Technical Guide

IPS Classic®

The metal-ceramic for
esthetics and efficiency.

Making People Smile

ivoclar

IPS Classic®

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IPS Classic®

IPS Classic has been commercially available and consistently improved for many years. So, the time-tested metal-ceramic offers many advantages for fast, efficient and esthetic ceramic layering procedures.

IPS Classic permits the fabrication of restorations shaded according to A–D shade guide.

After the application of the paste opaquer or powder opaquer, you can choose the product according to your personal preferences and the type of restoration you are fabricating.

Please observe the regulatory Instructions for Use (www.ivoclar.com/eIFU).

IPS Classic for the multi-layer technique
IPS Classic V Opaquer (Paste) IPS Classic V Powder Opaquer IPS Classic Powder Opaquer Liquid
IPS Opaque Dentin V IPS Classic V Dentin IPS Classic V Incisal IPS Classic Opal Incisal IPS Classic Add-On Powder
IPS Classic V Transparent IPS Impulse IPS Effect IPS Gingiva
IPS Classic Build-Up Liquid L/N
IPS Shade V IPS Stains P IPS Classic Glazing Paste IPS Classic Glazing and Staining Liquid

Explanation of symbols

Symbol	Explanation
	Important
	Information
	Tips and tricks
	Note on firing
	See Instructions for Use

Product information

IPS Classic®

Material

The IPS Classic metal-ceramic that has clinically proven itself for many years. Controlled particle size distribution permits excellent built-up and maintenance of shape of the ceramic material even after several firing cycles.

Generally, IPS Classic is suitable for use with alloys with a CTE of approximately 13.8 to 15.2 x 10^{-6}/K at 25–500°C. Depending on the type and the composition of the alloy, the firing temperature and the cooling phase in particular have to be taken into consideration. Alloys with a CTE in the lower range (e.g. approx. 13.8–14.5 x 10^{-6}/K at 25–500°C) can be processed with standard cooling.

Type of restorations

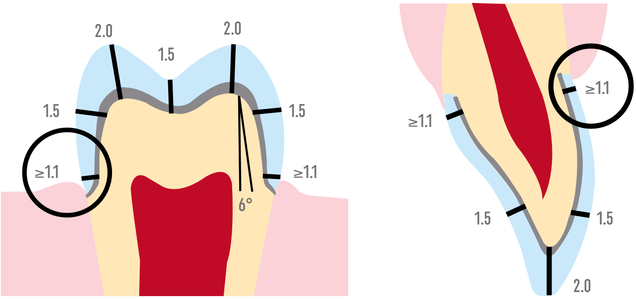
- Crowns
- 3- to 14-unit bridges

Techniques

- Characterization with IPS Shade V and IPS Stains P
- Glazing with IPS Classic Glazing Paste

Preparation guidelines and minimum thicknesses

The preparation must provide sufficient space in order to achieve stable and esthetic metal-ceramic restorations. For the IPS Classic veneering ceramic, the usual preparation guidelines for metal-ceramics apply. As usual for metal-supported restorations, dentists may use a conventional cementation protocol.



Example of a preparation; dimensions in mm

Minimum dimensions for metal framework:
- Crowns min. 0.3 mm
- Bridge abutments min. 0.5 mm

Minimum ceramic layer thickness:
- IPS Classic min. 0.8 mm

Maximum layer thickness of the ceramic:
- IPS Classic min. 1.7 mm

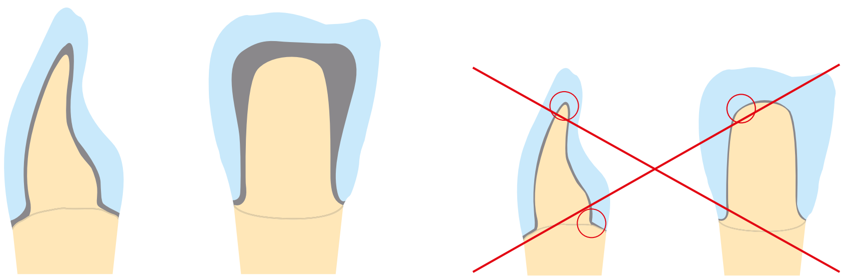
- With conventional cementation, a minimum height of 3 mm of the prepared tooth and a convergence angle of approx. 6° must be observed.
- The minimum connector dimensions must be observed for bridge restorations. The connector dimensions depend on the selected alloy and the pontic width (see framework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

Practical procedure

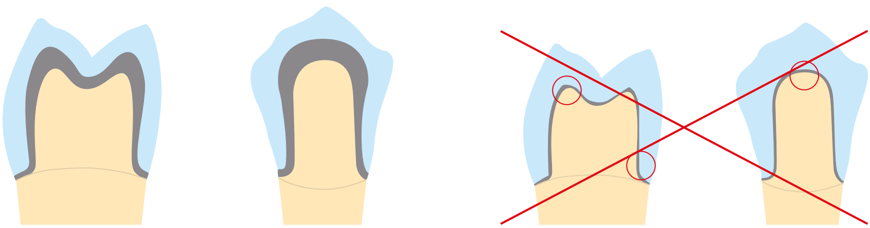
Framework fabrication and preparation

Functional support of the veneering ceramic

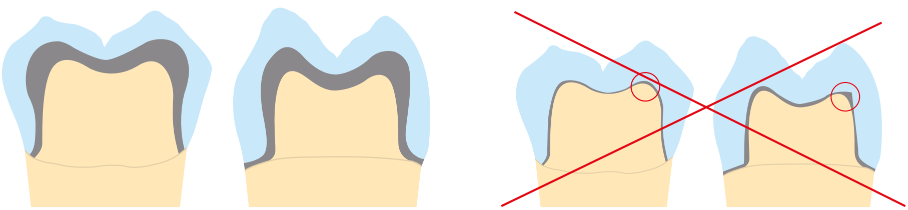
Anterior crowns



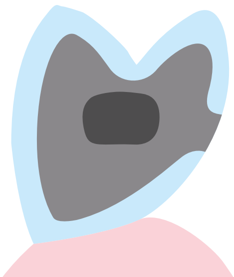
Premolar crowns



Molar crowns

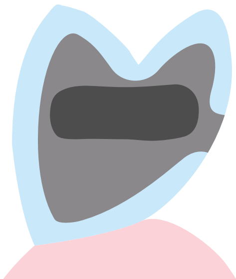


Framework stability



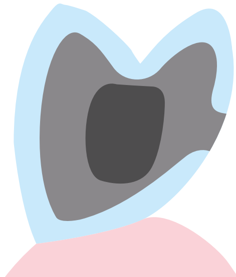
Single connector width

= single stability



Double the width of the connector

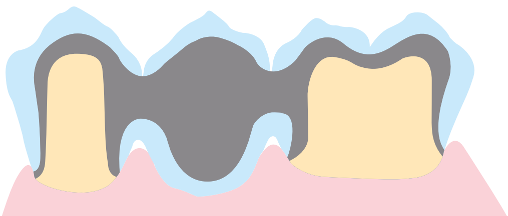
= double the stability

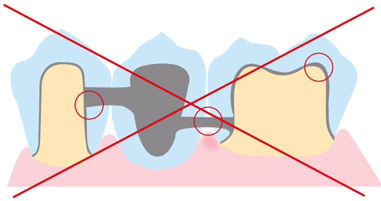


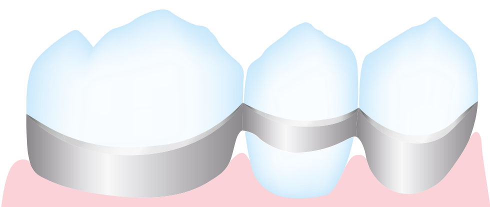
Double the height of the connector with single width

= eightfold stability

Framework design for bridges







Starting situation

Fabricate a master model or a model with detachable segments on the basis of the impression in the usual manner. It is advisable to apply a sealer to harden the surface and to protect the die. The application of a sealer must not cause any changes in the dimensions of the die. After that, a spacer may be applied in the usual manner.

Fabricating the framework

When fabricating the framework, make sure that the minimum wall thickness after finishing is 0.3 mm for single crowns and 0.5 mm for bridge abutments. These dimensions are the prerequisite for the stability of the metal framework and the durable bond between the metal and ceramic material. If the stipulated framework and connector dimensions are not observed, the resulting stress within the material will lead to delamination of the ceramic material and distortion of the framework.

Recommended procedure

1. Complete modelling or desiging of the anatomical tooth shape
2. Reduce to make room for the veneering materials
3. Waxing or designing the contact points and connector areas
4. Checking the occlusal and proximal contact points

Contouring

The framework reflects the reduced anatomical tooth shape (functional support of the veneering ceramic). In this way, the ceramic material may be applied in even layers and is adequately supported. For that purpose, the properties of the different alloys (e.g. firing stability) must be taken into consideration.

- Undersized metal frameworks result in increased shrinkage of the veneering ceramic and require additional corrective firings.
- 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.

Finishing the metal framework

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

- Use reduced pressure when working with softer alloys.
- 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.

Oxide firing

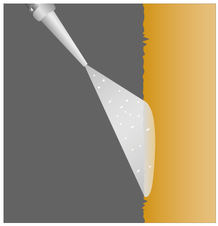
After grinding, carefully blast the framework with Al_2O_3 50 – 100 µm. The required pressure is 1.5 – 2.0 bar.

– Use only disposable, pure Al_2O_3 to blast the alloy surface.
– Observe the Instructions for Use of the alloy manufacturer.

Blasting improves the mechanical bond. It results in the object surface being roughened and considerably enlarged. In order to prevent inclusions of blasting medium residue in the ceramic, we recommend blasting the alloys 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 during ceramic firing. When finishing the frameworks, the instructions of the alloy manufacturer must be observed at all times. Oxidation is carried out according to the instructions of the alloy manufacturer.

Schematic diagram of the blasting direction

Correct angle
for blasting the alloy surface



Before the oxidation firing, clean the metal framework using a brush under running water. Then, thoroughly clean it with steam or in the ultrasonic cleaner. Allow the framework to dry after cleaning. Oxidize the framework according to the instructions given by the alloy manufacturer. Provide ample support for the framework on the firing tray. This is particularly important for long-span bridges. After oxidation, carefully check the framework for porosity or irregular oxide layer. Refinish and reoxidize if necessary.

Please refer to the "Framework design manual for metal-ceramic restorations" for additional information on framework design. The manual is available available in the download centre at www.ivoclar.com or can be ordered from your Ivoclar contact.

Ceramic layering and proccessing

IPS Classic® – standardized individual layering technique

Layering diagram A–D shade

Paste Opaquer

1st Paste Opaquer firing (Wash firing)

Apply the first opaquer layer (wash) thinly using a brush.

2nd Opaquer firing

Apply the 2nd opaquer layer so that it covers the entire framework. The fired opaquer should have a silky-mat appearance (egg-shell gloss).

2nd Opaquer firing (individualization with IPS Classic V I-Opaquer white)

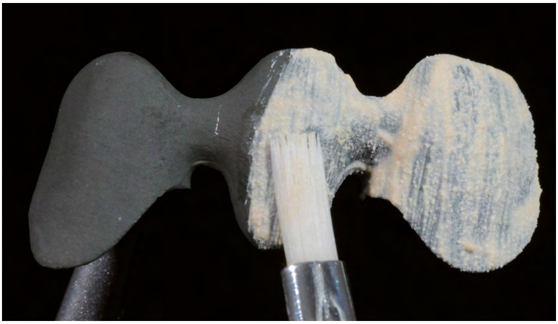
During the second Opaquer firing, users have the possibility of customizing the opaquer layer by using the Intensive Opaquer.

The firing tray with the opaqued metal framework should only be placed in the firing chamber / removed from the firing chamber after firing once the furnace head is completely open and the beeper has sounded.

Firing parameters for the 1st and 2nd Paste Opaquer firing see page 20.

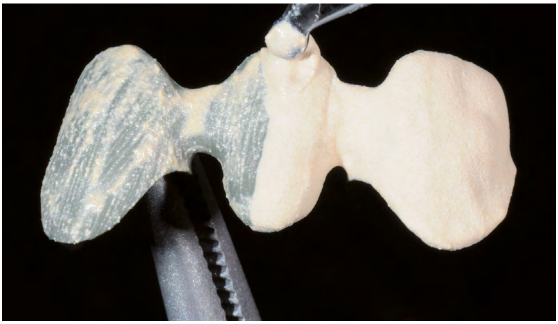
Powder Opaquer

1st Powder Opaquer firing (Wash firing)



Mix the powder opaquer thoroughly with the Powder Opaquer Liquid and apply the first opaquer layer (wash) thinly using a brush.

2nd Opaquer firing



Apply the 2nd opaquer layer evenly in such a way that the metal framework is entirely covered with oqaquer. The fired opaquer should have a silky-mat appearance (egg-shell gloss).

The firing tray with the opaqued metal framework should only be placed in the firing chamber / removed from the firing chamber after firing once the furnace head is completely open and the beeper has sounded.

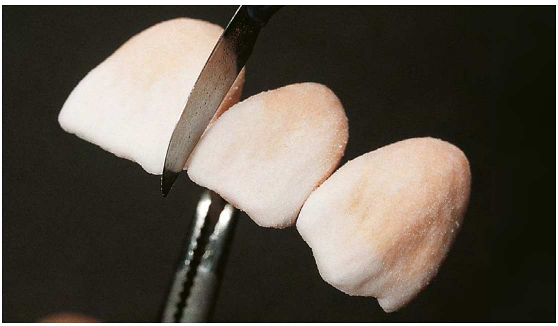
Firing parameters for the 1st and 2nd Powder Opaquer firing see page 20.

The IPS Classic V Powder Opaquer and Powder Opaquer Liquid are ideally suitable for the application with conventional spray-on techniques. Mix the powder opaquer to a thin consistency, depending on the spray-on system used. Observe the instructions of the manufacturer of the spray-on systems.

Important
– Use distilled water to rewet the mixed or the already applied powder opaquer.
– IPS Classic V Powder Opaquer:
  Alloys (CTE of approx. 13.8 to 15.2 x 10^{-6}/K at 25-500 °C) with a solidus point of ≥ 1080 °C are suitable for opaquerizing with the powder opaquer at a firing temperature of 960 °C.

1st Dentin and Incisal firing

Layered IPS Classic Dentin material, where the mamelon shape is only outlined then, Incisal material is applied in small portions and the anatomical shape is completed by means of over-contouring.



Once the contact points have been provided, the bridge restorations are separated in the interdental spaces down to the opaquer using a sharp instrument (e.g. thin scalpel, razor blade).

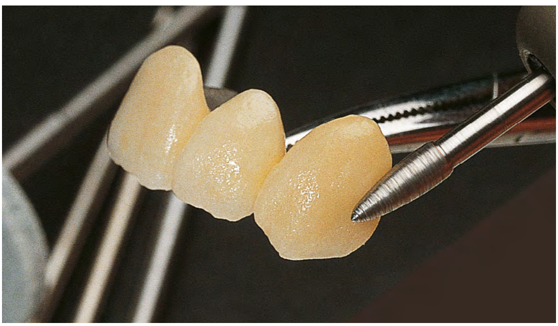
Firing parameters for 1st Dentin and Incisal firing see page 20.

2nd Dentin and Incisal firing

The proximal areas are supplemented with the same materials used for the 1st dentin and incisal firing and the restoration is adjusted using Incisal material.

Firing parameters for 2nd Dentin and Incisal firing see page 20.

Individual finishing – preparing for Stain and Glaze firing



Providing a true-to-nature surface texture including growth lines and convex/concave areas.

Completion

Stain and Characterization firing

- **IPS Shade V**
  IPS Shade V pastes are used to tint the shades of ceramic materials.
- **IPS Stains P**
  IPS Stains P pastes are used for individual characterization.

IPS Shade V and IPS Stains P are preferably used for surface staining.

Glaze firing using IPS Classic Glazing Paste

Apply glazing material in the usual manner using a brush.

- **Glaze firing without glaze material**
  Slightly wet the restoration using IPS Classic Glaze and Stain liquid and apply shade adjustments and/or individualized characterizations.

- **Glaze firing with glaze material**
  Remove IPS Classic Glazing Paste from the syringe and mix thoroughly. After that, apply glazing material in the usual manner using a brush. Avoid pooling or applying too thick of a layer.

Firing parameters for Stains and Glaze firing see page 20.

Corrective firings (Add-On)

Add-On firing

Before the completion of a restoration, small adjustments, such as contact points, pontic rests, may be necessary.

- **Method 1 (dentin / incisal adjustments)**
  Mix the IPS Classic Add-on material with any Dentin and Incisal material in a 1:1 ratio and mix with the desired build-up liquid. Then apply and fire.
- **Method 2 (contact areas)**
  Mix IPS Classic Add-on material with the desired build-up liquid, apply on the missing areas and fire.

Completely fired IPS Classic bridge on the model.

General Information

Firing parameters

IPS Classic	Firing temperature T [°C/°F]	Stand-by temperature B [°C/°F]	Closing time S [min]	Heating rate t↗ [°C/°F]	Holding time H [min]	Vacuum on V_1 [°C/°F]	Vacuum off V_2 [°C/°F]
1st Paste Opaquer firing	980/1796	403/757	6:00	80/144	1:00	550/1022	979/1794
2nd Paste Opaquer firing	970/1778	403/757	6:00	80/144	1:00	550/1022	969/1776
1st/2nd Powder Opaquer firing	960/1760	403/757	4:00	100/180	2:00	450/842	959/1758
1st Dentin / Incisal / Gingiva firing	920/1688	403/757	4:00	60/108	1:00	580/1076	919/1686
2nd Dentin / Incisal / Gingiva firing	910/1670	403/757	4:00	60/108	1:00	580/1076	909/1668
Stain firing using IPS Shade / IPS Stains P	900/1652	403/757	4:00	60/108	1:00	0	0
Glaze firing without Glaze Paste	920/1688	403/757	4:00	60/108	1:00	0	0
Glaze firing using IPS Classic Gazing Paste	900/1652	403/757	4:00	60/108	1:00–2:00	0	0
Add-On after glaze firing (1:1)	810/1490	403/757	4:00	60/108	1:00	420/788	809/1488
Add-On after glaze firing (pure)	690/1274	403/757	4:00	60/108	0:50	420/788	689/1274

Please observe the regulatory Instructions for Use (www.ivoclar.com/eIFU).

- All the firing programs described do not involve active cooling. After the holding time, the furnace heater switches off and the furnace head cools down with a device-related cooling gradient due to 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 further Dentin / Incisal / Gingiva firings are required, they will be conducted with the 2nd Dentin / Incisal / Gingiva firing cycles.
- With very large restorations, we recommend slightly extending the pre-drying time (closing time S).
- If ceramic layers of more than 1.5 mm thickness are applied, long-term cooling can be advantageous in conjunction with base metal alloys and alloys with a high CTE.

These firing parameters are guidance values. They are valid for the Programat furnaces from Ivoclar. When using ceramic furnaces of other manufacturers, it may be necessary to adjust the firing parameters. Deviations may occur:

- due to the furnace generation
- due to regional differences in the power supply or if several electrical devices are operated on the same circuit.

Combination table

<table>
<tr><th colspan="17">IPS Classic</th></tr>
<tr><td>A–D shade</td><td>A1</td><td>A2</td><td>A3</td><td>A3.5</td><td>A4</td><td>B1</td><td>B2</td><td>B3</td><td>B4</td><td>C1</td><td>C2</td><td>C3</td><td>C4</td><td>D2</td><td>D3</td><td>D4</td></tr>
<tr><td>IPS Classic V Opaquer (Paste & Powder)</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td></tr>
<tr><td>IPS Classic V Intensive Opaquer (Paste)</td><td colspan="16">white</td></tr>
<tr><td>IPS Opaque Dentin V</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td></tr>
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<tr><td>IPS Classic Add-On Powder</td><td colspan="16">A-O</td></tr>
<tr><td>IPS Classic V Transparent</td><td colspan="16">clear, neutral</td></tr>
<tr><td>IPS Impulse</td><td colspan="16">Occlusal Dentin orange, Transparent blue, Molar Incisal</td></tr>
<tr><td>IPS Effect</td><td colspan="16">E1 super opal, E2 opal, E3 whitish opal, E4 white opal, E5 red-brown</td></tr>
<tr><td>IPS Gingiva</td><td colspan="16">Gingiva Opaquer (Paste), Gingiva G1, G2, G3, G4, G5, Gingiva Modifier GM2, GM3, GM4</td></tr>
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<tr><td>IPS Stains P</td><td colspan="16">white, bamboo beige, caramel brown, copper brown, cork brown, mahogany brown,
azure blue, black, orange, basic yellow, basic red, basic blue</td></tr>
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