


CT orange-pink


CT khaki


CT orange

G3	G4	G5	Intensive Gingiva	IG1	IG2	IG3	IG4	IG5
E 10 mahogany	E 11 cappuccino	E 12 espresso	E 13 terra	E 14 profundo	E 15 ocean	E 16 sapphire	E 17 anthracite	E 18 black	E 19 rose	E 20 coral
E 22 basic yellow		E 23 basic blue								
Shade 4		Shade 5		Shade 6				Shade 7		Shade 6
Shade Incisal 2		Shade Incisal 3								

B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
O B1	O B2	O B3	O B4	O C1	O C2	O C3	O C4	O D2	O D3	O D4
One 1	One 2	One 4	One 4	One 5	One 6	One 6	One 7	One 5	One 3	One 6

Firing parameters

IPS Style Ceram	Firing temperature T [°C/°F]	Stand-by temperature B [°C/°F]	Closing time S [min]	Heating rate t↗ [°C/°F/min]	Holding time H [min]	Vacuum on V_1 [°C/°F]	Vacuum off V_2 [°C/°F]
1st/2nd Opaquer firing 870	870/1598	403/757	4:00	100/180	1:00	450/842	869/1596
1st/2nd Margin firing	840/1544	403/757	6:00	60/108	1:30	450/842	839/1542
1st Dentin/Incisal firing / One firing	790/1454	403/757	6:00	60/108	1:00	450/842	789/1452
2nd Dentin/Incisal firing / One firing	780/1436	403/757	6:00	60/108	1:00	450/842	779/1434
Stain firing *	750/1382	403/757	6:00	60/108	1:00	450/842	749/1380
Glaze firing / Add-On with Glaze firing	750/1382	403/757	6:00	60/108	1:00	450/842	749/1380
Add-On after Glaze firing	690/1274	403/757	6:00	60/108	1:00	450/842	689/1272

* The Stain firing is used to fixate IPS Ivocolor Shade/Essence in place and is particularly recommended for comprehensive characterizations (e.g. one-layer technique).

- All the firing programs described in these Instructions for Use are run without active cooling. After the holding time, the furnace heater is switched off and furnace head cools down with a device-related cooling gradient with the help of the time-controlled opening of the furnace head. If long-term cooling is conducted, the closed furnace head cools down to 650°C / 1202°F after the heater is switched off, at which point the time-controlled opening of the furnace head provides the device-related cooling gradient.
- If additional Dentin/Incisal/One firing cycles are required, they are conducted using the firing parameters for the **2nd Dentin/Incisal firing / One firing**.
- For very large restorations, it is recommended to use a slightly longer predrying time (closing time S).
- If ceramic layers with a thickness of more than 1.5 mm are applied, long-term cooling can be favourable on base metal alloys and alloys with a high CTE value.

IPS Style Ceram (veneering technique) Veneers fabricated on refractory dies	Firing temperature T [°C/°F]	Stand-by temperature B [°C/°F]	Closing time S [min]	Heating rate t↗ [°C/°F/min]	Holding time H [min]	Vacuum on V_1 [°C/°F]	Vacuum off V_2 [°C/°F]
Veneer Wash firing	810/1490	403/757	8:00	50/90	1:00	450/842	809/1488
Veneer Cervical firing	800/1472	403/757	8:00	50/90	1:00	450/842	799/1470
Veneer Dentin/Impulse firing	800/1472	403/757	8:00	50/90	1:00	450/842	799/1470
Veneer Incisal firing	800/1472	403/757	8:00	50/90	1:00	450/842	799/1470
Veneer Stain and Glaze firing	750/1382	403/757	8:00	50/90	1:00–1:30	450/842	749/1380

These firing parameters are guidance values. They are valid for the Programat furnaces from Ivoclar Vivadent. If furnaces from other manufacturers are used, the firing parameters have to be adjusted accordingly, as the case may be.

Deviations may occur:

- Depending on the furnace generation
- In case of regional differences in the power supply or if several electrical devices are operated on the same circuit.

Firing Parameters **please fold out the page**

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Date information prepared: 2017-07-31, Rev. 1

Printed in Germany

674594/en

ivoclar vivadent® technical