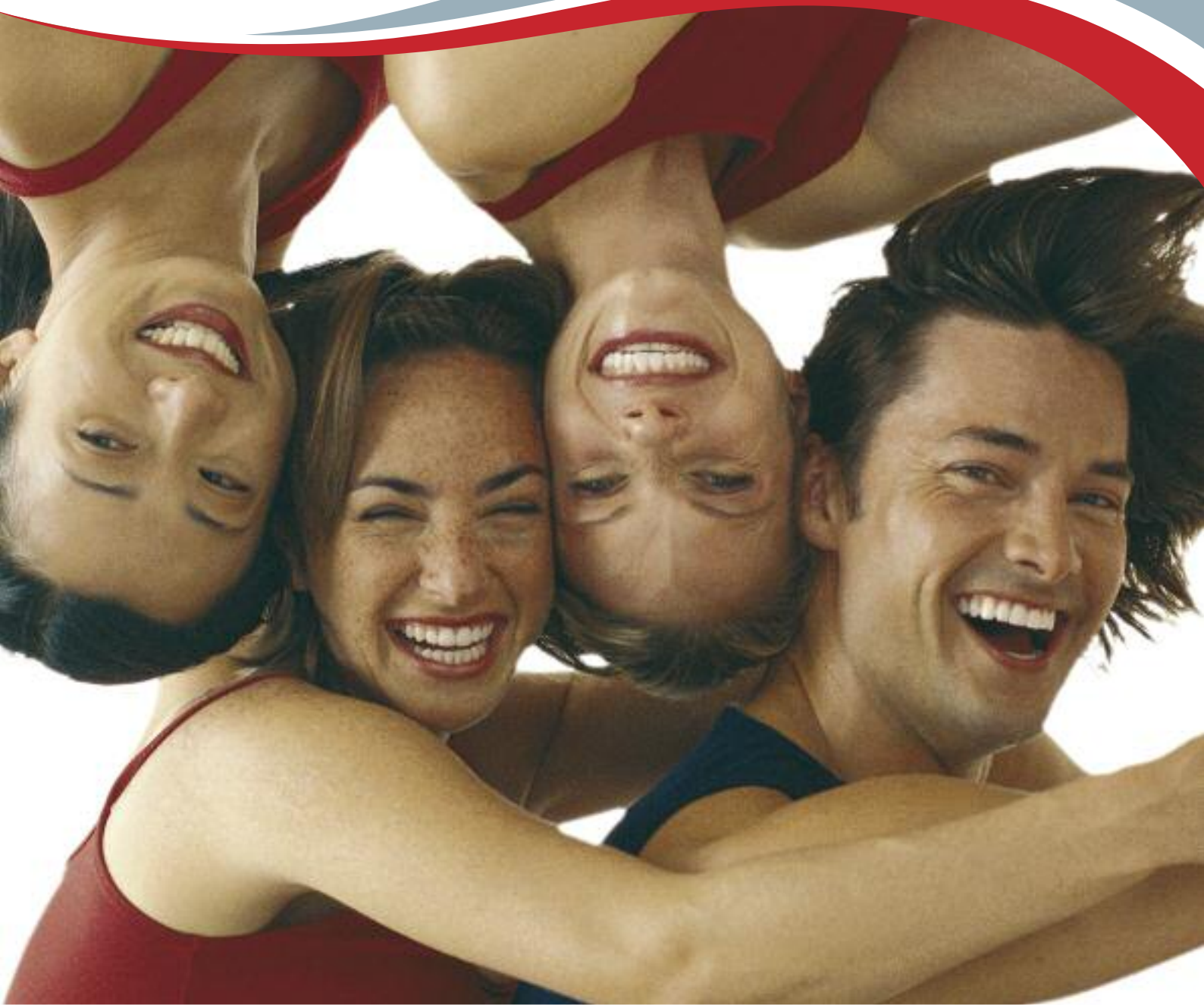
IPS InLine® One
One-layer metal-ceramic

IPS InLine®
Conventional metal-ceramic

IPS InLine® PoM
Press-on-Metal ceramic

# IPS InLine®

## Instructions for Use



CE 0123

ivoclar vivadent® technical

**IPS InLine® One**
One-layer metal-ceramic

**IPS InLine®**
Conventional metal-ceramic

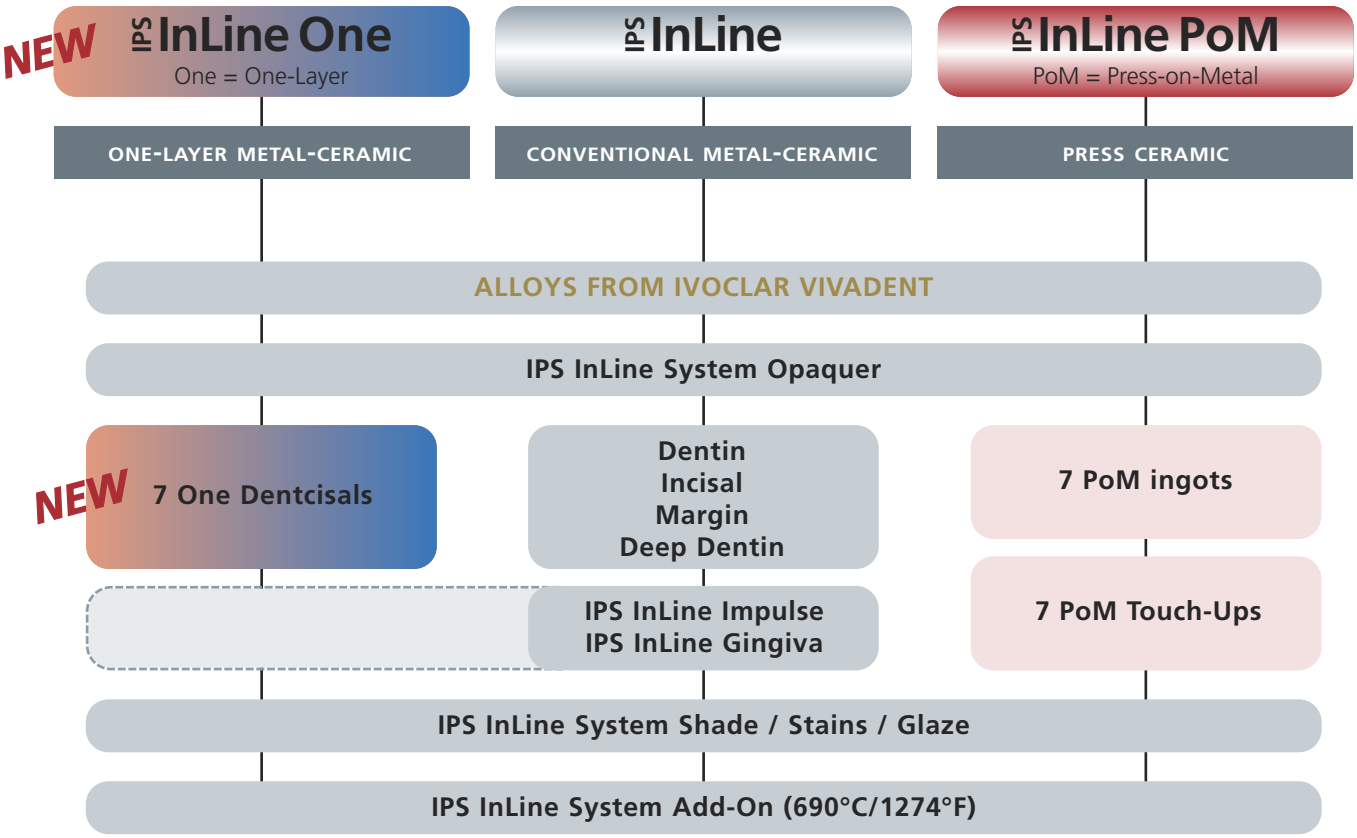
**IPS InLine® PoM**
Press-on-Metal ceramic

Optimize your working procedures and simultaneously increase the productivity and economic efficiency in your laboratory.
With the **IPS InLine** metal-ceramic system, you will have the flexibility required for today's everyday laboratory work – from simple layering to highly esthetic veneers.
The **IPS InLine** metal-ceramic system permits the fabrication of restorations shaded according to A-D, Chromascop and Bleach shade guides.
After the application of the opaquer, you can choose the product and the corresponding processing procedure according to your personal preferences and the clinical situation:

– **IPS InLine One**: Uncomplicated one-layer ceramic for quick and efficient layering
– **IPS InLine**: Conventional metal-ceramic for traditional, individualized layering
– **IPS InLine PoM**: Press-on-Metal ceramic for accurately fitting, fully anatomical press-on procedures

The IPS InLine System gives you the choice without increasing the number of components. Join in a new way to process metal-ceramic.

## IPS InLine



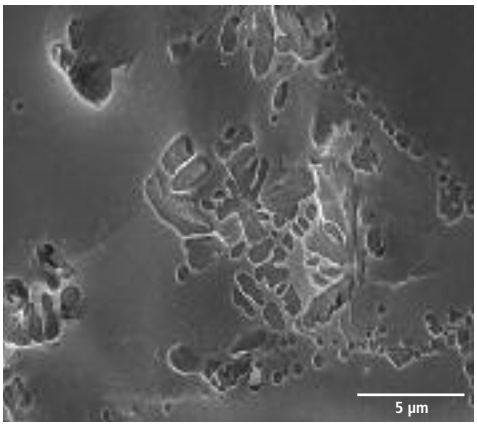
# Table of Contents

# Product Information

## IPS InLine® One – one-layer metal-ceramic
## IPS InLine® – conventional metal-ceramic

### Material

IPS InLine and IPS InLine One are veneering ceramic materials containing leucite. They are suitable for the fabrication of metal-ceramic restorations at firing temperatures higher than 900 °C (1652 °F). With both products, alloys in the CTE range of 13.8–15.0 x $10^{-6}/K^{-1}$ (25–500°C) can be veneered, irrespective of the metal composition. These ceramics are based on leucite-forming glasses, some of which are produced of feldspar raw materials of a natural origin. Given their composition they demonstrate excellent chemical resistance. With the corresponding mixture and targeted heat treatment of these glasses, leucite crystals with a defined grain size distribution are released in the glass matrix. This results in a homogeneous structure for the veneering material, which is not only extremely gentle to antagonist but also provides the high strength and convincing optical properties of the IPS InLine veneering ceramic materials.




| | | |
|---|---|---|
| CTE (100–500°C) [$10^{-6}$ /K] | 2 firing cycles | 12.6 |
| CTE (100–500°C) [$10^{-6}$ /K] | 4 firing cycles | 13.2 |
| Flexural strength (biaxial) [MPa]* | | 80 |
| Chem. resistance [µg/cm²]* | | < 100 |
| Firing temperature [°C/°F] | | 900–930/1652–1706 |

*according to ISO 9693

**Indications**
- One-layer veneering ceramic for the most popular dental alloys in the CTE range of 13.815.0 x $10^{-6}$/K (25–500°C) (IPS InLine One)
- Conventional multi-layer veneering ceramic for the most popular dental alloys in the CTE range of 13.815.0 x $10^{-6}$/K (25–500°C) (IPS InLine)
- Veneers on refractory die material (only IPS InLine)

**Contraindications**
- If patients are known to be allergic to any of the ingredients, the material should not be used.
- Bruxism
- Veneering of titanium and zirconium oxide frameworks
- Any other use not listed in the indications

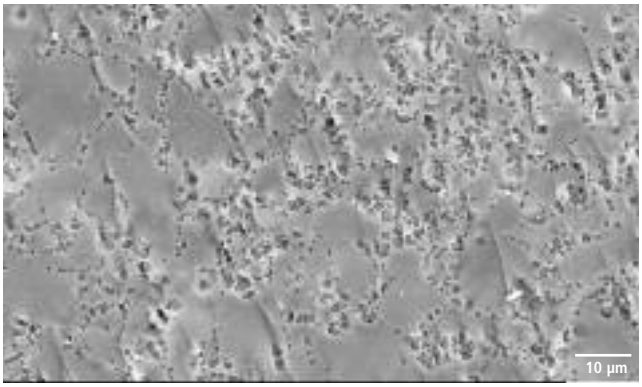
**Important processing restrictions**
- Exceeding or falling short of the stipulated veneering layer thicknesses
- Failure to observe the layer thickness ratio between the framework and layering ceramic
- Mixing with and processing in conjunction with other dental ceramics
- Veneering of dental alloys 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 InLine One and IPS InLine restorations should not be used.

# IPS InLine® PoM – Press-on-Metal ceramic

## Material

The IPS InLine PoM ingots are made of a glass-ceramic material containing leucite and based on synthetic glass raw materials, which contain small quantities of an opalescent glass-ceramic in addition to the translucent components. This provides the ingots pressed to full contour with their highly esthetic appearance. The ingots are shaded with pigments, the temperature resistance of which permits the high shade match of the pressed restorations. Both in their pressed and unpressed condition, the ingots demonstrate an iso-tropic structure, which is responsible for its homogeneous distribution of the leucite crystals and the high strength. Another important feature of IPS InLine PoM is its excellent firing stability, which enables the application of Touch-Up materials, Shade, Stains and Glaze without jeopardizing the accuracy of fit of the restoration. The Touch-Up materials are leucite glass-ceramics shaded according to the ingot shade concept. Their thermal expansion and firing temperature are adjusted to suit the application in the cervical area of the ingot after pressing and before the characterization firing cycles.




| | |
|---|---|
| CTE (100–500°C) [$10^{-6}$ /K] | 13.4 |
| Flexural strength (biaxial) [MPa]* | 130 |
| Chem. resistance [µg/cm²]* | <100 |
| Press temperature [°C / °F] | 940–950 / 1724–1742 |

*according to ISO 6872

### Indications

- Fully anatomical pressing on masked (opaquerized) crown and bridge metal frameworks
- Pressing on dental alloys with a CTE range of 13.8–14.5 x $10^{-6}$/K (25–500°C) with a silver content of <10%

### Contraindications

- Pressing on dental alloys with a CTE outside the stipulated range and not featuring the defined composition
- Alloys with a silver (Ag) content higher than 10%.
- If patients are known to be allergic to any of the ingredients, the material should not be used.
- Pressing on titanium and zirconium oxide frameworks
- Very deep sub-gingival preparations
- Patients with substantially reduced residual dentition
- Bruxism
- Any other use not listed in the indications

### Important processing restrictions

- Exceeding or falling short of the stipulated layer thicknesses for press ceramics
- Failure to observe the layer thickness ratio between the framework and layering ceramics
- Failure to observe the necessary minimum connector and framework thicknesses
- Layering with IPS InLine One / IPS InLine layering materials (e.g. Dentcisal, Dentin, Incisal, Deep Dentin, Margin, Impulse and Gingiva materials, etc.)
- Mixing with and processing in conjunction with other dental ceramics
- Pressing over dental alloys not within the stipulated CTE range

### Side effects

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

# Composition

| IPS InLine One | IPS InLine | IPS InLine PoM |
|---|---|---|
| – **IPS InLine One Ceramic Materials**<br>Leucite ceramic based on alcalialumo silicate glasses and feldspar | – **IPS InLine Ceramic Materials**<br>Leucite ceramic based on alcalialumo silicate glasses and feldspar<br>– **IPS InLine Margin Build-Up Liquid**<br>Water and cellulose derivative | – **IPS InLine PoM Ingots**<br>Leucite ceramic based on alcalialumo silicate glasses<br>– **IPS InLine PoM Touch-Up Materials**<br>Leucite ceramic based on alcalialumo silicate glasses<br>– **IPS e.max AlOx Plungers**<br>$Al_2O_3$<br>– **IPS e.max AlOx Plunger Separator**<br>Boron nitride<br>– **IPS PressVEST Powder**<br>$SiO_2$ (quartz powder), MgO and $NH_4H_2PO_4$<br>– **IPS PressVEST Liquid**<br>Colloidal silicic acid in water<br>– **IPS PressVEST Speed Powder**<br>$SiO_2$ (quartz powder), MgO and $NH_4H_2PO_4$<br>– **IPS PressVEST Speed Liquid**<br>Colloidal silicic acid in water |

– **IPS InLine System Shade / Stains / Glaze**
Ceramic materials and glycols

– **IPS InLine System Build-Up Liquids L and P**
Water, glycols and additives

– **IPS InLine System Glaze and Stains Liquid**
Butandiol

– **IPS Model Sealer**
Ethyl acetate, nitro-cellulose, softener

– **IPS Ceramic Separating Liquid**
Paraffin oil

– **IPS Margin Sealer**
Wax dissolved in hexane

**Warning**

– Hexane is highly flammable and detrimental to health. Avoid contact of the material with skin and eyes. Do not inhale vapours. Keep away from sources of ignition.
– Avoid inhaling grinding dust when working on ceramic restorations. Use suction equipment or protective masks.

# Coordinated Ivoclar Vivadent alloys

**IPS InLine One, IPS InLine ...**
are suitable for alloys with a CTE of approximately 13.8 to 15.0 x $10^{-6}$/K at 25–500 °C. If the required framework design with metal scallops (as described on page 25) and the ceramic layer thickness of max. 1.5 mm are observed, these alloys may be processed using **standard cooling** in the Programat® furnaces.

**IPS InLine PoM ...**
is suitable for pressing on alloys with a CTE of 13.8 to 14.5 x $10^{-6}$/K at 25–500 °C and with a maximum silver content of 10 %.

| Alloy | IPS InLine One IPS InLine | IPS InLine PoM IPS Investment Ring 100/200 g | IPS InLine PoM IPS Investment Ring 300 g | Colour | CTE 25–500°C |
|---|---|---|---|---|---|
| **High gold** | | | | | |
| Brite Gold | ✓* | – | – | rich yellow | 14.8 |
| Brite Gold XH | ✓* | – | – | rich yellow | 14.4 |
| Golden Ceramic | ✓* | – | – | rich yellow | 14.6 |
| Aquarius Hard | ✓* | ✓ 2) | ✓ 2) | rich yellow | 14.5 |
| Aquarius | ✓* | – | – | rich yellow | 14.6 |
| IPS d.SIGN 98 | ✓* | ✓ 1) | – | rich yellow | 14.3 |
| Y | ✓ | – | – | yellow | 14.6 |
| Aquarius XH | ✓ | ✓ | ✓ | yellow | 14.1 |
| Y-2 | ✓* | – | – | yellow | 15.0 |
| Y-Lite | ✓ | ✓ | ✓ | yellow | 13.9 |
| Sagittarius | ✓ | ✓ | ✓ | white | 14.0 |
| Y-1 | ✓* | – | – | yellow | 14.8 |
| IPS d.SIGN 96 | ✓ | ✓ | – | yellow | 14.3 |
| **Reduced gold** | | | | | |
| IPS d.SIGN 91 | ✓ | ✓ | ✓ | white | 14.2 |
| W | ✓ | – | – | white | 14.2 |
| W-5 | ✓ | – | – | white | 14.0 |
| Lodestar | ✓ | ✓ | ✓ | white | 14.1 |
| W-3 | ✓ | ✓ | ✓ | white | 13.9 |
| Leo | ✓ | ✓ | ✓ | white | 13.9 |
| W-2 | ✓ | ✓ | ✓ | white | 14.2 |
| Evolution Lite | ✓ | ✓ | ✓ | white | 14.2 |
| **Palladium content** | | | | | |
| Capricorn 15 | ✓ | – | – | white | 14.3 |
| IPS d.SIGN 84 | ✓ | ✓ 2) | ✓ 2) | white | 13.8 |
| Capricorn | ✓ | ✓ | ✓ | white | 14.1 |
| Protocol | ✓ | ✓ 2) | ✓ 2) | white | 13.8 |
| IPS d.SIGN 67 | ✓ | – | – | white | 13.9 |
| Spartan Plus | ✓ | ✓ | – | white | 14.3 |
| Spartan | ✓ | ✓ | – | white | 14.2 |
| Callisto 75 Pd | ✓ | ✓ | ✓ | white | 13.9 |
| Aries | ✓ | – | – | white | 14.7 |
| IPS d.SIGN 59 | ✓* | – | – | white | 14.5 |
| IPS d.SIGN 53 | ✓** | – | – | white | 14.8 |
| W-1 | ✓* | – | – | white | 15.2 |
| Callisto CP+ | ✓ | ✓ | ✓ | white | 14.2 |
| **Implant alloys** | | | | | |
| Callisto Implant 78 | ✓ | ✓ | ✓ | white | 13.9 |
| IS -64 | ✓** | – | – | white | 14.8 |
| Callisto Implant 60 | ✓* | – | – | white | 14.5 |
| **Free of precious metals** | | | | | |
| Pisces Plus | ✓ | ✓ | ✓ | white | 14.1 |
| 4all | ✓ | ✓ 2) | ✓ 2) | white | 13.8 |
| IPS d.SIGN 15 | ✓ | ✓ | ✓ | white | 13.9 |
| IPS d.SIGN 30 | ✓** | ✓ 2) | ✓ 2) | white | 14.5 |
| Colado CC | ✓** | ✓ 2) | ✓ 2) | white | 14.2 |

* Cooling to 800 °C / 1472 °F
** Cooling to 700 °C / 1292 °F
1) Single restorations
2) see "Important" next page

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

## Important

### IPS InLine One, IPS InLine

– If these minimum requirements cannot be observed, cooling to *800 °C, or **700 °C (depending on the alloy type), is required in conjunction with all main firings and glaze firings.
– With ceramic layer thicknesses of over 1.5 mm up to max. 2.5 mm, as well as with voluminous restorations (e.g. implant-retained reconstructions) in combination with high gold and base metal alloys, cooling to *800 °C or ** 700 °C must be conducted. This also applies to soldered restoratios.

## Important

### IPS InLine PoM

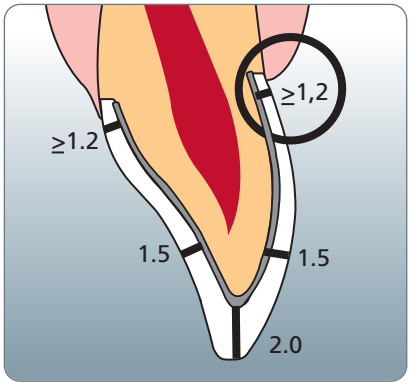
– With alloys in the lower CTE range of 13.8 x $10^{-6}$/K at 25–500 °C and the upper range of 14.5 x $10^{-6}$/K at 25–500 °C, no ceramic shoulders should be used. With such framework geometries (shoulder) or non-metal-supported areas, the cooling and tension conditions are critical. For ceramic shoulders, alloys in the CTE range of approximately 14.0 to 14.3 x $10^{-6}$/K at 25–500 °C are recommended.
– For single restorations – particularly with ceramic shoulders – only the 200g or 300g investment rings should be used, since the expansion values as well as the cooling and tension conditions are ideally coordinated.

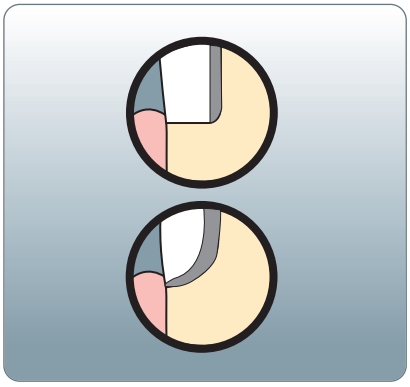
# Preparation guidelines and minimum layer thicknesses

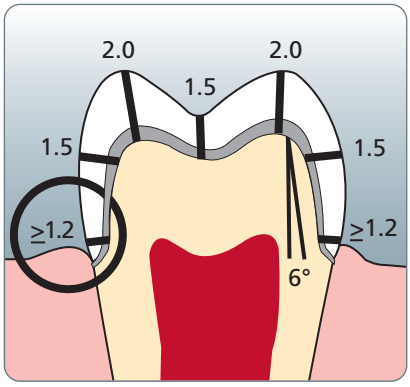
The preparation must provide sufficient space to achieve stable and esthetic metal-ceramic restorations. The usual preparation guidelines for metal-ceramics apply for the IPS InLine System. As usual for metal-supported restorations, dentists may use conventional cementation.

A chamfer preparation is suitable for tapered metal margins. For metal-supported inlays, partial crowns and inlay-retained bridges that are seated using conventional cementation, a chamfer preparation is indicated to minimize the cement gap. The margin is designed in metal. For esthetically pleasing single crowns and bridge abutment crowns, a ceramic shoulder 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 thin, non-metal-supported margins demonstrate a fracture risk.

| **IPS InLine One**<br>One-layer metal-ceramic | **IPS InLine**<br>Conventional metal-ceramic | **IPS InLine PoM**<br>Press-on-Metal ceramic |
|---|---|---|
| Minimum dimensions for metal frameworks<br>– Crowns min. 0.3 mm<br>– Abutment crowns min. 0.5 mm<br><br>Minimum ceramic layer thickness<br>– IPS InLine One min. 0.8 mm | Minimum dimensions for metal frameworks<br>– Crowns min. 0.3 mm<br>– Abutment crowns min. 0.5 mm<br><br>Minimum ceramic layer thickness<br>– IPS InLine min. 0.8 mm | Minimum dimensions for metal frameworks<br>– Crowns min. 0.3 mm<br>– Abutment crowns min. 0.5 mm<br><br>Minimum ceramic layer thickness<br>– IPS InLine PoM min. 0.8 mm |

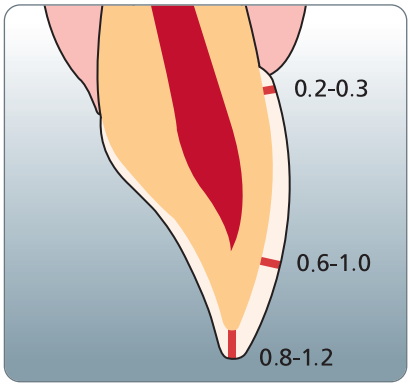


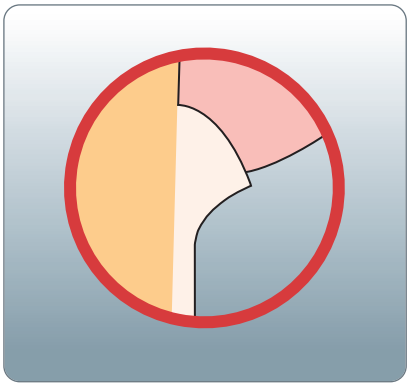



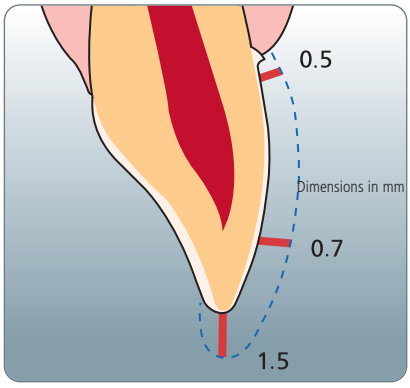



– With conventional cementation, a minimum height of 3 mm of the prepared tooth and a convergence angle of approx. 6° must be observed.
– The following minimum connector dimensions should be observed for bridge restorations: The connector dimensions depend on the selected alloy and the pontic width (see Framework Design Guidelines, page 9).

**Veneers on refractory die material**





# IPS InLine® One – one-layer metal-ceramic

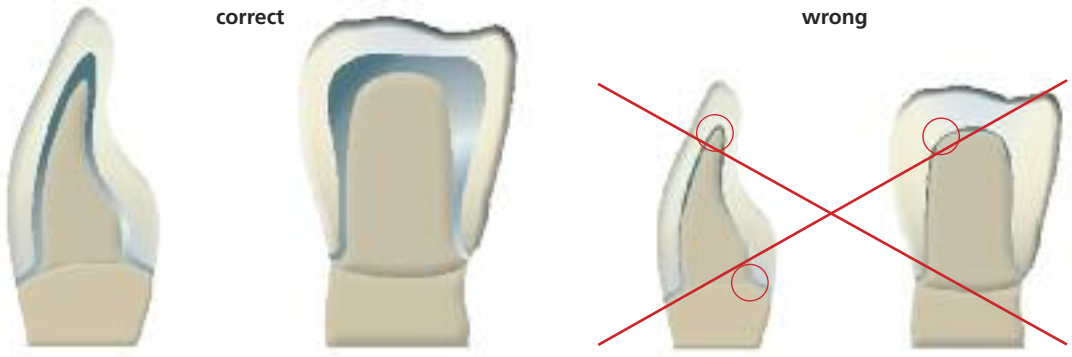
## Framework design criteria

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

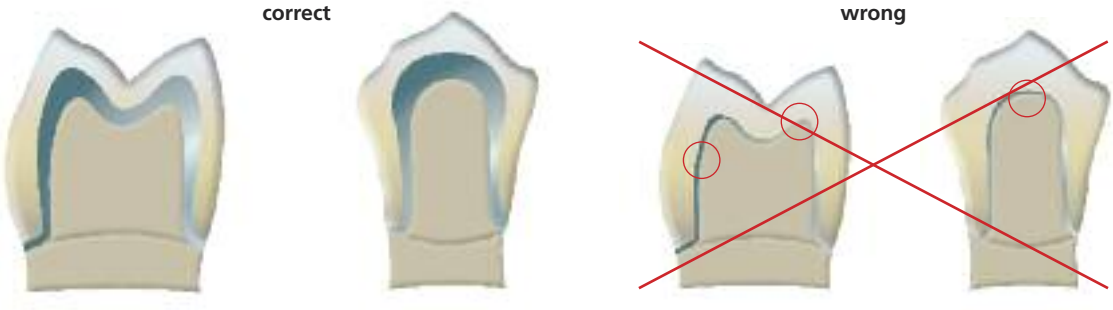
### 1. Functional support of the veneering ceramic

The framework reflects the shape of the tooth in a reduced form. It 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 in the cusp-fissure area. In this way, the masticatory forces occurring during functional chewing are exerted on the framework rather than on the veneering ceramic. Therefore, 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. Such angles and edges should already be rounded off in the wax-up, not as late as in the metal. 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). Please refer to the Instructions for Use of the corresponding alloy for further information.

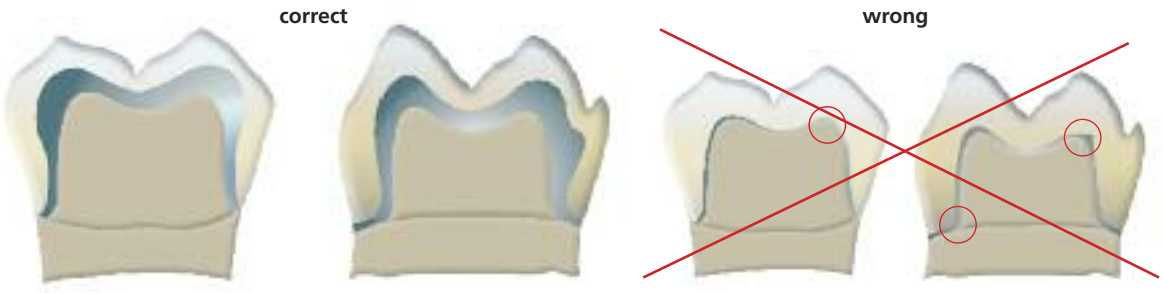
**Anterior crowns**




**Premolar crowns**

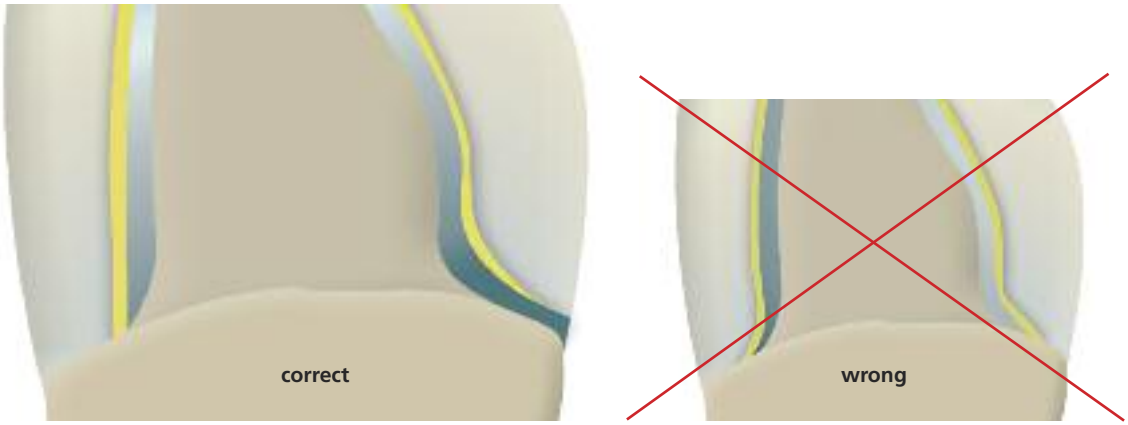



**Molar crowns**



## 2. Framework design for fired ceramic shoulders

With fired ceramic shoulders, 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 to achieve functional support of the framework on the preparation. Excellent accuracy of fit on the preparation is essential to ensure that the shoulder material may not reach the inner aspects of the framework during subsequent application.




## 3. Framework stability

The dimensions and shape of the interdental connector surfaces significantly influence the stability of the restoration during processing as well as the clinical long-term success after incorporation. 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**

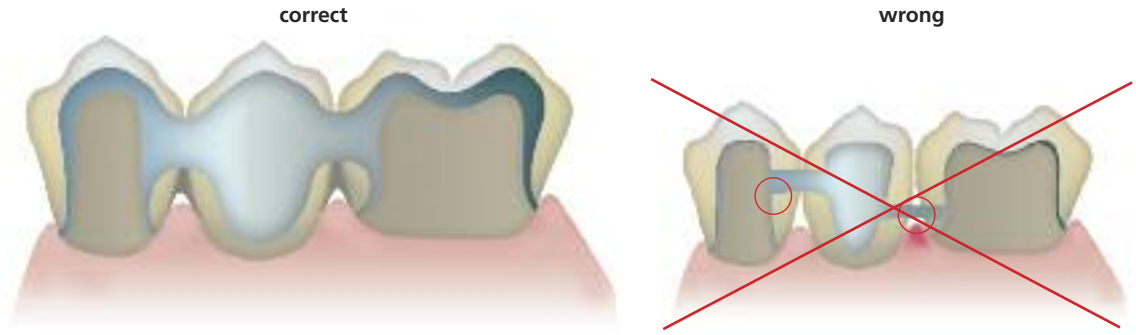
Double the height of the connector with single width
**= eightfold stability**

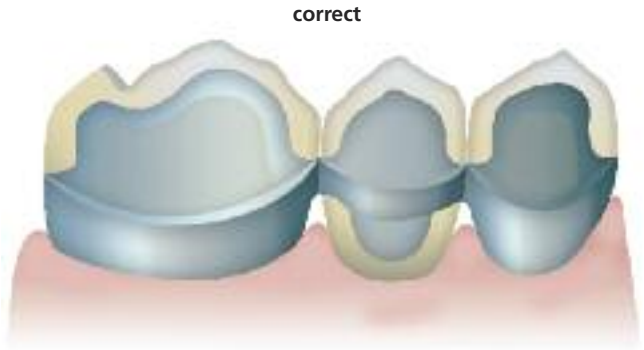
## 4. Framework design for bridges

Thermal stress during firing and masticatory forces after cementation affect metal frameworks. These forces must be transferred on 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 most predictable results.

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 struts) ensures more even cooling of the restoration during the cooling phase. This is particularly important for high gold alloys.

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 given special attention in order to ensure proper periodontal hygiene with interdental brushes and dental floss.

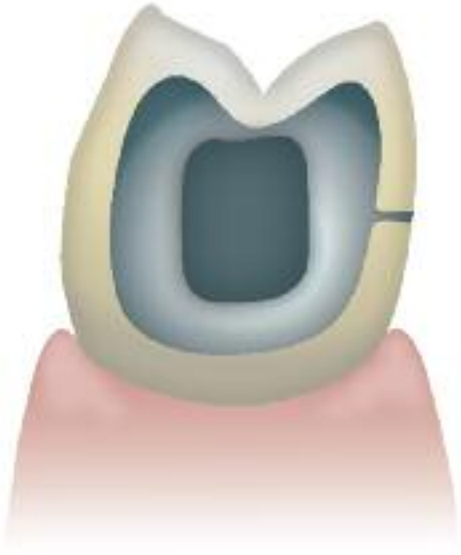


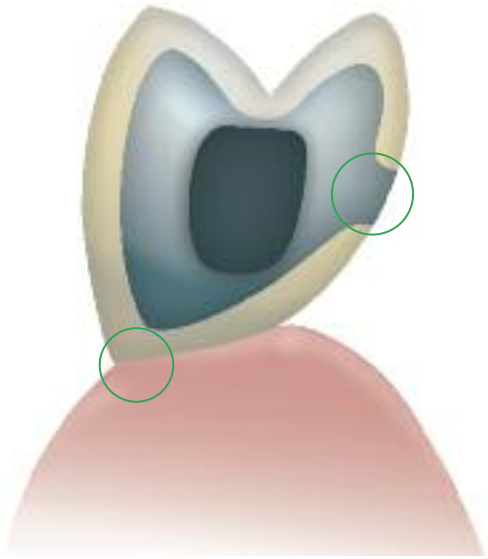
## 5. Design of bridge pontics

Bridge pontics are designed with esthetic and functional aspects as well as oral hygiene in mind. The area of the pontic that contacts the alveolar ridge should 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 struts are advantageous.

**Bridge pontic design – ovate pontic**

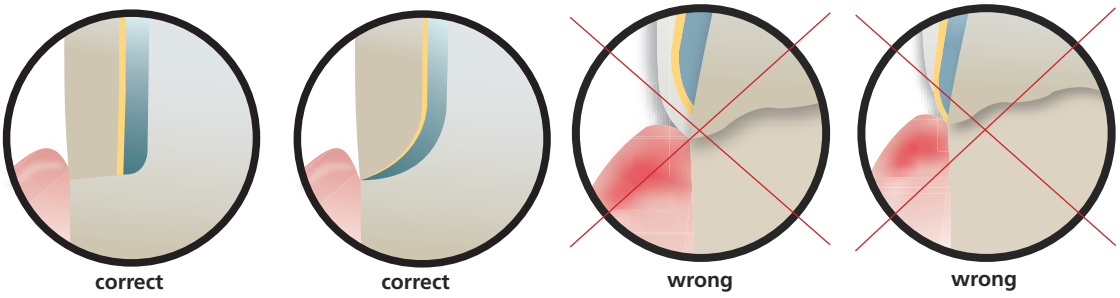


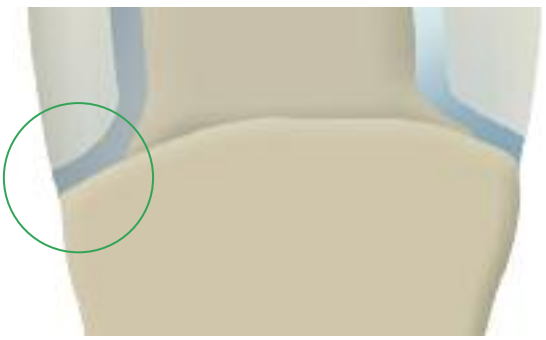
**Bridge pontic design – saddle-type pontic**

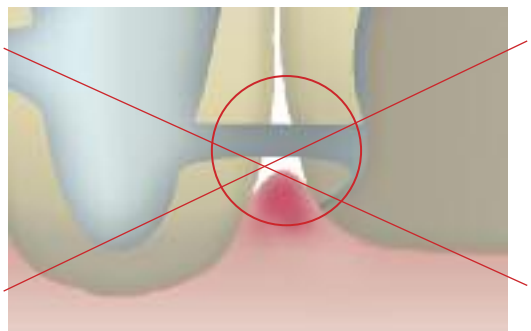


## 6. Interface between metal and ceramic

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 neither be located in the contact area nor on surfaces involved in masticatory functions. The interface in the interdental area should be designed in such a way that cleaning of these hard-to-reach areas is possible.

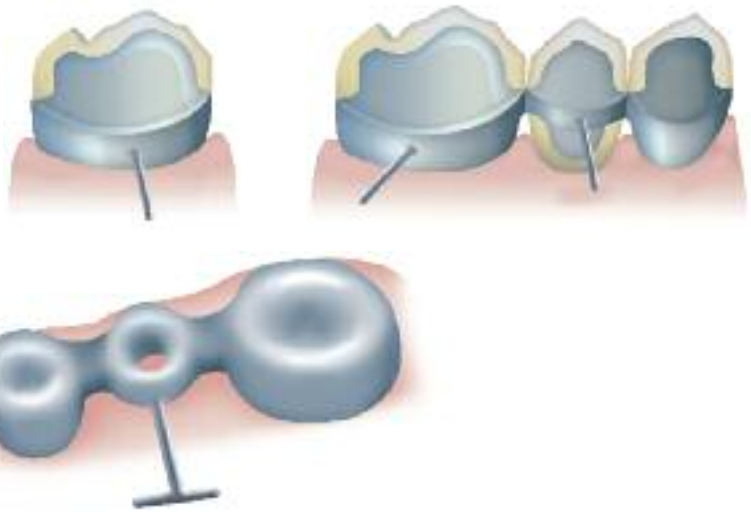




## Holding pins

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 struts during casting and firing.



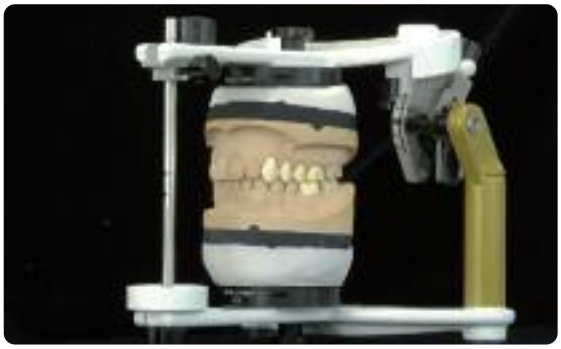
**Important**

**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 contact address.**

# Step-by-step

## Starting situation



Maxillary and mandibular model articulated in the "Stratos 200"

Starting situation for metal-supported IPS InLine restorations

## Framework design

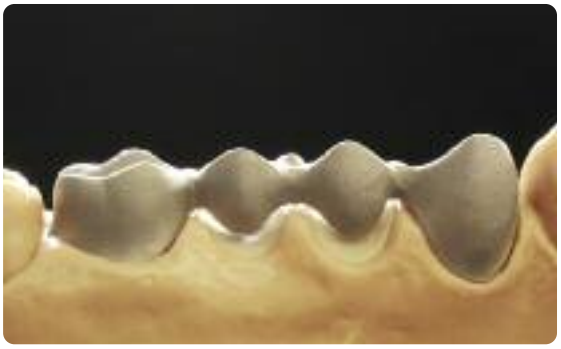
Design the framework with a reduced anatomical shape taking the planned layering into account. The wall thickness for single crowns should be at least 0.3 mm and at least 0.5 mm for abutment crowns.
Make sure to provide sufficient stability of shape for the framework. Avoid sharp transitions and edges.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

Design the framework in a reduced supported shape.

## Alloy processing / oxide firing

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

Surface finishing before blasting

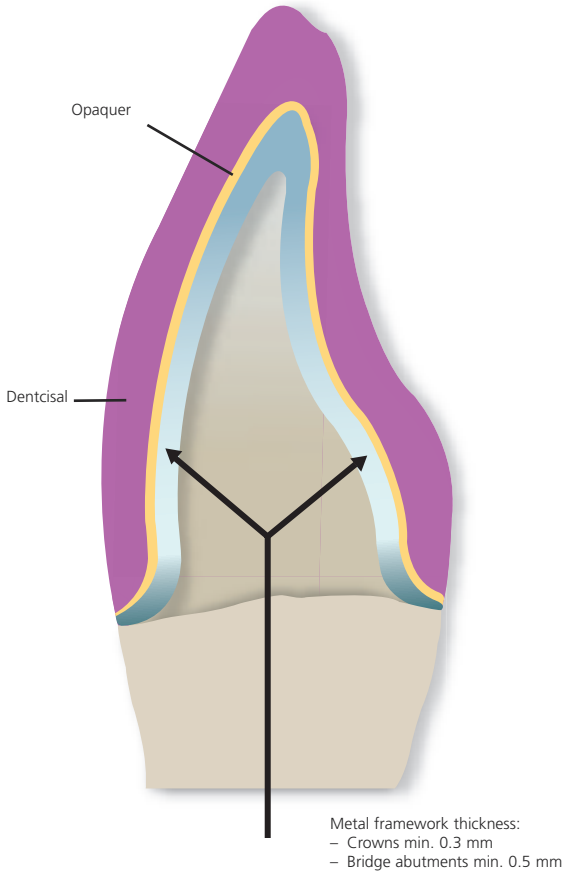


Carefully blast the framework with aluminium oxide $Al_2O_3$ 50–100 µm (observe the instructions of the alloy manufacturer).

After blasting, clean the metal framework with a steam jet and allow to dry thoroughly. Conduct the oxide firing according to the instructions of the manufacturer.

After oxide firing, the framework should exhibit an evenly oxidized surface.

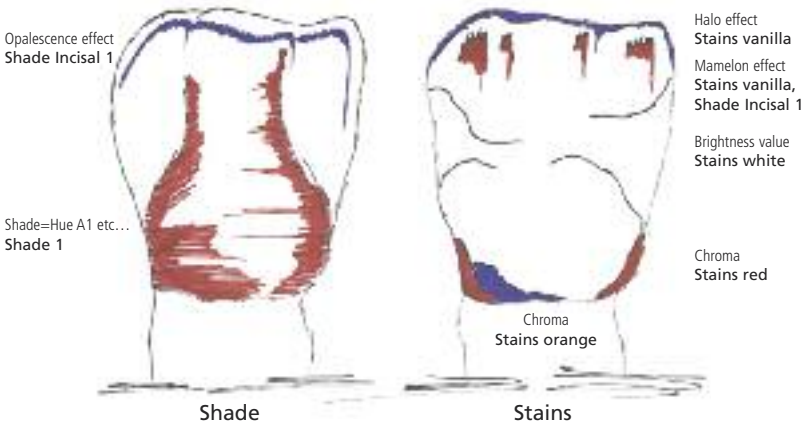
## IPS InLine One layering diagram




| | Ideal layer thickness | Limited layer thickness |
|---|---|---|
| **Framework** | **0.3–0.5 mm** | **0.3–0.5 mm** |
| **Opaquer** | **0.1 mm** | **0.1 mm** |
| **Dentcisal** | | |
| cervical | **0.8 mm** | **0.5 mm** |
| incisal | **1.5 mm** | **0.8 mm** |

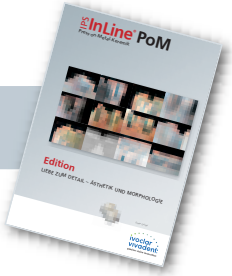
These figures are drawn from past experience and they may vary in certain situations.

**Note:**
To enhance the chroma in thin layers, IPS InLine Deep Dentin in the corresponding opaquer shade may be thinly applied on the opaquer.




Depending on the desired individualization, IPS InLine System Shade/Stains can be used to achieve true-to-nature shade effects.

**You can find additional information on esthetic individualization in the edition "Love for Detail" by D. Grübel. It can be ordered from your Ivoclar Vivadent contact address.**



## 1st Opaquer firing (wash firing)

Select the IPS InLine System Opaquer paste in the corresponding tooth shade. If required, homogenize the opaquer paste by stirring it before taking it from its jar. Extrude the desired amount from the syringe or jar and mix thoroughly on the mixing pad. Thin it, if required. Apply the first opaquer layer thinly and agitate it into the alloy surface. After firing and cooling, clean the opaquerized metal framework with the steam jet and allow to dry thoroughly.

**Tip:**
The consistency can be individually adjusted using the IPS InLine System Opaquer Liquid.

## 2nd Opaquer firing

Apply the second opaquer layer in such a way that the metal framework is entirely covered with opaquer. After firing, the IPS InLine System Opaquer should show a covering, silky-mat shiny surface. After the opaquer firing, the alloy framework should be entirely covered with opaquer.

**Firing parameters IPS InLine System Opaquer (1st and 2nd Opaquer firing)**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 930/1706 | 403/757 | 6 | 100/180 | 2 | 450/842 | 929/1704 |

## 1st Dentcisal firing

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

**Tip:**
To achieve an optimum bond between the ceramic material and the opaquer surface, apply a small amount of IPS InLine One Dentcisal material to the cervical and interdental areas (for bridges) and slightly roughen it.

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 Dentcisal materials. Before firing, separate the entire interdental area down to the opaquer.

**Tip:**
Densify the ceramic surface (after contouring) with a large, dry brush toward the cervical margin before firing.

The ceramic material is applied according to the individual situation.

For an optimum firing result, the interdental areas must be separated down to the opaquer.

Restoration after the 1st Dentcisal firing

**Important**
- **Use distilled water to rewet the mixed or even already applied layering material.**
- **The firing tray with the restoration should only be placed in the firing chamber once the furnace head is completely open and the beeper has sounded.**

**Firing parameters 1st Denticisal firing**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 910/1670 | 403/757 | 4 | 60/108 | 1 | 450/842 | 909/1668 |

## 2nd Dentcisal firing

Finish and thoroughly clean the restoration. Clean under running water or 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. Thoroughly dry the restoration and complete the missing areas. Pay special attention to interdental spaces as well as contact points. Place the completely layered restoration on the firing tray and ensure adequate support. The firing tray with the restoration should only be placed in the firing chamber once the furnace head is completely open and the beeper has sounded. Use the firing parameters stipulated below to fire the restoration.

Supplementing the restoration with Dentcisal material

Final design of the occlusal surface

**Important**

- **Use distilled water to rewet the mixed or even already applied layering material.**
- **The firing tray with the restoration should only be placed in the firing chamber once the furnace head is completely open and the beeper has sounded.**

**Firing parameters 2nd Denticisal firing**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 900/1652 | 403/757 | 4 | 60/108 | 1 | 450/842 | 899/1650 |

# Individual finishing

## Finishing and preparing for the Stains and Glaze firing

Before the Stains and Glaze firing, the restoration has to be prepared as follows:

– Finish the restoration using diamond grinders and give it a true-to-nature shape and surface structure, such as growth lines and convex/concave areas.
– Areas which should exhibit a higher gloss after Glaze firing (e.g. pontic rests) can be smoothed out and pre-polished using silicone disks.
– If gold and/or silver dust was used to visualize the surface texture, the restoration has to be thoroughly cleaned with steam. Make sure to remove all gold or silver dust in order to avoid any discolouration after firing.

The true-to-nature shape and surface texture are designed.

## Stains and Characterization firing

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

– For better wetting of the stains, IPS InLine/IPS InLine PoM Glaze and Stains liquid may be slightly rubbed into the surface.
– If a more intensive shade effect is desired, it is achieved by several staining procedures and repeated firing. The application of too many stains results in an unnatural shade effect.
– The cusps and fissures can be individualized using Stains.
– The basic chromatic shade is supported with the corresponding Shade material (see table).

**Shade combination table for IPS InLine One / IPS InLine / IPS InLine PoM**

| Shade | 1 | 2 | 3 | 4 | 5 | 6 | 7 | SI1 | SI2 |
|---|---|---|---|---|---|---|---|---|---|
| A-D | A1, B1, B2 | A2, A3, A3.5 | B3, B4, D4 | A4 | C1, D2, D3 | C2, C3, C4 | – | A1, A2, A3, B1, B2, B3, B4 | A3.5, A4, C1, C2, C3, C4, D2, D3, D4 |
| Chromascop | 110, 120, 130 BL1, BL2, BL3, BL4 | 140, 210, 220, 230, 240 | 310, 320, 330 | 340, 540 | – | 410, 420, 430, 440, 510 | 520, 530 | 110–140, 210, 220, 310, 320, BL1–BL4 | 230, 240, 330, 340, 410–440, 510–540 |

**Firing parameters for the IPS InLine System Shade/Stains firing**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 850/1562 | 403/757 | 6 | 60/108 | 1 | 450/842 | 849/1560 |

## Shade adjustment with IPS InLine System Shade and Stains

These stains may be fired in a separate Stains firing. Minor shade adjustments and individual characterizations may also be fired in the Glaze firing.
Dispense the desired quantity of IPS InLine System Shade and dilute and mix with IPS InLine System Glaze and Stains Liquid to the desired consistency. Pooling should be avoided and the material must not be applied too thickly. If a more intensive shade effect is desired, it is achieved by several staining procedures and repeated firing. The application of too many stains results in an unnatural shade effect.

**Firing parameters for the IPS InLine System Shade/Stains firing (Stains and Characterization firing)**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 850/1562 | 403/757 | 6 | 60/108 | 1 | 450/842 | 849/1560 |

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

## Glaze firing

After the Stains and Characterization firing with IPS InLine System Shade/Stains, the Glaze firing is conducted.
– If required, homogenize the Glaze paste by stirring it before taking it from its jar. Extrude the desired amount of IPS InLine System Glaze paste from the syringe or jar and mix thoroughly on the mixing pad. If a different consistency is desired, adjust the consistency by diluting the material with IPS InLine System Glaze and Stains Liquid. Next, apply the Glaze material in the usual manner using a brush. Make sure not to apply the Glaze material either in too thick or too thin layers.
– Minor shade adjustments may be carried out together with the Glaze firing.

**Firing parameters for the Glaze firing**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 850/1562 | 403/757 | 6 | 60/108 | 1 | 450/842 | 849/1560 |

When working with a furnace from other manufacturers these parameters have to be adjusted accordingly! Finally, the shade of the completed restoration is checked.

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

## Add-On after Glaze firing

Mix the IPS InLine System Add-On 690 °C/1274 °F material with the desired build-up liquid, apply on the missing areas, and fire.

**Firing paramters for the Add-On 690°C/1274°F after Glaze firing**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 690/1274 | 403/757 | 4 | 60/108 | 1 | 450/842 | 689/1272 |

Individually designed and characterized bridge made of IPS InLine One

# IPS InLine® – Conventionally Layered

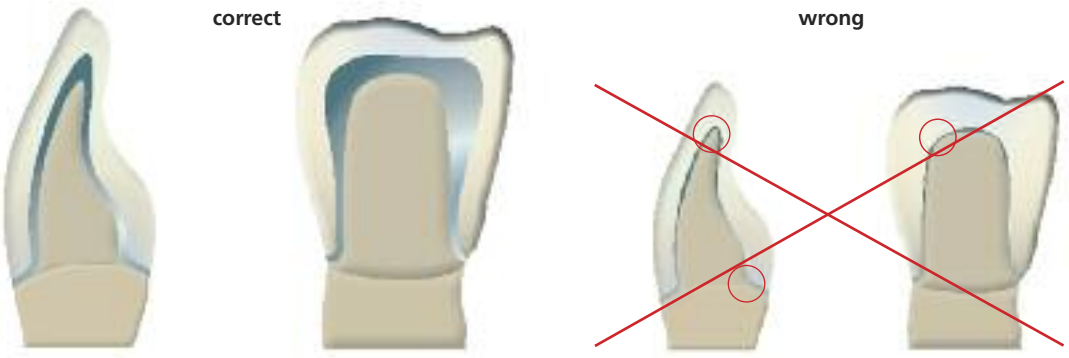
## Framework design criteria

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

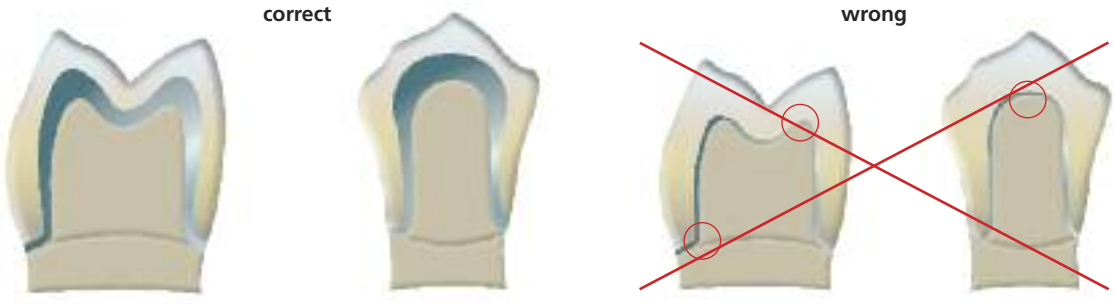
### 1. Functional support of the veneering ceramic

The framework reflects the shape of the tooth in a reduced form. It 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 in the cusp-fissure area. In this way, the masticatory forces occurring during functional chewing are exerted on the framework rather than on the veneering ceramic. Therefore, 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.

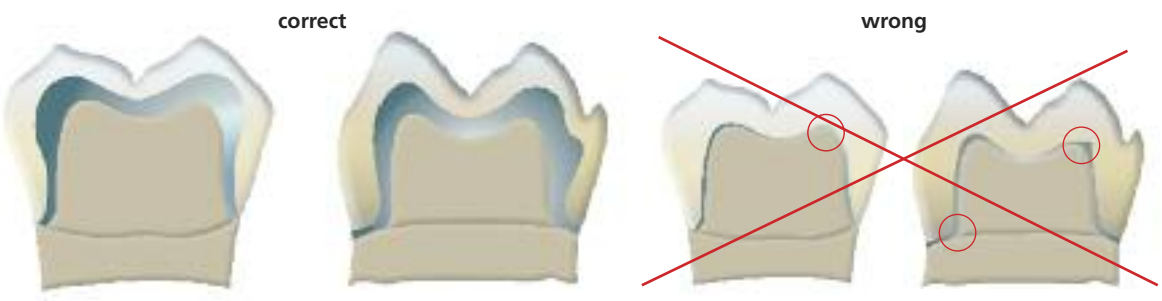
**Anterior crowns**




**Premolar crowns**

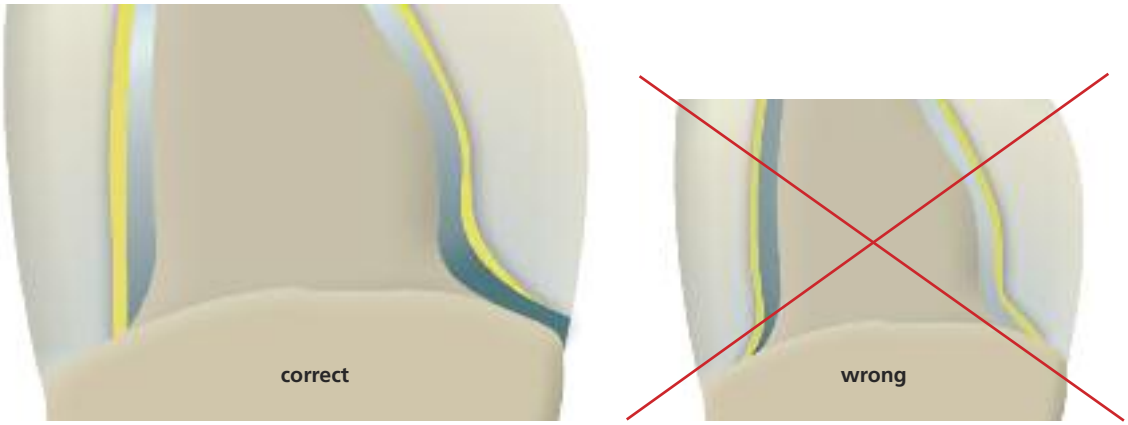



**Molar crowns**



## 2. Framework design for fired ceramic shoulders

With fired ceramic shoulders, 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 to achieve functional support of the framework on the preparation. Excellent accuracy of fit on the preparation is essential to ensure that the shoulder material may not reach the inner aspects of the framework during subsequent application.




## 3. Framework stability

The dimensions and shape of the interdental connector surfaces significantly influence the stability of the restoration during processing, as well as the clinical long-term success after incorporation. 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**

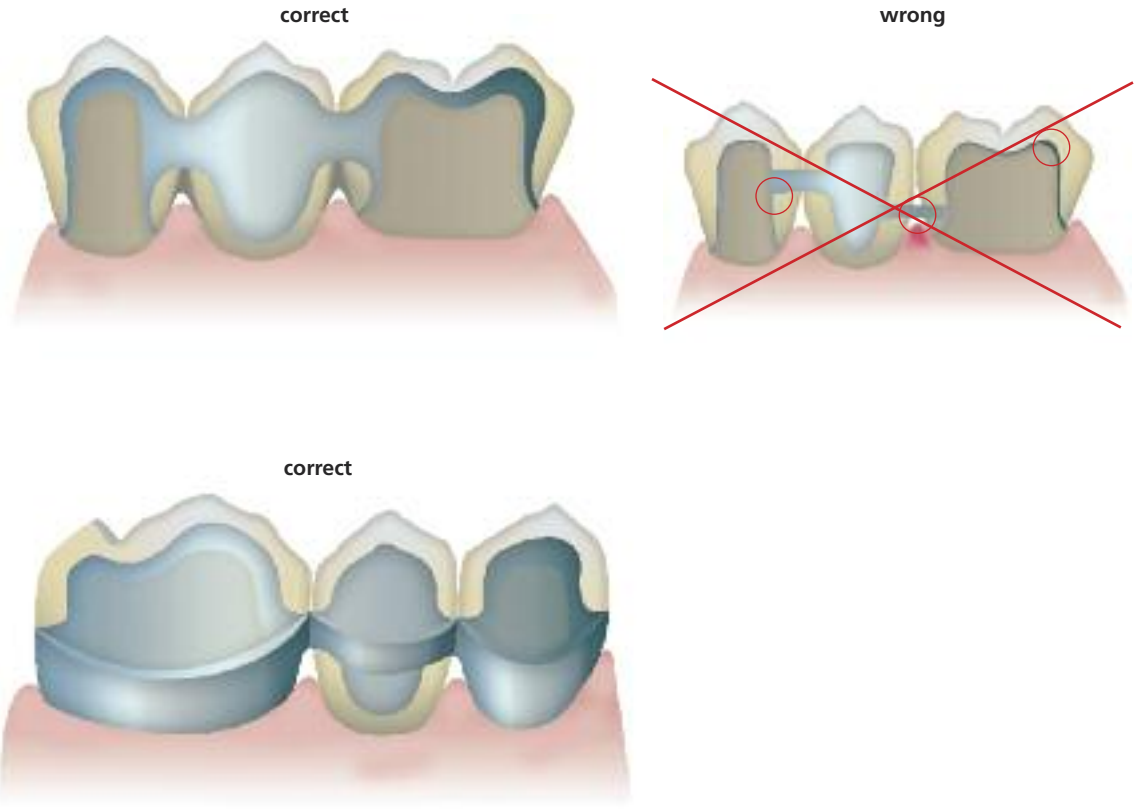
Double the height of the connector with single width
**= eightfold stability**

## 4. Framework design for bridges

Thermal stress during firing and masticatory forces after cementation affect metal frameworks. 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 most predictable results.

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 struts) ensures more even cooling of the restoration during the cooling phase. This is particularly important if high gold alloys are used.

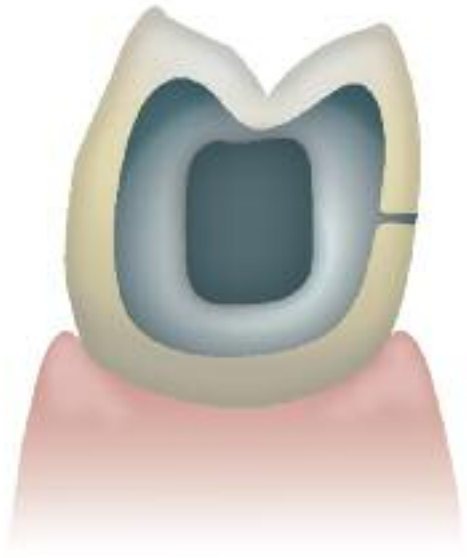
In order to enable optimum oral hygiene with bridge restorations, the design of the interdental spaces should be given special attention. Adequate opening of the interdental area without creating black triangles should be given special attention when designing the bridge in order to ensure proper periodontal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



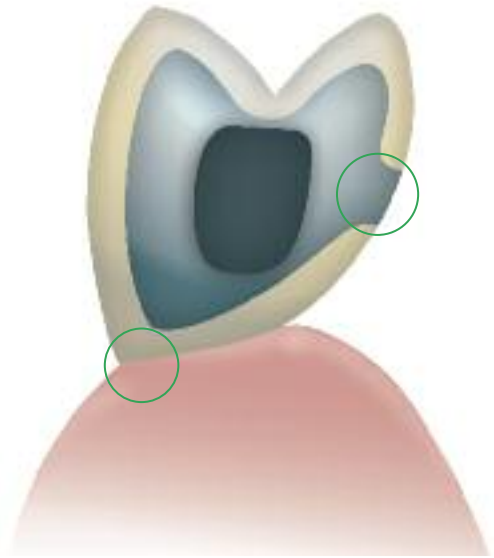
## 5. Design of bridge pontics

Bridge pontics are designed with esthetic and functional aspects as well as oral hygiene in mind. The area of the pontic that contacts the alveolar ridge should 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 struts are advantageous.

**Bridge pontic design – ovate pontic**

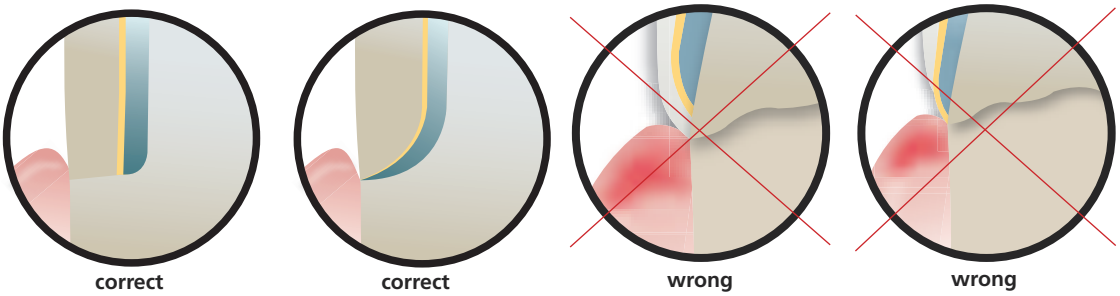


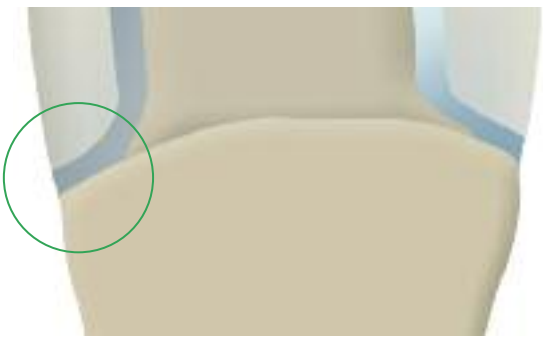
**Bridge pontic design – saddle-type pontic**

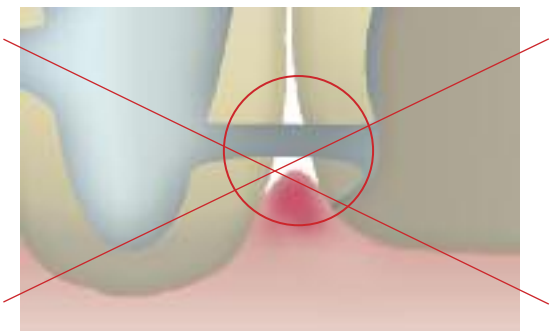


## 6. Interface between metal and ceramic

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 should be designed in such a way that cleaning of these hard-to-reach areas is possible.

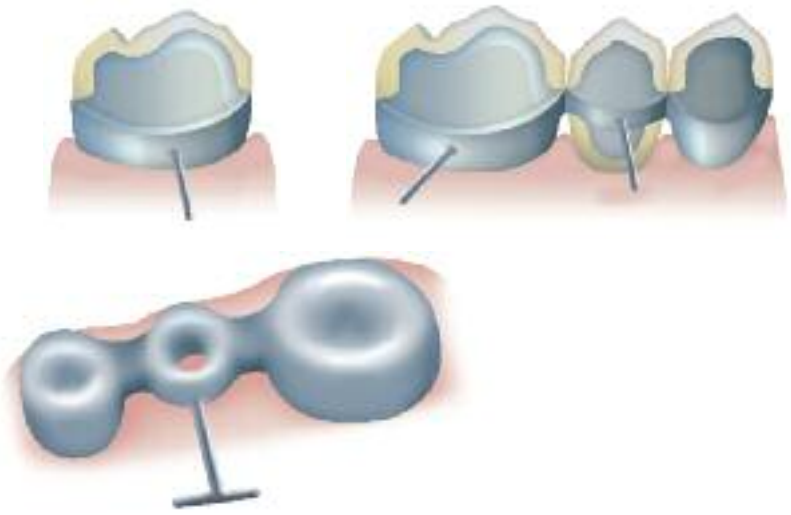




## Holding pins

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 struts during casting and firing.



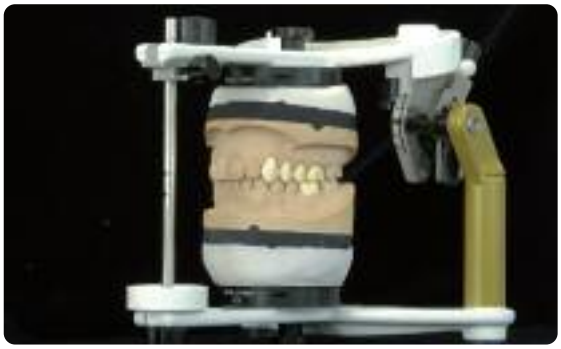
**Important**

**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 contact address.**

# Step-by-step procedure

## Starting situation



Maxillary and mandibular model articulated in the "Stratos 200"

Starting situation for metal-supported IPS InLine restorations

## Framework design

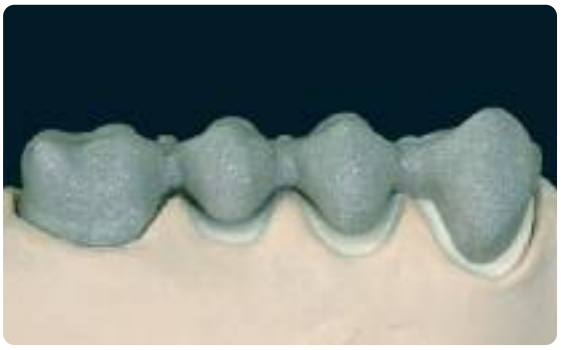
Design the framework with a reduced anatomical shape taking the planned layering into account. The wall thickness for single crowns should be at least 0.3 mm and at least 0.5 mm for abutment crowns.
Make sure to provide sufficient stability of shape for the framework. Avoid sharp transitions and edges.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

Design the framework in a reduced supported shape.

## Alloy processing / oxide firing

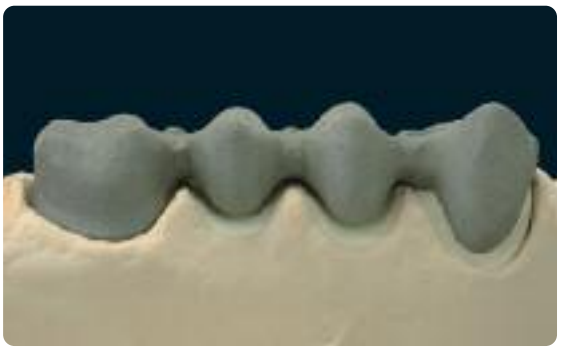
The cast metal framework is finished using tungsten carbide burs or ceramic-bonded grinding instruments. To make room for the ceramic shoulder (labial or circular), the marginal area of the framework is reduced up to the inner edge of the chamfer or shoulder preparation.

Surface finishing before blasting.



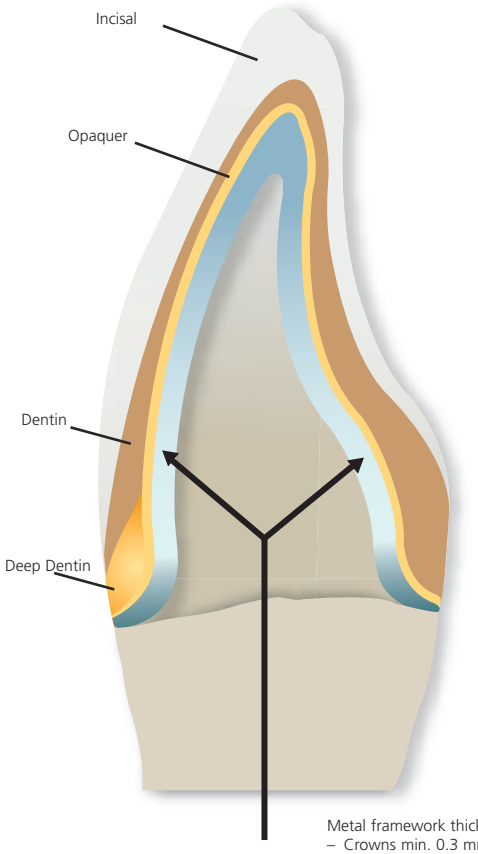
Carefully blast the framework with aluminium oxide $Al_2O_3$ 50–100 µm (observe the instructions of the alloy manufacturer).

After blasting, clean the metal framework with a steam jet and allow to dry thoroughly. Conduct the oxide firing according to the instructions of the manufacturer.



After oxide firing, the framework should exhibit an evenly oxidized surface.

## IPS InLine layering diagram




Metal framework thickness:
– Crowns min. 0.3 mm
– Bridge abutments min. 0.5 mm

| | 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 mm** | **0.5 mm** |
| incisal | **0.7 mm** | **0.3 mm** |
| **Incisal** | | |
| cervical | **0.2 mm** | **0.1 mm** |
| incisal | **0.5 mm** | **0.4 mm** |

These figures are drawn from past experience and they may vary in certain situations.

Depending on the clinical situation or the selected shade system (Chromascop, A-D and Bleach), various components may be used to achieve targeted shade effects.

The Incisal materials in A-D shades are applied up to the centre of the cervical third.

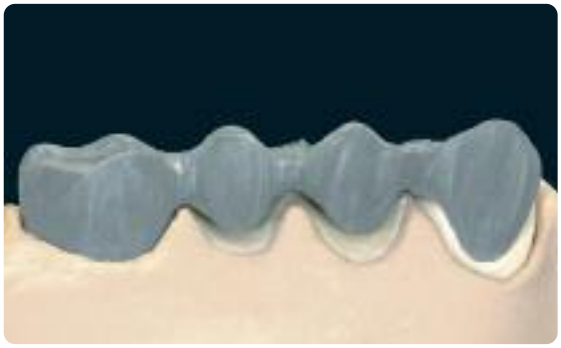
With Chromascop shades, the Incisal materials are only layered up to the beginning of the cervical third.

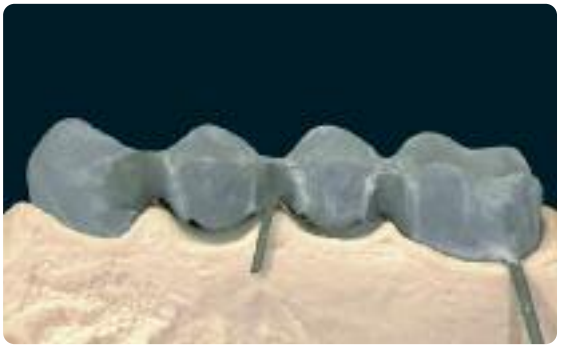
e.g. A–D shades

e.g. Chromascop shades

## 1st Opaquer firing (wash firing)

Select the IPS InLine System Opaquer paste in the corresponding tooth shade. Extrude the desired amount from the syringe or jar and mix thoroughly on the mixing pad. Thin it, if required. Apply the first opaquer layer thinly and agitate it into the alloy surface.

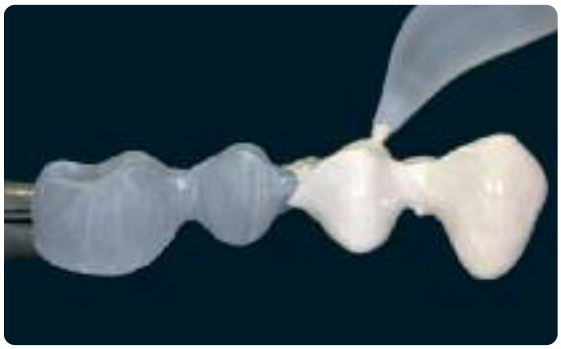




**Tip:**
The consistency can be individually adjusted using the IPS InLine System Opaquer Liquid.

## 2nd Opaquer firing

Apply the second opaquer layer in such a way that the metal framework is entirely covered with opaquer. After firing, the IPS InLine System Opaquer should show a covering, silky-mat shiny surface. After the opaquer firing, the alloy framework should be entirely covered with opaquer.



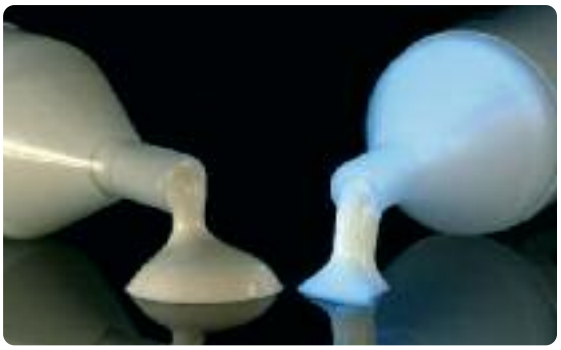
**Firing parameters IPS InLine System Opaquer (1st and 2nd Opaquer firing)**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 930/1706 | 403/757 | 6 | 100/180 | 2 | 450/842 | 929/1704 |

## IPS InLine System Opaquer F

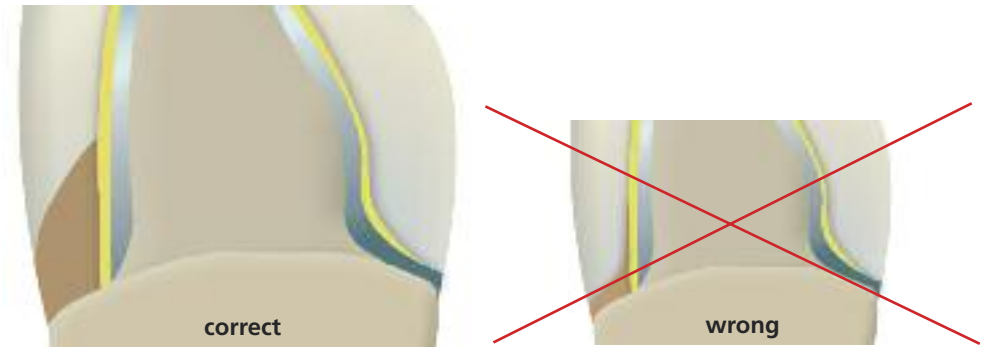
The Opaquer F can be used to reinforce the in-depth fluorescence.

– **Either**: Apply the Opaquer F as a thin, **third** opaquer layer and fire (930 °C/1706 °F).
– **Or**: Mix up to 20% of Opaquer F with the conventional IPS InLine System Opaquer before the second layer is applied and fire at 930 °C/1706 °F.



## 1st and 2nd Margin firing

A ceramic shoulder can be fabricated on the metal framework after the opaquer firing, if the necessary space has been provided during finishing. Before creating the ceramic shoulder, seal the stone die with IPS Margin Sealer and then, after drying, with IPS Ceramic Separating Liquid.




After that, the IPS 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. Then, carefully remove the framework with the dried shoulder material from the die.

**Tip:**
When designing a ceramic shoulder (particularly for bridges), the Margin material may be applied slightly higher up in the proximal areas. This will reduce the interdental shrinkage during the subsequent Dentin and Incisal firings.

After firing, the shoulder may have to be slightly adjusted by grinding in order to remove any interfering areas. Subsequently, the accuracy of fit (sinter shrinkage) has to be optimized by means of a 2nd Margin firing. Use the same Margin materials as for the 1st Margin firing for that purpose.
First, however, isolate the die again using IPS Ceramic Separating Liquid. Subsequently, supplement the missing areas by carefully inserting the shoulder material into the gap created during the 1st Margin firing so that the ceramic shoulder is provided with optimum accuracy of fit. Complete the shoulder, dry, and carefully remove the framework with the completed and dried shoulder material from the die and place it on the firing tray.

**Firing parameters for IPS InLine Margin (1st and 2nd firing)**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 930/1706 | 403/757 | 4 | 60/108 | 1 | 450/842 | 929/1704 |

## 1st Dentin and Incisal firing

Isolate the model before layering the Dentin and 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 areas using IPS Model Sealer. Additionally, separate the area of the pontics with IPS Ceramic Separating Liquid.

**Tip:**
To achieve an optimum bond between the ceramic material and the opaquer surface, apply a small amount of IPS InLine Deep Dentin or Dentin material to the cervical and interdental areas (for bridges) and slightly roughen it. In this way, the adaption of the ceramic material on the opaquer surface is enhanced.

Make sure 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, separate the entire interdental area down to the opaquer.

**Tip:**
Densify the ceramic surface (after contouring) with a large, dry brush toward the cervical margin before firing.

The ceramic material is applied according to the layering diagram.

For an optimum firing result, the interdental areas must be separated down to the opaquer.

Restoration after the 1st Dentin / Incisal firing

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

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 910/1670 | 403/757 | 4 | 60/108 | 1 | 450/842 | 909/1668 |

**Important**
- **Use distilled water to rewet the mixed or even already applied layering material.**
- **The firing tray with the restoration should only be placed in the firing chamber once the furnace head is completely open and the beeper has sounded.**

## 2nd Dentin and Incisal firing

Finish and thoroughly clean the restoration. Clean under running water or 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. Thoroughly dry the restoration and complete the missing areas. Pay special attention to interdental spaces as well as contact points. Place the completely layered restoration on the firing tray and ensure adequate support. The firing tray with the restoration should only be placed in the firing chamber once the furnace head is completely open and the beeper has sounded. Use the firing parameters stipulated below to fire the restoration.

Supplementing the restoration with Dentin and Incisal materials

Final design of the occlusal surface

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

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 900/1652 | 403/757 | 4 | 60/108 | 1 | 450/842 | 899/1650 |

**Important**

- **Use distilled water to rewet the mixed or even already applied layering material.**
- **The firing tray with the restoration should only be placed in the firing chamber once the furnace head is completely open and the beeper has sounded.**

## Margin Add-On firing

Margin Add-On is an add-on material for the ceramic shoulder area, which is applied after the main or add-on firing cycles with Dentin and Incisal materials. Thus, it is possible to adjust the accuracy of the marginal shoulder. Subsequently, the restoration is completed with the new Shade/Stains and Glaze materials.

**Firing parameters for the Margin Add-On firing**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 900/1652 | 403/757 | 4 | 60/108 | 1 | 450/842 | 89/1650 |

## Add-On firing

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

In order to employ a lower firing temperature, IPS InLine Dentin/Incisal materials can be mixed with IPSInLine Add-On in a 1:1 ratio and subsequently applied.

**Firing parameters for the Margin Add-On firing**

| T<br>°C | B<br>°C | S<br>min. | t↗<br>°C/min | H<br>min. | $V_1$<br>°C | $V_2$<br>°C |
|---|---|---|---|---|---|---|
| 860/1580 | 403/757 | 4 | 60/108 | 1 | 450/842 | 859/1578 |

# Individual finishing

## Finishing and preparing for the Stains and Glaze firing

Before the Stains and Glaze firing, the restoration has to be prepared as follows:

– Finish the restoration using diamond grinders and give it a true-to-nature shape and surface structure, such as growth lines and convex/concave areas.
– Areas which should exhibit a higher gloss after Glaze firing (e.g. pontic rests) can be smoothed out and prepolished using silicone disks.
– If gold and/or silver dust was used to visualize the surface texture, the restoration has to be thoroughly cleaned with steam. Make sure to remove all gold or silver dust in order to avoid any discolouration after firing.

The true-to-nature shape and surface texture are designed.

## Stains and Characterization firing

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

– For better wetting of the stains, IPS InLine System Glaze and Stains liquid may be slightly agitated on the surface.
– If a more intensive shade effect is desired, it is achieved by several staining procedures and repeated firing. The application of too many stains results in an unnatural shade effect.
– The cusps and fissures can be individualized using Stains.
– The basic chromatic shade is supported with the corresponding Shade material (see table).

**Shade combination table for IPS InLine One / IPS InLine / IPS InLine PoM**

| Shade | 1 | 2 | 3 | 4 | 5 | 6 | 7 | SI1 | SI2 |
|---|---|---|---|---|---|---|---|---|---|
| A-D | A1, B1, B2 | A2, A3, A3.5 | B3, B4, D4 | A4 | C1, D2, D3 | C2, C3, C4 | – | A1, A2, A3, B1, B2, B3, B4 | A3.5, A4, C1, C2, C3, C4, D2, D3, D4 |
| Chromascop | 110, 120, 130 BL1, BL2, BL3, BL4 | 140, 210, 220, 230, 240 | 310, 320, 330 | 340, 540 | – | 410, 420, 430, 440, 510 | 520, 530 | 110–140, 210, 220, 310, 320, BL1–BL4 | 230, 240, 330, 340, 410–440, 510–540 |

**Firing parameters for the IPS InLine System Shade/Stains firing**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 850/1562 | 403/757 | 6 | 60/108 | 1 | 450/842 | 849/1560 |

## Shade adjustment with IPS InLine System Shade and Stains

These stains may be fired in a separate Stains firing. Minor shade adjustments and individual characterizations may also be fired in the Glaze firing.

Dispense the desired quantity of IPS InLine System Shade and dilute and mix with IPS InLine System Glaze and Stains Liquid to the desired consistency. Pooling should be avoided and the material must not be applied too thickly. If a more intensive shade effect is desired, it is achieved by several staining procedures and repeated firing. The application of too many stains results in an unnatural shade effect.

**Firing parameters for the IPS InLine System Shade/Stains firing (Stains and Characterization firing)**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 850/1562 | 403/757 | 6 | 60/108 | 1 | 450/842 | 849/1560 |

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

## Glaze firing

After the Stains and Characterization firing with IPS InLine System Shade/Stains, the Glaze firing is conducted.

– Remove IPS InLine System Glaze paste from the syringe and mix thoroughly. If a different consistency is desired, adjust the consistency by diluting the material with IPS InLine System Glaze and Stains Liquid. Next, apply the Glaze material in the usual manner using a brush. Make sure not to apply the Glaze material either in too thick or too thin layers.
– Minor shade adjustments may be carried out together with the Glaze firing.

**Firing parameters for the Glaze firing**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 850/1562 | 403/757 | 6 | 60/108 | 1 | 450/842 | 849/1560 |

When working with a furnace from another manufacturer, these parameters have to be adjusted accordingly! Finally, the shade of the completed restoration is checked.

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

## Add-On after Glaze Firing

Mix the IPS InLine System Add-On 690 °C/1274 °F material with the desired build-up liquid, apply on the missing areas, and fire.

**Firing parameters for IPS InLine System Add-On 690°C/1274°F after Glaze firing**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 690/1274 | 403/757 | 4 | 60/108 | 1 | 450/842 | 689/1272 |

Individually designed and characterized bridge made of IPS InLine

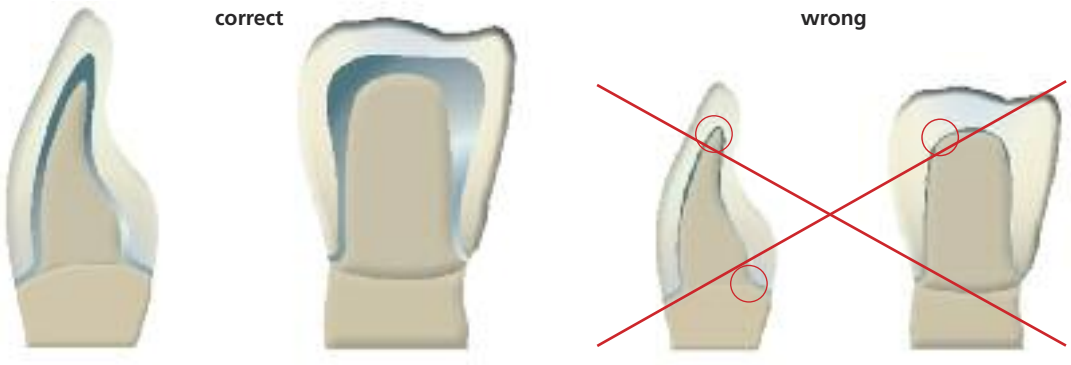
# Framework design criteria

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

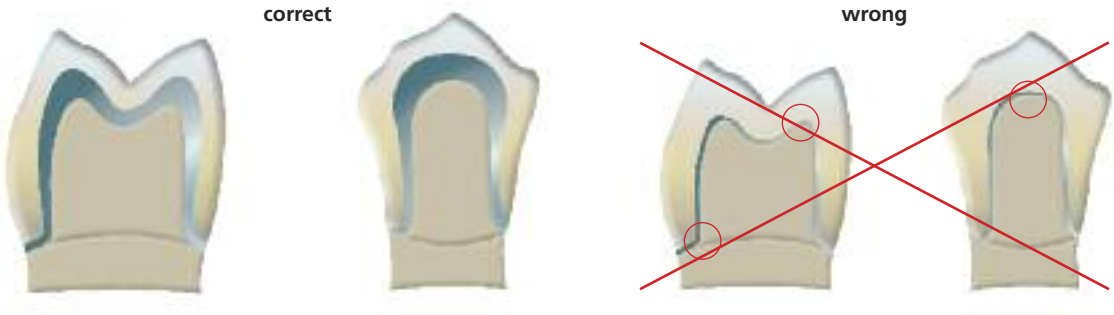
## 1. Functional support of the veneering ceramic

The framework reflects the shape of the tooth in a reduced form. It 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 in the cusp-fissure area. In this way, the masticatory forces occurring during functional chewing are exerted on the framework rather than on the veneering ceramic. Therefore, 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.

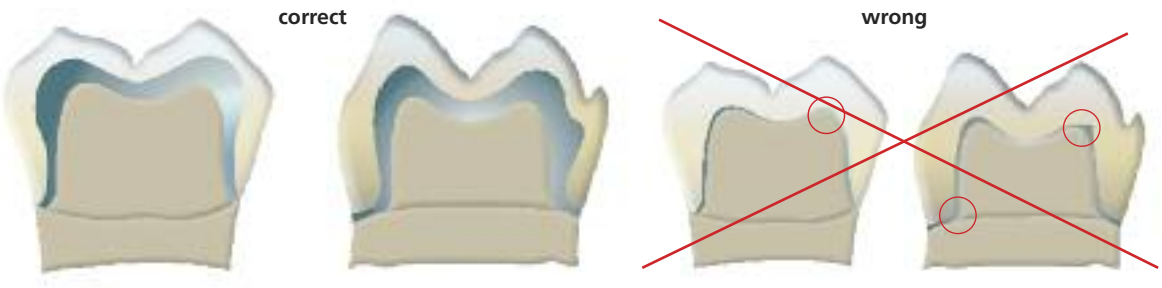
### Anterior crowns




### Premolar crowns

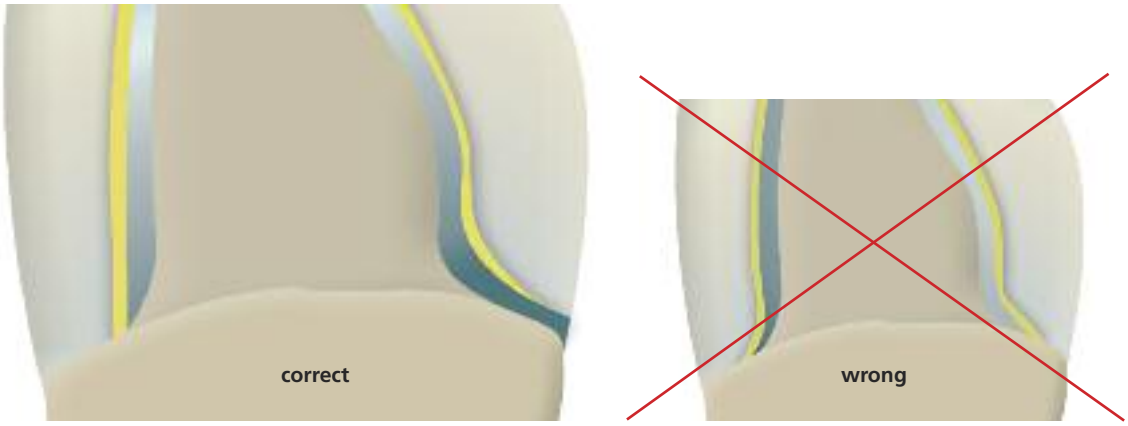



### Molar crowns



## 2. Framework design for pressed-on ceramic shoulders

With pressed-on ceramic shoulders, 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 to achieve functional support of the framework on the preparation. Excellent accuracy of fit on the preparation is essential to ensure that the shoulder material may not reach the inner aspects of the framework during subsequent application.




## 3. Framework stability

The dimensions and shape of the interdental connector surfaces significantly influence the stability of the restoration during processing as well as the clinical long-term success after incorporation. 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**

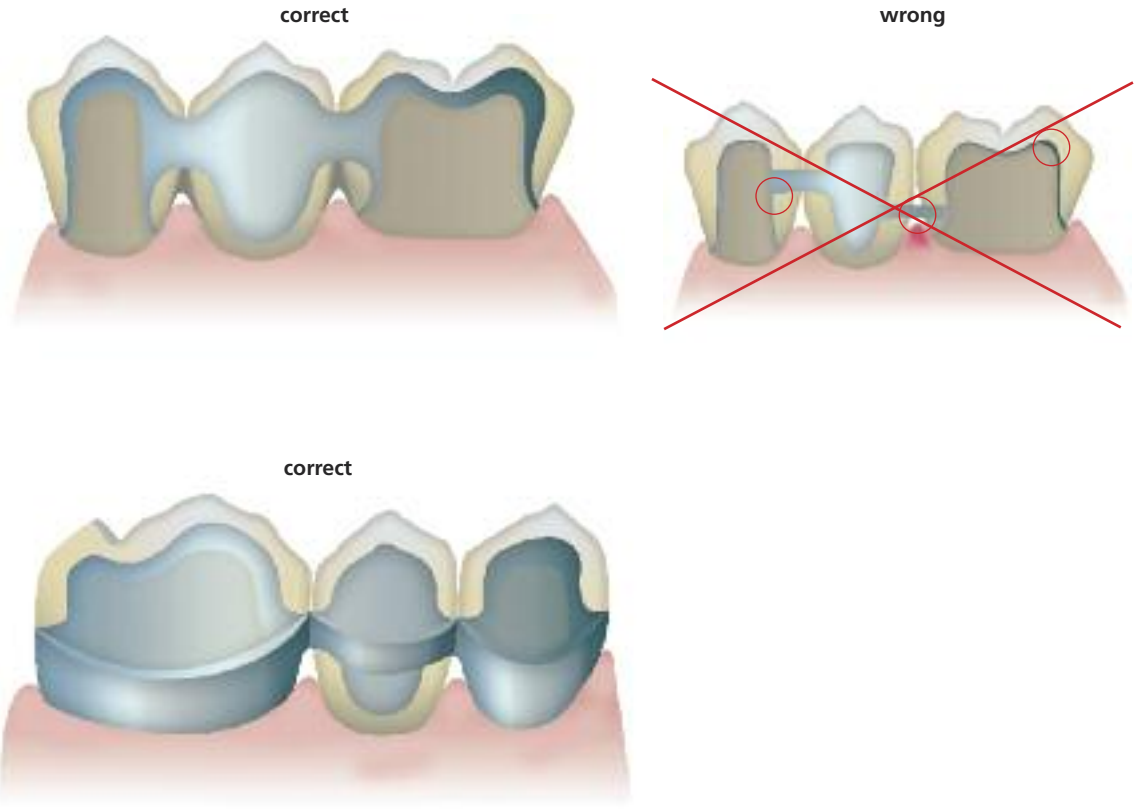
Double the height of the connector with single width
**= eightfold stability**

## 4. Framework design for bridges

Thermal stress during firing and masticatory forces after cementation affect metal frameworks. These forces must be transferred 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 most predictable results.

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 struts) ensures more even cooling of the restoration during the cooling phase. This is particularly important if high gold alloys are used.

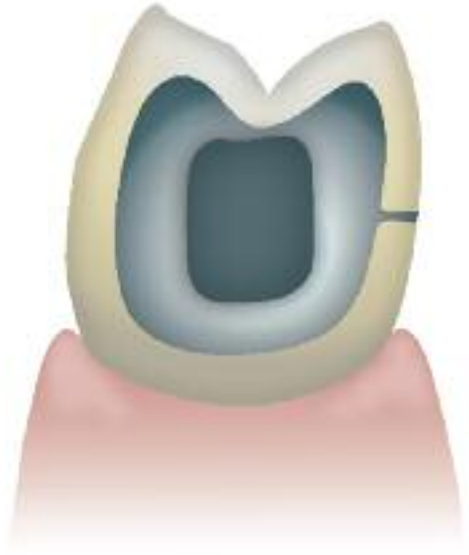
In order to enable optimum oral hygiene with bridge restorations, the design of the interdental spaces should be given special attention. Adequate opening of the interdental area without creating black triangles should be given special attention when designing the framework in order to ensure proper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



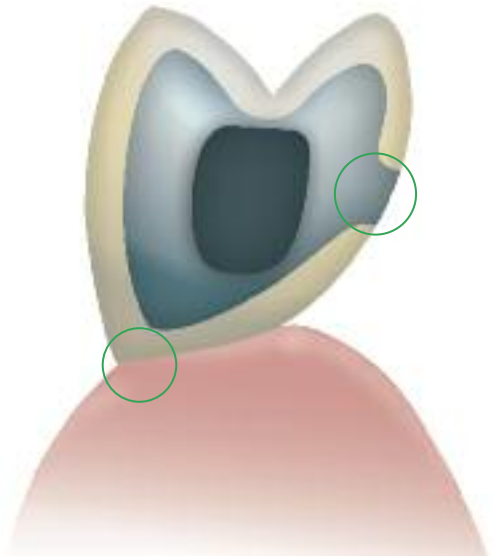
## 5. Design of bridge pontics

Bridge pontics are designed with esthetic and functional aspects as well as oral hygiene in mind. The area of the pontic that contacts the alveolar ridge should 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 struts are advantageous.

**Bridge pontic design – ovate pontic**

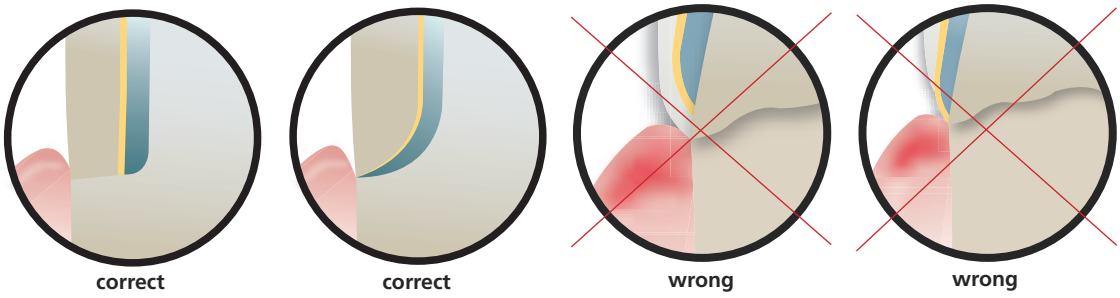


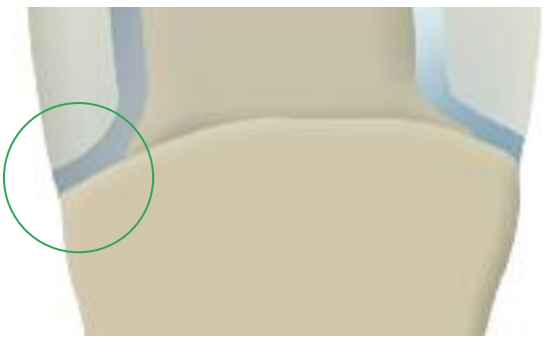
**Bridge pontic design – saddle-type pontic**

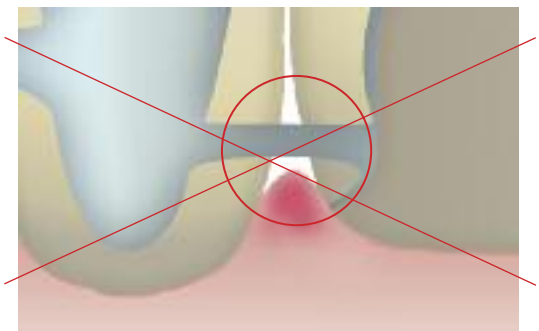


## 6. Interface between metal and ceramic

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 neither be located in the contact area nor on surfaces involved in masticatory functions. The interface in the interdental area should be designed in such a way that cleaning of these hard-to-reach areas is possible.



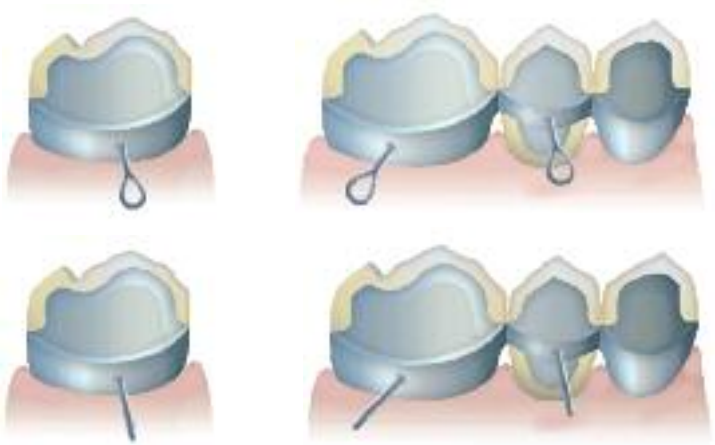


## Retention pins

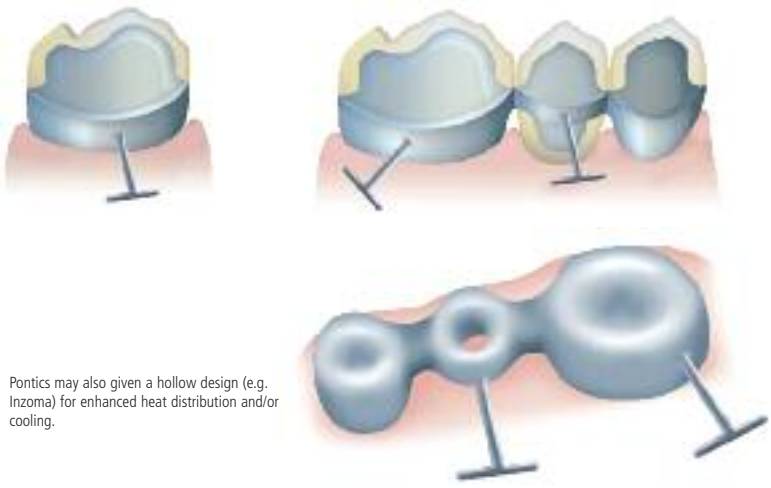
It is important for the press-on-metal technique that retention pins are attached to the crown and bridge frameworks. These retention pins have to be attached in the area of the pontics or the scallops. They are directly attached to the framework with the help of wax. Dimensions of Ø 1.0–1.5 mm for the retention pins have proven to be useful.

Advantages of cast-on retention pins:
1. Act as cooling struts during casting and firing
2. Retention for improved fixation in the investment material during the press-on procedure with IPS InLine PoM
3. Handling aid for further processing

The retention pins have to be shaped in such a way that the bridge framework cannot distort and/or move in the investment material. At least 2 retention pins (diverging) have to be provided for bridge frameworks, one of which has to be positioned in the area of the pontic.



If straight wax wires are used, 2 diverging wires have to be applied for bridges. A profile has to be positioned in the area of the pontic.



Pontics may also given a hollow design (e.g. Inzoma) for enhanced heat distribution and/or cooling.

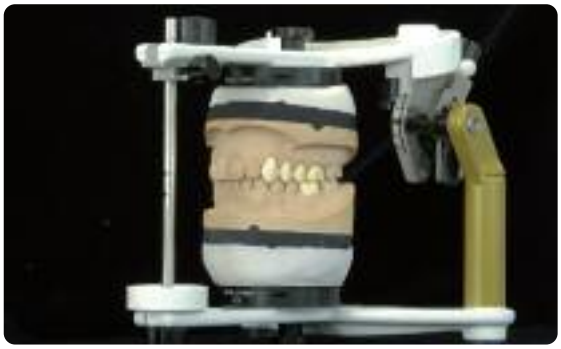
**Important**

**The retention 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 contact address.**

# Step-by-step procedure

## Starting situation

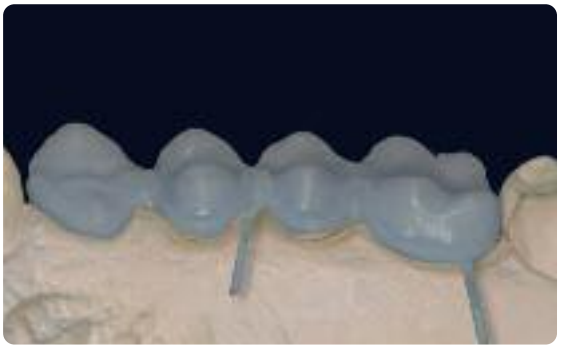


Maxillary and mandibular model articulated in the "Stratos 200"

Starting situation for the metal-supported IPS InLine PoM restoration

## Framework design

Design the framework with a reduced anatomical shape taking the planned press-on procedure into account. The wall thickness for single crowns should be at least 0.3 mm and at least 0.5 mm for abutment crowns. 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 of interdental hygiene and the alloy used.



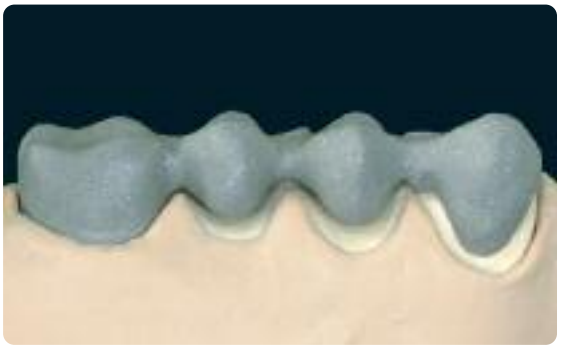
Design the framework in a reduced supported shape.

- **Due to the optical properties, the ceramic should feature a thickness of at least 0.8 mm in connection with the press-on-metal technique.**
- **Especially if frameworks are to be pressed over, it is recommended to attach retention grooves in the palatal / lingual area.**

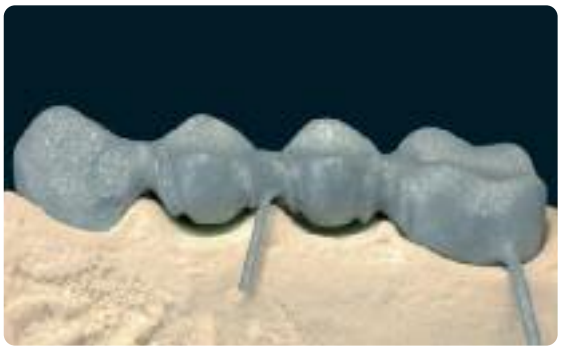
## Alloy processing / oxide firing

The cast metal framework is finished using tungsten carbide burs or ceramic-bonded grinding instruments. To make room for the ceramic shoulder (labial or circular), the marginal area of the framework is reduced up to the inner edge of the chamfer or shoulder preparation.

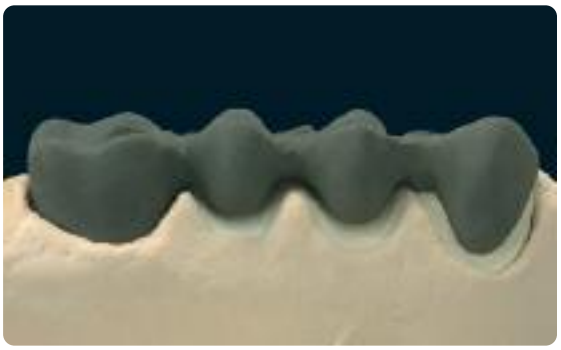
Surface finishing before blasting



Carefully blast the framework with aluminium oxide $Al_2O_3$ 50–100 µm (observe the instructions of the alloy manufacturer).

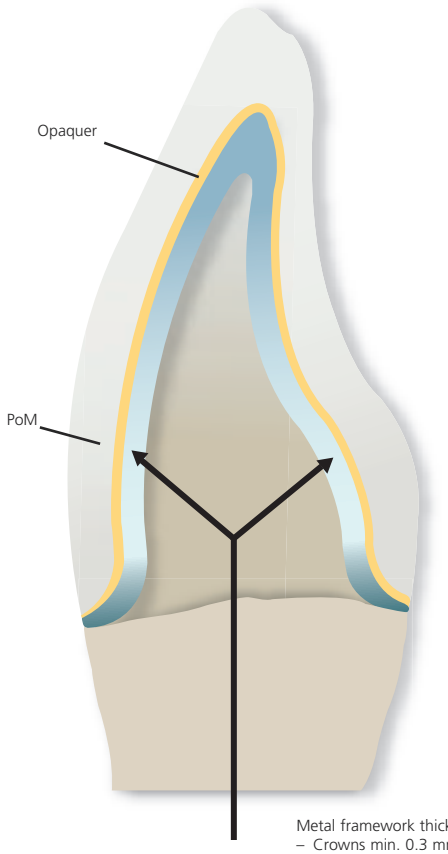


After blasting, clean the metal framework with a steam jet and allow to dry thoroughly. Conduct the oxide firing according to the instructions of the manufacturer.



After oxide firing, the framework should exhibit an evenly oxidized surface.

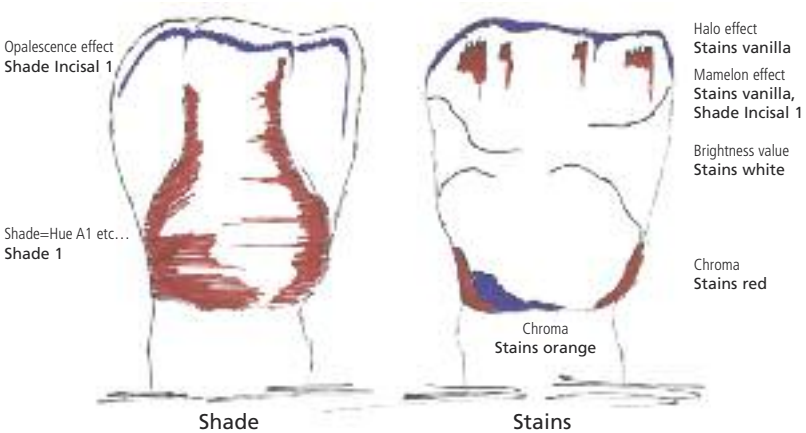
## IPS InLine PoM layering diagram




Metal framework thickness:
– Crowns min. 0.3 mm
– Bridge abutments min. 0.5 mm

| | Ideal layer thickness | Limited layer thickness |
|---|---|---|
| Framework | 0.3–0.5 mm | 0.3–0.5 mm |
| Opaquer | 0.1 mm | 0.1 mm |
| PoM | 0.8–1.5 mm | 0.8 |

These figures are drawn from past experience and they may vary in certain situations.



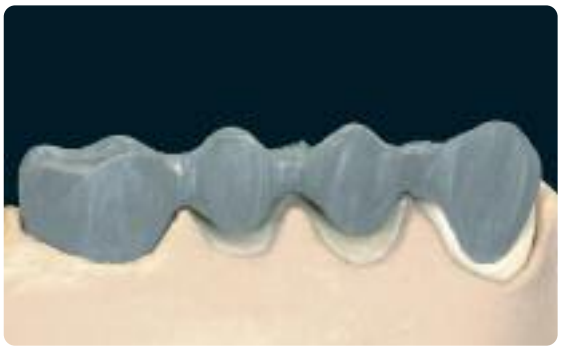

Depending on the desired individualization, IPS InLine System Shade/Stains can be used to achieve true-to-nature shade effects.

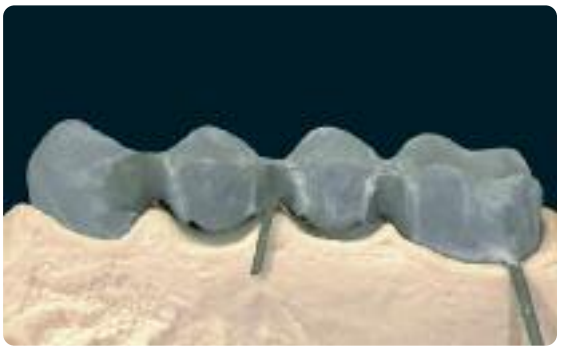
**You can find additional information on esthetic individualization in the edition "Love for Detail" by D. Grübel. It can be ordered from your Ivoclar Vivadent contact address.**

# Opaquer firing

## 1st Opaquer firing (wash firing)

Select the IPS InLine System Opaquer paste in the corresponding tooth shade. Extrude the desired amount from the syringe or jar and mix thoroughly on the mixing pad. Thin it, if required. Apply the first opaquer layer thinly and agitate it into the alloy surface.

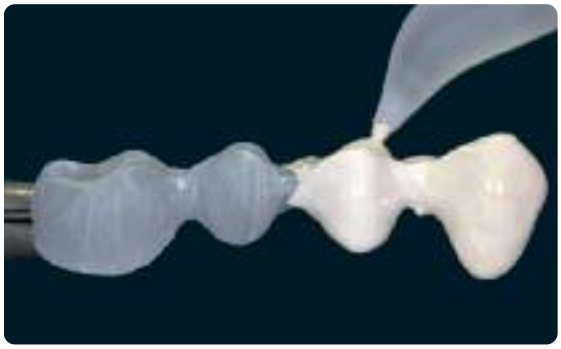




**Tip:**
The consistency can be individually adjusted using the IPS InLine System Opaquer Liquid.

## 2nd Opaquer firing

Apply the second opaquer layer in such a way that the metal framework is entirely covered with opaquer. After firing, the IPS InLine System Opaquer should show a covering, silky-mat shiny surface. After the opaquer firing, the alloy framework should be entirely covered with opaquer.



**Firing parameters IPS InLine System Opaquer (1st and 2nd Opaquer firing)**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 930/1706 | 403/757 | 6 | 100/180 | 2 | 450/842 | 929/1704 |

## IPS InLine System Opaquer F

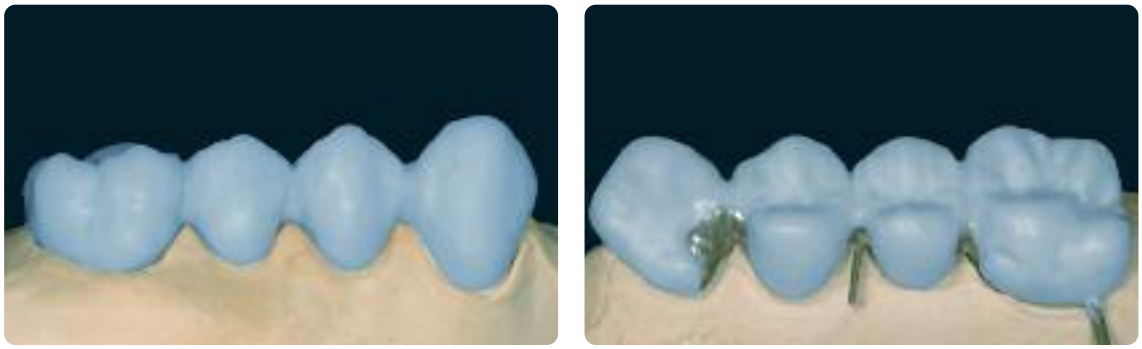
The Opaquer F can be used to reinforce the in-depth fluorescence.

– **Either**: Apply the Opaquer F as a thin, **third** opaquer layer and fire (930 °C/1706 °F).
– **Or**: Mix up to 20% of Opaquer F with the conventional IPS InLine System Opaquer before the second layer is applied and fire at 930 °C/1706 °F.

## Wax-up

After the fabrication of the model with detachable segments and the preparation of the dies, the restoration is contoured. Use only organic waxes for contouring, since they fire without leaving residue.

– Weigh the metal framework coated with opaquer and record the weight. The weight is used to determine the wax weight after contouring. .
– Subsequently, secure the framework on the model in the proper position and wax the margins first.
– Fabricate a fully anatomical wax-up as usual. Observe a layer thickness of at least 0.8 mm. Make sure not to exceed a thickness of 1.5 mm in order to ensure optimum shade reproduction.
– Observe a wax thickness of at least 0.8 mm to avoid incomplete press results.

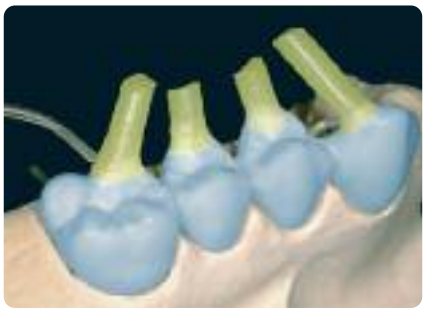


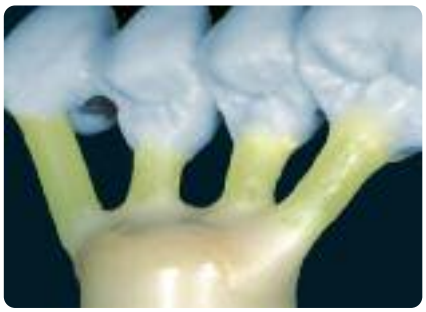
Fully anatomical wax-up on the metal framework. Observe the minimum layer thicknesses at all times.

## Sprueing

The diameter for the sprues is 3 mm. For multi-unit bridges, each bridge unit must be provided with a sprue. Always attach the sprues in the direction of flow of the ceramic and at the thickest part of the wax-up so that smooth flowing of the viscous ceramic during pressing is enabled. Depending on the number of objects to be invested, either the 100 g, 200 g, or 300 g IPS Investment Ring System is selected. Bridges must only be pressed in the 200 g or 300 g Investment Ring System. The following sprueing guidelines have to be observed:

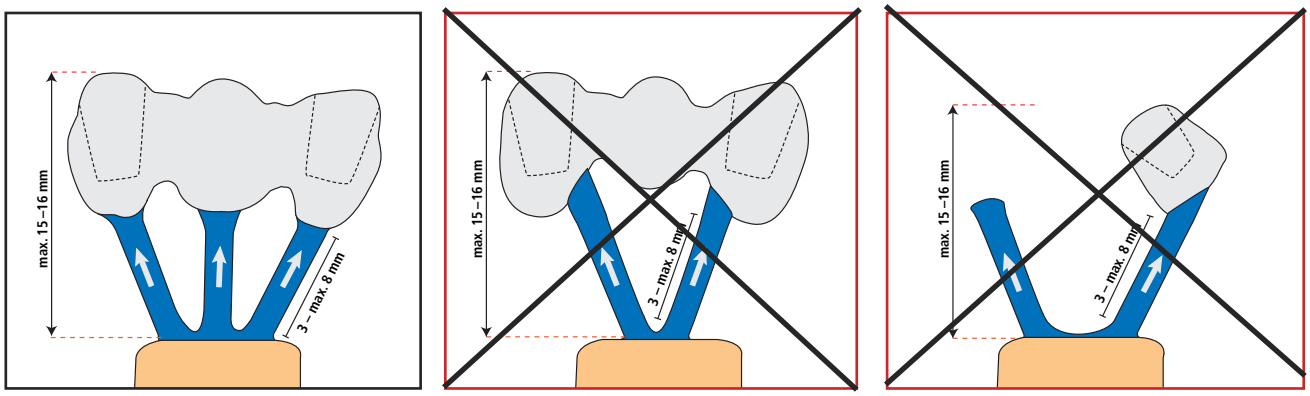
| | Single Crowns, Bridges |
|---|---|
| **Ring Base** | 100 g, 200 g, 300 g |
| **Wax wire Ø** | 3 mm |
| **Length of the wax wire** | min. 3 mm, max. 10 mm |
| **Length of the wax wire including waxed-up object** | max. 15–16 mm |
| **Sprue attachment point at the waxed-up object** | thickest part of the wax-up; every bridge unit |
| **Sprue angle to the waxed-up object** | in the direction of flow of the ceramic; observe the cusp angulation |
| **Sprue angle to the ring base** | 45–60° |
| **Design of the attachment points** | rounded, no angles or edges |
| **Distance between the objects** | min. 3 mm |
| **Distance to the silicone ring** | Crowns: min. 10 mm; Bridges: 58 mm |
| **Important** | Larger bridges may also be placed in the centre of the investment ring. |



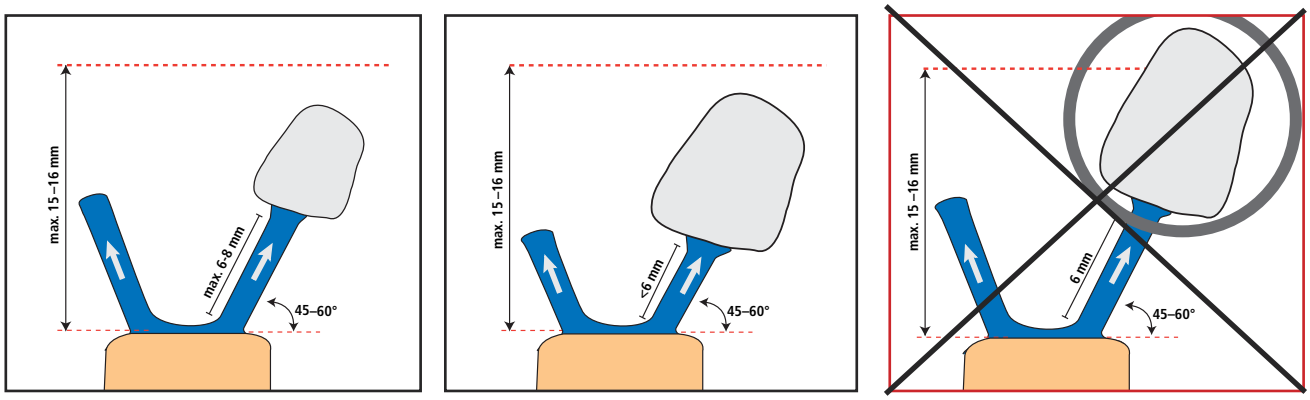


On the IPS Investment Ring Base, always attach sprues in the direction of flow of the ceramic and to the thickest part of the restoration.

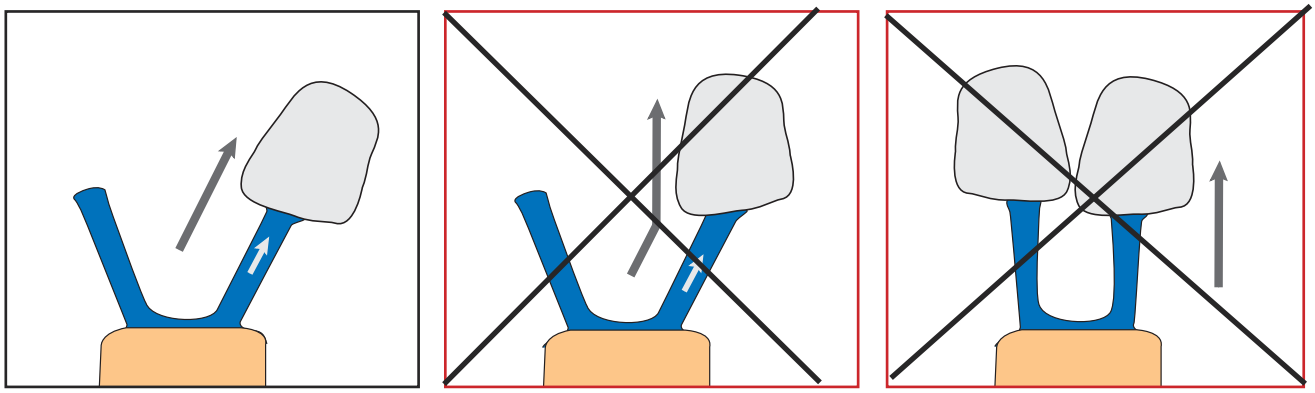
## Correct sprueing



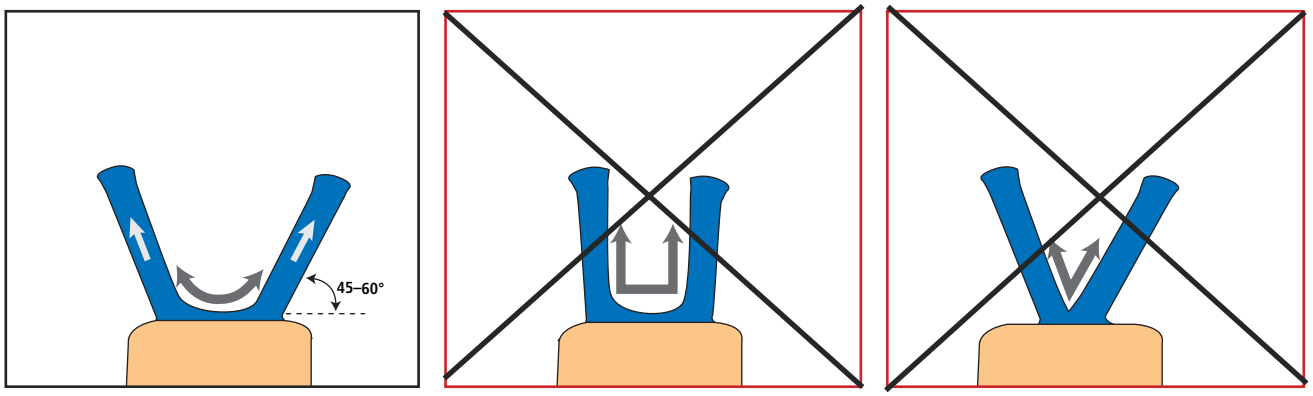

Direct the sprues towards the wax pattern (imagine continuation of wax pattern).



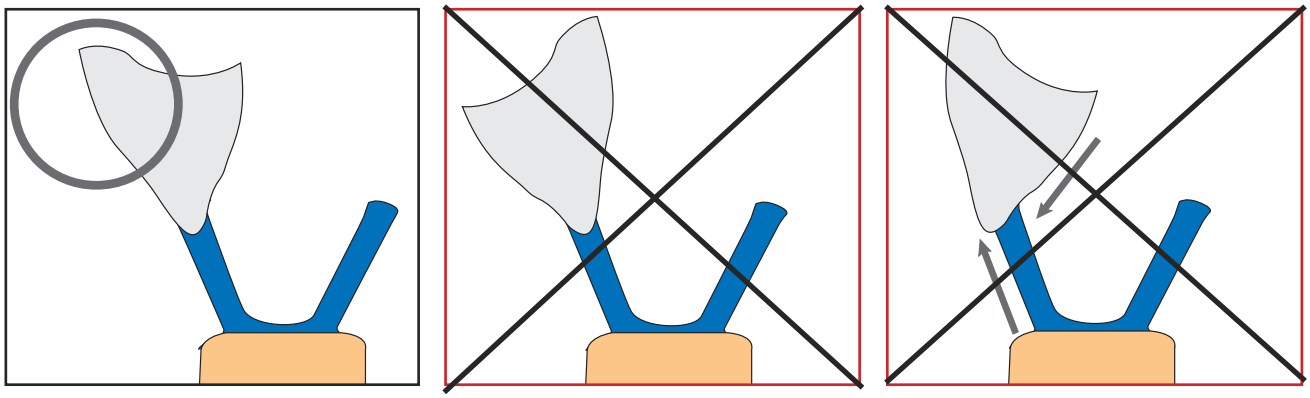

The sprue and object together should not be longer than 15-16 mm. Observe a 45-60° angle.



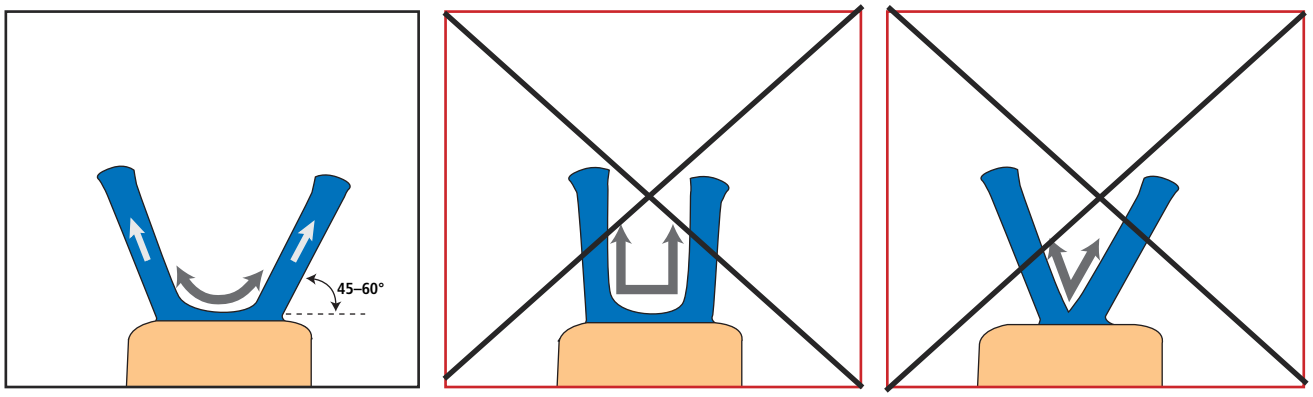
Provide sprues in the direction of flow of the ceramic material.



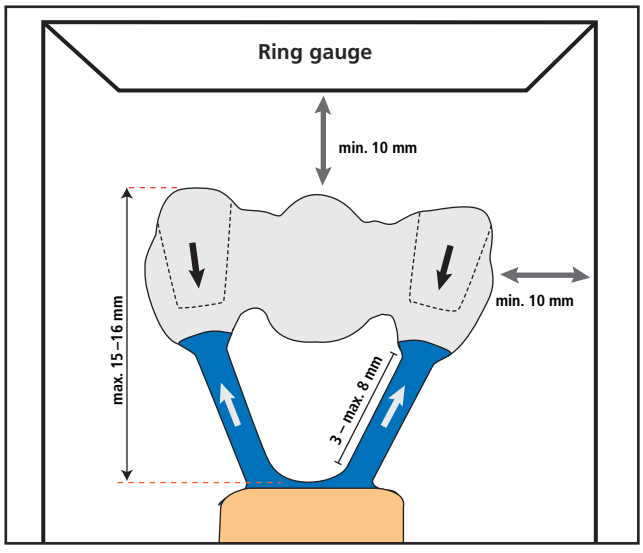

The attachment points of the sprues must be rounded. Observe a 45–60° angle.



If the crown is viewed from the proximal, the longer side of the object (usually the buccal surface) points outwards. Additionally, the flow of the ceramic material must be observed.




The attachment points of the sprues must be rounded. Observe a 45–60° angle.



## Investing

Investing is carried out using either IPS PressVEST (e.g. overnight) or IPS PressVEST Speed. For that purpose, the IPS Silicone Ring with the matching investment ring gauge is used. Determine the precise wax weight as follows:

– Weigh the ring base (seal the opening of the ring base with wax).
– Position the objects to be pressed on the ring base and attach them with wax. Weigh again.
– The wax weight is calculated by deducting the weight of the ring base and the weight of the framework (including opaquer) from the total weight.

| | 100 g | | 200 g | | | 300 g | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of ingots | 1 x XS | 1 x S | 2 x XS | 1 x S + 1 x XS | 1 x S + 1 x S | 3 x XS | 3 x S | 6 x XS | 3 x XS + 3 x S | 6 x S |
| Individual objects | 1 | 2–3 | 3–4 | 4–5 | 5–6 | 4–5 | 5–6 | 6–7 | 8–9 | 9–12 |
| Bridge pontics | | | 3 | 3–4 | 4–6 | 3–4 | 4–6 | 6–7 | 8–9 | 9–12 |
| Wax weight | 0.4 g | 0.6 g | 1.0 g | 1.5 g | 2.0 g | 1.4 g | 2.1 g | 3.0 g | 4.1 g | 5.1 g |

Please refer to the Instructions for Use of the corresponding investment material for the detailed processing parameters. The following procedure is recommended:

– Do **not** use a debubblizer on the wax objects. Remove separator thoroughly with oil-free compressed air.
– Mix the investment material. The investment material contains quartz powder. Therefore, avoid the inhalation of dust.
– Use a suitable instrument for the fine investment of the cavity. Make sure that the delicate wax margins are not damaged.
– Carefully place the IPS Silicone Ring on the ring base without damaging the wax objects. The silicone ring must sit flush on the investment ring base.
– Subsequently, carefully fill the investment ring with investment material up to the marking and position the ring gauge with a hinged movement.
– Allow the investment ring to set without manipulating it.
– Do not use IPS PressVEST for investment over the weekend to prevent crystallization.

**Investment material mixing ratio**

| | 100 g investment ring | 200 g investment ring | 300 g investment ring |
|---|---|---|---|
| **IPS PressVEST** | 13 ml liquid<br>9 ml dist. water | 26 ml liquid<br>18 ml dist. water | 37 ml liquid<br>27 ml dist. water |
| **IPS PressVEST Speed** | 16 ml liquid<br>11 ml dist. water | 32 ml liquid<br>22 ml dist. water | 48 ml liquid<br>33 ml dist. water |





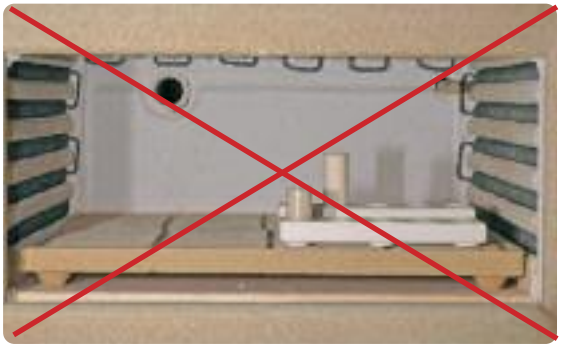
## Preheating

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

– Remove the ring gauge and ring base with a turning movement.
– Carefully push the investment ring out of the IPS Silicone Ring.
– Remove rough spots on the bottom surface of the investment ring with a plaster knife. Check the 90° angle. Investment material residue must not enter the sprues. Blow into the sprues if necessary.
– If several investment rings are preheated together, mark them with the respective ingot shade.
– When placing several investment rings in the preheating furnace using the Speed method, make sure that the furnace temperature does not drop too much.

| | IPS PressVEST | IPS PressVEST Speed |
|---|---|---|
| **Setting time** | min. 60 min | min. 30 min, max. 45 min |
| **Preheating furnace temperature** | Start room temperature heat up to 850 °C/1562 °F / 5 °C/9°F min | Direct 850 °C/1562 °F |
| **Position of the investment ring in the furnace** | towards the rear wall, tipped with the opening facing down | towards the rear wall, tipped with the opening facing down |
| **IPS InLine PoM ingots** | **no preheating** | |
| **IPS Alox plunger/IPS One-Way plunger 300g** | **no preheating** | |
| **Holding time at final temperature 850°C/1562°F** | at least 90 min | at least 90 min |
| **Important** | | If several Speed investments are to be conducted, they should be invested consecutively and placed into the preheating furnace at an interval of approximately 20 minutes. Make sure that the furnace temperature does not drop too much when placing the investment rings into the preheating furnace. The stipulated holding time counts from the point when the preheating temperature has been reached again. |

Position the heating muffle towards the rear wall, tipped with the opening facing down

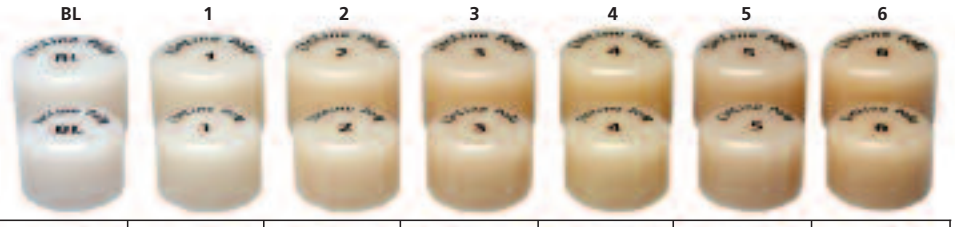


Do **not** preheat the IPS InLine PoM ingot and the IPS One-Way plunger.

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

## Selection of ingots

Select the proper ingot. Only seven shades are sufficient to reproduce all the Chromascop, A-D and Bleach shades. Therefore, it is possible to press fully anatomical restorations for different patient cases in one press cycle. The final tooth shade is achieved by individual characterization using the IPS InLine System Shade/Stains and Glaze materials.
Given the two ingot sizes, the objects may be optimally fabricated with the corresponding number of IPS InLine PoM ingots depending on the wax weight.




| Ingots & Touch Up | BL1, BL2, BL3, BL4 | A1, B1 | A2, B2, C1, D2 | A3, A3.5 | B3, B4 | C2, D3, D4 | A4, C3, C4 |
|---|---|---|---|---|---|---|---|
| | | 110, 120, 130, 140 | 210, 220, 230, 240 | – | 310, 320, 330, 340 | 410, 420, 430, 440 | 510, 520, 530, 540 |

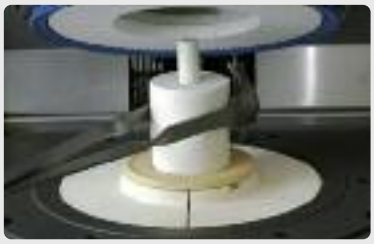
## Pressing with the 100g, 200g, 300g IPS Investment Ring System

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

Provide a **cold** IPS Alox Plunger and **cold** IPS InLine PoM ingots in the desired shade.

Insert the **cold** IPS InLine PoM ingot with the imprint facing upwards into the **hot** investment ring.

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



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

Press START to start the selected program.

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

### Press parameters for IPS InLinePoM ingots in the IPS Investment Ring System 100g and 200 g

| | B °C/°F | t↗ °C/°F/min | T °C/°F | H min 100 g | H min 200 g | $V_1$ °C/°F | $V_2$ °C/°F | N / E |
|---|---|---|---|---|---|---|---|---|
| EP 500 / V 2.9 | 700/1292 | 60/108 | 950/1742 | 10 | 20 | 500/932 | 950/1742 | 0 Program 11-20 |
| EP 600 / EP 600 Combi | 700/1292 | 60/108 | 940/1724 | 10 | 20 | 500/932 | 940/1724 | 250 µm/min * |
| Programat EP 3000 | 700/1292 | 60/108 | 940/1724 | 10 | 20 | 500/932 | 940/1724 | 250 µm/min * |
| Programat EP 5000 | 700/1292 | 60/108 | 940/1724 | 10 | 20 | 500/932 | 940/1724 | 250 µm/min * |

***Important**: If you enter the program manually, observe the abort criterion.

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

Provide a **cold** IPS One-Way Plunger and **cold** IPS InLine PoM ingots in the desired shade.

Insert the **cold** IPS InLine PoM ingots with the imprint facing upwards into the **hot** investment ring.

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

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

Press START to start the selected program.

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

## Press parameters for IPS InLine PoM ingots in the IPS Investment Ring System 300g

| | B<br>°C/°F | t↗<br>°C/°F/min | T<br>°C/°F | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F | N / E |
|---|---|---|---|---|---|---|---|
| EP 500 / V 2.9 | 700/1292 | 60/108 | 960/1760 | 40 | 500/932 | 960/1760 | Program 31-51 |
| EP 600 / EP 600 Combi | 700/1292 | 60/108 | 950/1742 | 40 | 500/932 | 950/1742 | 50 µm/min * |
| Programat EP 3000 | 700/1292 | 60/108 | 950/1742 | 40 | 500/932 | 950/1742 | 50 µm/min * |
| Programat EP 5000 | 700/1292 | 60/108 | 950/1742 | 40 | 500/932 | 950/1742 | 50 µm/min * |

***Important**: If you enter the program manually, observe the abort criterion.

## Divesting

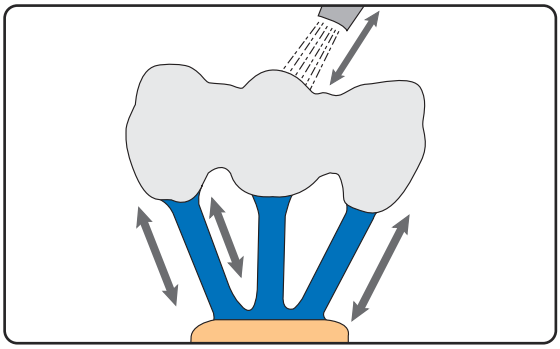
Once the investment ring has cooled to room temperature (approx. 60 min), divest as follows:

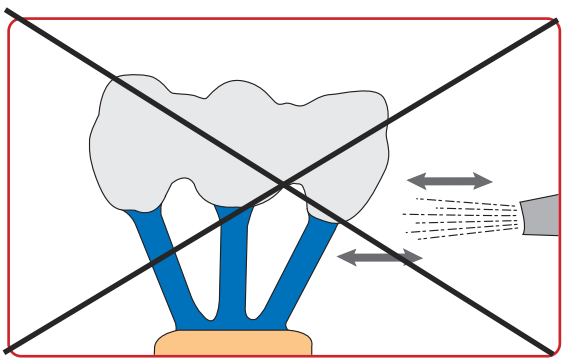
- Mark the length of the Alox plunger on the cooled investment ring.
- Separate the investment ring using a separating disk. This predetermined breaking point enables reliable separation of the investment material and the ceramic material.
- Always use polishing beads to divest the pressed objects (rough and fine divestment). Do not use $Al_2O_3$ .
- Rough divestment is carried out with polishing beads at 4 bar (60 psi) pressure.
- Fine divestment is carried out with polishing beads at 1–1.5 bar (15–22 psi) pressure.
- Observe the blasting direction and distance to prevent damage to the object margins during divestment. Cover the marginal areas thoroughly with the glove.

Mark the length of the Alox plunger.

Separate the investment ring using a separating disk.

The Alox plunger is already very clean if it is removed with tongs from the investment material. Check the cleanness and blast with $Al_2O_3$ if required.





Sandblasting the objects

## Separating / finishing

After separation of the sprues and smoothing of the attachment points, the pressed object is fitted to the master model. For that purpose, the usual rotary instruments (as those used for IPS Empress) are used (without pressure and overheating). After that, carefully sandblast the restoration. Finally, clean the restoration under running water or with steam. Dry thoroughly with oil-free air.

Bridge with sprues

Special attention is required for separating the palatal metal retention pin. Make sure to separate and polish the retention pin carefully after glazing without creating too much heat.

## Adjustments with IPS InLine PoM Touch-Up

For minor shape adjustments, such as incompletely pressed margins or occlusal surfaces, the 7 Touch-Up materials are available in the respective ingot shade. The Touch-Up materials must only be used for metal-supported IPS InLine PoM restorations.

*Processing*

- The restoration must be free of dirt and grease prior to adjustment. For that purpose, clean the restoration thoroughly with a steam jet.
- Apply the IPS InLine PoM Touch-Up material mixed with IPS InLine System Build-Up Liquid on the missing, cleaned areas using a brush and slightly blot with an absorbent cloth.
- Place the restoration on the firing tray and fire it.
- Next, finish the restoration or apply second Touch-Up adjustments and fire with the same parameters.

Adjustment with IPS InLine PoM Touch Up

**Firing parameters for IPS InLine PoM Touch-Up**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 840/1544 | 403/757 | 4 | 60/108 | 1 | 450/842 | 839/1542 |

# Individual finishing

## Finishing and preparing for the Stains and Glaze firing

Before the Stains and Glaze firing, the restoration has to be prepared as follows:

– Finish the restoration using diamond grinders and give it a true-to-nature shape and surface structure, such as growth lines and convex/concave areas.
– Areas which should exhibit a higher gloss after Glaze firing (e.g. pontic rests) can be smoothed out and prepolished using silicone disks.
– If gold and/or silver dust was used to visualize the surface texture, the restoration has to be thoroughly cleaned with steam. Make sure to remove all gold or silver dust in order to avoid any discolouration after firing.

The true-to-nature shape and surface texture are designed.

## Stains and Characterization firing

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

– For better wetting of the stains, IPS InLine System Glaze and Stains liquid may be slightly agitated on the surface.
– If a more intensive shade effect is desired, it is achieved by several staining procedures and repeated firing. The application of too many stains results in an unnatural shade effect.
– The cusps and fissures can be individualized using Stains.
– The basic chromatic shade is supported with the corresponding Shade material (see table).

**Shade combination table for IPS InLine One / IPS InLine / IPS InLine PoM**

| Shade | 1 | 2 | 3 | 4 | 5 | 6 | 7 | SI1 | SI2 |
|---|---|---|---|---|---|---|---|---|---|
| A-D | A1, B1, B2 | A2, A3, A3.5 | B3, B4, D4 | A4 | C1, D2, D3 | C2, C3, C4 | – | A1, A2, A3, B1, B2, B3, B4 | A3.5, A4, C1, C2, C3, C4, D2, D3, D4 |
| Chromascop | 110, 120, 130 BL1, BL2, BL3, BL4 | 140, 210, 220, 230, 240 | 310, 320, 330 | 340, 540 | – | 410, 420, 430, 440, 510 | 520, 530 | 110–140, 210, 220, 310, 320, BL1–BL4 | 230, 240, 330, 340, 410–440, 510–540 |

**Firing parameters for the IPS InLine System Shade/Stains firing**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 800/1472 | 403/757 | 6 | 60/108 | 1 | 450/842 | 799/1470 |

**Note:**
All the firing cycles for stains and characterization as well as the Glaze firing in conjunction with IPS InLine PoM restorations are carried out at 800 °C / 1472 °F.

## Shade adjustment with IPS InLine System Shade and Stains

These stains may be fired in a separate Stains firing. Minor shade adjustments and individual characterizations may also be fired in the Glaze firing.

Dispense the desired quantity of IPS InLine System Shade and dilute and mix with IPS InLine System Glaze and Stains Liquid to the desired consistency. Pooling should be avoided and the material must not be applied too thickly. If a more intensive shade effect is desired, it is achieved by several staining procedures and repeated firing. The application of too many stains results in an unnatural shade effect.

**Firing parameters for the IPS InLine System Shade/Stains firing (Stains and Characterization firing)**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 800/1472 | 403/757 | 6 | 60/108 | 1 | 450/842 | 799/1470 |

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

## Glaze firing

After the Stains and Characterization firing with IPS InLine System Shade/Stains, the Glaze firing is conducted.

– Remove IPS InLine System Glaze paste from the syringe and mix thoroughly. If a different consistency is desired, adjust the consistency by diluting the material with IPS InLine System Glaze and Stains Liquid. Next, apply the Glaze material in the usual manner using a brush. Make sure not to apply the Glaze material either in too thick or too thin layers.
– Minor shade adjustments may be carried out together with the Glaze firing.

**Firing parameters for the Glaze firing**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|
| 800/1472 | 403/757 | 6 | 60/108 | 2 | 450/842 | 799/1470 |

When working with a furnace from another manufacturer, these parameters have to be adjusted accordingly! Finally, the shade of the completed restoration is checked.

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

## Add-On after Glaze firing

After the completion of a restoration, small adjustments, such as contact points, pontic rests, shoulder adjustments, may be necessary.
Mix the IPS InLine System Add-On 690 °C/1274 °F material with the desired build-up liquid, apply on the missing areas, and fire.

**Firing parameters for IPS InLine System Add-On 690°C/1274°F after Glaze firing**

| T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C°/°F |
|---|---|---|---|---|---|---|
| 690/1274 | 403/757 | 4 | 60/108 | 1 | 450/842 | 689/1272 |

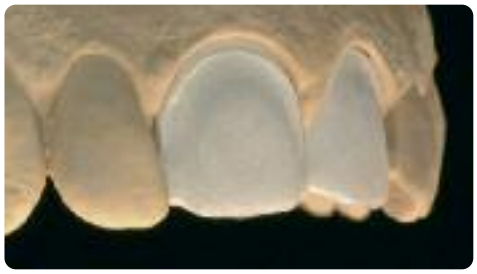
**Important**
**Special attention is required for separating the "retention pins". Make sure to separate and polish the retainer carefully after glazing without creating too much heat.**

Individually designed and characterized bridge made of IPS InLine PoM

# IPS InLine® – Veneers

The following chapter shows the step-by-step layering of veneers on refractory dies.
**Important:** After each working step, the master model has to be immersed in water for about 5–10 minutes, depending on the size.

**Tip:**
For the veneer fabrication, smaller working steps and several intermediate firing cycles are recommended.



## Model fabrication

Fabricate a duplicate model using a commercially available refractory die material, e.g. BegoForm® from Bego, Cosmotech VEST from GC or G-CERA™ VEST from GC (observe the instructions of the manufacturer).
**Important**: Correct processing and properly degassed dies are an important prerequisite for accurately fitting veneers.

## Wash firing

After degassing the refractory dies, apply IPS InLine Add-On mixed with the IPS InLine System Glaze and Stains Liquid in a thin layer and fire.

**Firing parameters for IPS InLine Add-On / IPS InLine System Glaze**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 830/1526 | 403/757 | 4 | 60/108 | 1 | 450/842 | 829/1524 |

## Cervical firing

Build up the marginal areas using a mixture of IPS InLine Dentin and, for example, Occlusal Dentin brown.

**Firing parameters for the Cervical firing**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 940/1724 | 403/757 | 8 | 60/108 | 1 | 450/842 | 939/1722 |

## Dentin/Impulse firing

Internal layering is modelled to the natural characteristics and consists of a dentin build-up and various effects. Individual layering with the Impulse materials enables mamelons, opalescence and translucent effects to be achieved.

**Firing parameters for the Dentin / Impulse firing**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 940/1724 | 403/757 | 8 | 60/108 | 1 | 450/842 | 939/1722 |

## Incisal firing

Subsequently, build up the outer enamel layer and fire.

**Firing parameters for the Incisal firing**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 930/1706 | 403/757 | 8 | 60/108 | 1 | 450/842 | 929/1704 |

## Glaze firing

Apply the IPS InLine System Glaze paste on the surface and fire.

**Firing parameters for the Glaze firing**

| T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H °C/°F | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|
| 860/1580 | 403/757 | 8 | 60/108 | 1 | 450/842 | 859/1578 |

## Divesting the veneers

Remove large amounts of die material using a grinding disk. Fine divestment is carried out with polishing beads at 1 bar (30 psi) pressure.

## Conditioning the veneers for adhesive cementation

Etch the inner aspect of the veneer with IPS Ceramic Etching Gel for 120 seconds in preparation for adhesive cementation. Next, thoroughly rinse the object with running water and dry.
**Important**: IPS InLine veneers must be placed with the adhesive technique.

# IPS InLine® One / IPS InLine® / IPS InLine® PoM
# General Information

## Cementation

As usual, your dentist may use a conventional cementation protocol for metal-supported IPS InLine restorations or use adhesive cementation for metal-supported restorations with a ceramic shoulder as well as IPS InLine veneers.
Glass ionomer cements, such as Vivaglass CEM, or self-adhesive composite cements are suitable for conventional cementation. For an adhesive cementation protocol, we recommend the Multilink Automix universal composite.

| | Esthetic luting composites | | Universal luting composite | Self-adhesive composite cement |
|---|---|---|---|---|
| Material | **Variolink® Veneer** | **Variolink® II** | **Multilink® Automix** | **SpeedCEM** |
| Polymerization | **light-curing** | **light-/dual-curing** | **dual-curing** | **self-curing** |
| Method | **Adhesive:** Syntac or ExciTE Total-Etch | **Adhesive:** Syntac or ExciTE DSC Total-Etch | **Adhesive:** Multilink Primer A/B self-etching | **Self-adhesive** |
| IPS InLine One<br>One-layer metal-ceramic | – | – | ✓ | ✓ |
| IPS InLine<br>Conventional metal-ceramic | – | – | ✓ | ✓ |
| IPS InLine PoM<br>Press-on-Metal ceramic | – | – | ✓ | ✓ |
| IPS InLine Veneers | ✓ | ✓ | – | – |

Please observe the corresponding Instructions for Use.

✓ Recommended product combination
– Not recommended

### Conditioning of the restoration

Metal-ceramic restorations

- Sandblast the inner aspects of the crown (parameters according to the instructions of the manufacturer of the restorative material) until an even mat surface has been achieved.
- If necessary, clean the restoration in an ultrasonic unit for about 1 minute.
- Thoroughly rinse 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 with a strong stream of air.

IPS InLine Veneers

- Etch the inner aspect of the veneer with IPS Ceramic Etching Gel for 120 seconds.
- Thoroughly rinse with water spray and dry with oil-free air.
- Apply Monobond Plus with a brush or a Microbrush to the pre-treated surfaces, let it react for 60 s and then disperse with a strong stream of air.

# IPS InLine® One – One-layer metal-ceramic

## Firing Parameters

| IPS InLine One<br>*One-layer metal-ceramic* | T<br>°C/°F | B<br>°C/°F | S<br>min | t↗<br>°C/°F/min | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F |
|---|---|---|---|---|---|---|---|
| 1st + 2nd Opaquer firing | 930/1706 | 403/757 | 6 | 100/180 | 2 | 450/842 | 929/1704 |
| 1st Dentcisal firing | 910/1670 | 403/757 | 4 | 60/108 | 1 | 450/842 | 909/1668 |
| 2nd Dentcisal firing | 900/1652 | 403/757 | 4 | 60/108 | 1 | 450/842 | 899/1650 |
| Shade/Stains firing | 850/1562 | 403/757 | 6 | 60/108 | 1 | 450/842 | 849/1560 |
| Glaze firing | 850/1562 | 403/757 | 6 | 60/108 | 2 | 450/842 | 849/1560 |
| Add-On after Glaze firing (690°C/1274°F) | 690/1274 | 403/757 | 4 | 60/108 | 1 | 450/842 | 689/1272 |

T = Firing temperature °C/°F
B = Stand-by temperature °C/°F
S = Closing time in minutes
t↗ = Heating rate °C/°F/min
H = Holding time
$V_1$ = Vacuum on temperature °C/°F
$V_2$ = Vacuum off temperature °C/°F

**These firing parameters are guidance values. They are valid for the Programat furnaces from Ivoclar Vivadent.**
Deviations (approx. +/- 10 °C/18 °F) may occur:

- Depending on the furnace generation.
- If ceramic furnaces from other manufacturers are used.
- In case of regional differences in the power supply or if several electrical devices are operatated on the same circuit.

# IPS InLine® – Conventional metal-ceramic

## Firing Parameters

| **IPS InLine**<br>***Conventional metal-ceramic*** | **T**<br>**°C/°F** | **B**<br>**°C/°F** | **S**<br>**min** | **t↗**<br>**°C/°F/min.** | **H**<br>**min** | **$V_1$**<br>**°C/°F** | **$V_2$**<br>**°C/°F** |
|---|---|---|---|---|---|---|---|
| 1st + 2nd Opaquer firing / Gingiva | 930/1706 | 403/757 | 6 | 100/180 | 2 | 450/842 | 929/1704 |
| 1st + 2nd Margin firing | 930/1706 | 403/757 | 4 | 60/108 | 1 | 450/842 | 929/1704 |
| 1st Dentin and Incisal firing / Gingiva | 910/1670 | 403/757 | 4 | 60/108 | 1 | 450/842 | 909/1668 |
| 2nd Dentin and Incisal firing / Gingiva | 900/1652 | 403/757 | 4 | 60/108 | 1 | 450/842 | 899/1650 |
| Margin Add-On firing | 900/1652 | 403/757 | 4 | 60/108 | 1 | 450/842 | 899/1650 |
| Corrective firing after Dentin and Incisal firing Add-On | 860/1580 | 403/757 | 4 | 60/108 | 1 | 450/842 | 859/1578 |
| Shade / Stains firing | 850/1562 | 403/757 | 6 | 60/108 | 1 | 450/842 | 849/1560 |
| Glaze firing | 850/1562 | 403/757 | 6 | 60/108 | 2 | 450/842 | 849/1560 |
| Add-On after Glaze firing (690°C/1274°F) | 690/1274 | 403/757 | 4 | 60/108 | 1 | 450/842 | 689/1274 |

T = Firing temperature °C/°F
B = Stand-by temperature °C/°F
S = Closing time in minutes
t↗ = Heating rate °C/°F/min
H = Holding time
$V_1$ = Vacuum on temperature °C/°F
$V_2$ = Vacuum off temperature °C/°F

**These firing parameters are guidance values. They are valid for the Programat furnaces from Ivoclar Vivadent.**
Deviations (approx. +/- 10 °C/18 °F) may occur:

– Depending on the furnace generation.
– If ceramic furnaces from other manufacturers are used.
– In case of regional differences in the power supply or if several electrical devices are operatated on the same circuit.

# IPS InLine® PoM – Press-on-Metal ceramic

## Investment material mixing ratio

| | 100 g investment ring | 200 g investment ring | 300 g investment ring |
|---|---|---|---|
| **IPS PressVEST** | 13 ml liquid<br>9 ml dist. water | 26 ml liquid<br>18 ml dist. water | 37 ml liquid<br>27 ml dist. water |
| **IPS PressVEST Speed** | 16 ml liquid<br>11 ml dist. water | 32 ml liquid<br>22 ml dist. water | 48 ml liquid<br>33 ml dist. water |

## Press parameters

**Press parameters for IPS InLine PoM ingots in the IPS Investment Ring System 100g and 200g**

| | B<br>°C/°F | t↗<br>°C/°F/min | T<br>°C/°F | H min<br>100 g | H min<br>200 g | $V_1$<br>°C/°F | $V_2$<br>°C/°F | N / E |
|---|---|---|---|---|---|---|---|---|
| EP 500 / V 2.9 | 700/1292 | 60/108 | 950/1742 | 10 | 20 | 500/932 | 950/1742 | 0<br>Program 11-20 |
| EP 600 / EP 600 Combi | 700/1292 | 60/108 | 940/1724 | 10 | 20 | 500/932 | 940/1724 | 250 µm/min<br>* |
| Programat EP 3000 | 700/1292 | 60/108 | 940/1724 | 10 | 20 | 500/932 | 940/1724 | 250 µm/min<br>* |
| Programat EP 5000 | 700/1292 | 60/108 | 940/1724 | 10 | 20 | 500/932 | 940/1724 | 250 µm/min<br>* |

***Important**: If you enter the program manually, observe the abort criterion.

**Press parameters for IPS InLinePoM ingots in the IPS Investment Ring System 300g**

| | B<br>°C/°F | t↗<br>°C/°F/min | T<br>°C/°F | H<br>min | $V_1$<br>°C/°F | $V_2$<br>°C/°F | N / E |
|---|---|---|---|---|---|---|---|
| EP 500 / V 2.9 | 700/1292 | 60/108 | 960/1760 | 40 | 500/932 | 960/1760 | Program 31-51 |
| EP 600 / EP 600 Combi | 700/1292 | 60/108 | 950/1742 | 40 | 500/932 | 950/1742 | 50 µm/min<br>* |
| Programat EP 3000 | 700/1292 | 60/108 | 950/1742 | 40 | 500/932 | 950/1742 | 50 µm/min<br>* |
| Programat EP 5000 | 700/1292 | 60/108 | 950/1742 | 40 | 500/932 | 950/1742 | 50 µm/min<br>* |

***Important**: If you enter the program manually, observe the abort criterion.

# Firing parameters

| **IPS InLine PoM**<br>***Press-on-Metal ceramic*** | **T**<br>**°C/°F** | **B**<br>**°C/°F** | **S**<br>**min** | **t↗**<br>**°C/°F/min** | **H**<br>**min** | **$V_1$**<br>**°C/°F** | **$V_2$**<br>**°C/°F** |
|---|---|---|---|---|---|---|---|
| 1st + 2nd Opaquer firing | 930/1706 | 403/757 | 6 | 100/180 | 2 | 450/842 | 929/1704 |
| Touch-Up firing | 840/1544 | 403/757 | 4 | 60/108 | 1 | 450/842 | 839/1542 |
| Shade/Stains firing | 800/1472 | 403/757 | 6 | 60/108 | 1 | 450/842 | 799/1470 |
| Glaze firing | 800/1472 | 403/757 | 6 | 60/108 | 2 | 450/842 | 799/1470 |
| Add-On after Glaze firing (690°C/1274°F) | 690/1274 | 403/757 | 4 | 60/108 | 1 | 450/842 | 689/1272 |

T = Firing temperature °C/°F
B = Stand-by temperature °C/°F
S = Closing time in minutes
t↗ = Heating rate °C/°F/min
H = Holding time
$V_1$ = Vacuum on temperature °C/°F
$V_2$ = Vacuum off temperature °C/°F

**These firing parameters are guidance values. They are valid for the Programat furnaces from Ivoclar Vivadent.**
Deviations (approx. +/- 10 °C/18 °F) may occur:

– Depending on the furnace generation.
– If ceramic furnaces from other manufacturers are used.
– In case of regional differences in the power supply or if several electrical devices are operatated on the same circuit.

# IPS InLine® – Veneer

## Firing parameters

| IPS InLine *Veneers* | T °C/°F | B °C/°F | S min | t↗ °C/°F/min | H min | $V_1$ °C/°F | $V_2$ °C/°F |
|---|---|---|---|---|---|---|---|
| Wash Firing | 830/1526 | 403/757 | 4 | 60/108 | 1 | 450/842 | 829/1524 |
| Cervical firing | 940/1724 | 403/757 | 8 | 60/108 | 1 | 450/842 | 939/1722 |
| Dentin / Impulse firing | 940/1724 | 403/757 | 8 | 60/108 | 1 | 450/842 | 939/1722 |
| Incisal firing | 930/1706 | 403/757 | 8 | 60/108 | 1 | 450/842 | 929/1704 |
| Glaze firing | 860/1580 | 403/757 | 8 | 60/108 | 1 | 450/842 | 859/1578 |

T = Firing temperature °C/°F
B = Stand-by temperature °C/°F
S = Closing time in minutes
t↗ = Heating rate °C/°F/min
H = Holding time
$V_1$ = Vacuum on temperature °C/°F
$V_2$ = Vacuum off temperature °C/°F

**These firing parameters are guidance values. They are valid for the Programat furnaces from Ivoclar Vivadent.**
Deviations (approx. +/- 10 °C/18 °F) may occur:

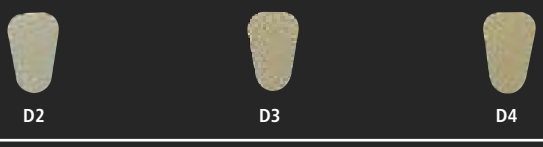
– Depending on the furnace generation.
– If ceramic furnaces from other manufacturers are used.
– In case of regional differences in the power supply or if several electrical devices are operatated on the same circuit.

IPS InLine®

# Combination Tables

## A–D shades

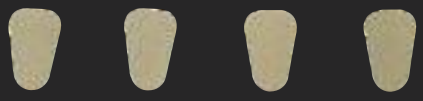
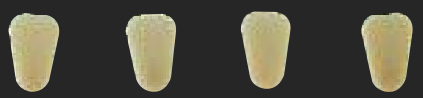
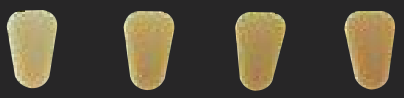
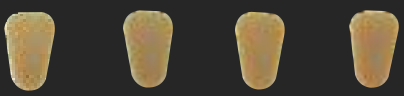
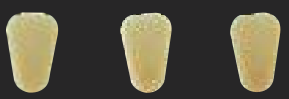
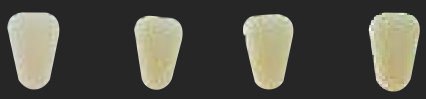
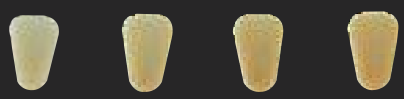
| | reddish-brown | | | | | reddish-yellow | | | |
|---|---|---|---|---|---|---|---|---|---|
| Opaquer |  A1 |  A2 |  A3 |  A3.5 |  A4 |  B1 |  B2 |  B3 |  B4 |
| Intensive Opaquer | | | | | |  white | | |  violet |
| Margin |  A1 |  A2 |  A3 |  A3.5 |  A4 |  B1 |  B2 |  B3 |  B4 |
| Intensive Margin | | |  yellow | | | | |  orange-pink | |
| Cervical Dentin | | | | | | | | | |
| Deep Dentin |  A1 |  A2 |  A3 |  A3.5 |  A4 |  B1 |  B2 |  B3 |  B4 |
| Dentin |  A1 |  A2 |  A3 |  A3.5 |  A4 |  B1 |  B2 |  B3 |  B4 |
| Transpa Incisal |  TI1 |  TI1 |  TI2 |  TI2 |  TI3 |  TI1 |  TI1 |  TI1 |  TI2 |
| Transparent | clear | | | | | clear | | | |

| shades of grey | reddish-grey |
| --- | --- |
|  C1 C2 **C3** C4 |  D2 D3 D4 |
|  brown incisal | |
|  C1 C2 C3 C4 |  D2/D3 D4 |
|  add-on opaque |  orange |
| |  D2/D3 D2/D3 |
|  C1 C2 C3 C4 |  D2/D3 D4 |
|  C1 C2 C3 C4 |  D2 D3 D4 |
|  TI1 TI3 TI3 TI3 |  TI3 TI3 TI3 |
| clear | clear |

IPS InLine®

## Chromascop shades

| | white | | | | yellow | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Opaquer |  110 |  120 |  130 |  140 |  210 |  220 |  230 |  240 |  310 |
| Intensive Opaquer | | | | |  white | | |  violet | |
| Margin |  110 |  120 |  130 |  140 |  210 |  220 |  230 |  240 |  310 |
| Intensive Margin | | | |  yellow | | | |  orange-pink | |
| Deep Dentin |  110 |  120 |  130 |  140 |  210 |  220 |  230 |  240 |  310 |
| Dentin |  110 |  120 |  130 |  140 |  210 |  220 |  230 |  240 |  310 |
| Incisal |  I1 |  I1 |  I1 |  I2 |  I2 |  I2 |  I3 |  I3 |  I3 |
| Transparent | clear | | | | clear | | | | |

| light-brown | grey | dark-brown |
| --- | --- | --- |
|  320 330 340 |  410 420 430 440 |  510 520 530 540 |
|  brown |  incisal | |
|  320 330 340 |  410 420 430 440 |  510 520 530 540 |
|  add-on |  opaque |  orange |
|  320 330 340 |  410 420 430 440 |  510 520 530 540 |
|  320 330 340 |  410 420 430 440 |  510 520 530 540 |
|  I3 I3 I3 |  I3 I3 I3 I3 |  I3 I3 I3 I3 |
| clear | clear | clear |

## Independent of any shade system

### Impulse Kit

**Occlusal Dentin**

orange, brown

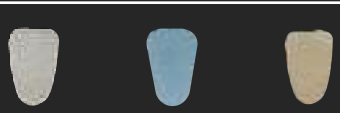
**Mamelon**

light, salmon, yellow-orange

**Opal Effect**

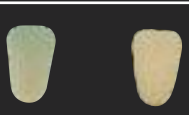
OE 1, OE 2, OE 3, OE 4, OE 5, OE violet

**Transparent**



neutral, blue, brown-grey

**Cervical Incisal**



orange, yellow

### Gingiva Kit

**Gingiva Opaquer**

pink

**Gingiva**

G1, G2, G3, G4, G5

**Intensive Gingiva**

IG1, IG2, IG3, IG4

### Shade / Stains Kit

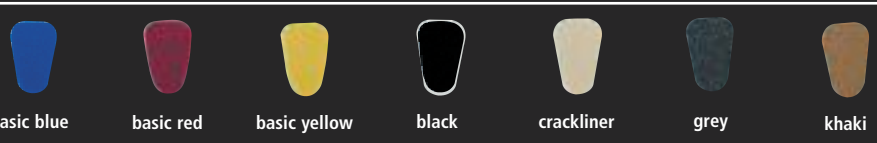
**Shade**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| AD shades | A1, B1, B2 | A2, A3, A3.5 | B3, B4, D4 | A4 | C1, D2, D3 | C2,C3,C4 | – |
| Chromascop | 110, 120, 130<br>BL1, BL2, BL3, BL4 | 140, 210, 220, 230, 240 | 310, 320, 340 | 340, 540 | – | 410, 420, 430, 440, 510 | 520, 530 |

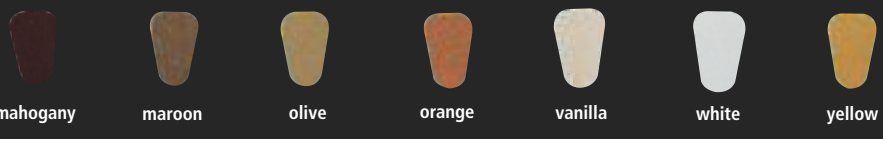
**Shade Incisal**

SI1, SI2

**Stains**



basic blue, basic red, basic yellow, black, crackliner, grey, khaki



mahogany, maroon, olive, orange, vanilla, white, yellow

## Bleach Kit BL

**Opaquer**


BL1/BL2


BL3/BL4

**Margin**


BL1


BL4

The Margin materials are only available in shades BL1 and BL4.
The shades BL2 and BL3 are achieved with the following mixing ratios:

BL2 = 2/3 BL1 : 1/3 BL4
BL3 = 1/3 BL1 : 2/3 BL4

**Deep Dentin**


BL1


BL4

The Deep Dentin materials are only available in shades BL1 and BL4.
The shades BL2 and BL3 are achieved with the following mixing ratios:

BL2 = 2/3 BL1 : 1/3 BL4
BL3 = 1/3 BL1 : 2/3 BL4

**Dentin**


BL1


BL2


BL3


BL4

**Incisal**


BL

**Add-On**


BL

# IPS InLine® PoM

| Opaquer AD | BL1, BL2, BL3, BL4 | A1, B1 | A2, B2, C1, D2 | A3, A3.5 | B3, B4 | C2, D3, D4 | A4, C3, C4 |
|---|---|---|---|---|---|---|---|
| Opaquer Chromascop | | 110, 120, 130, 140 | 210, 220, 230, 240 | | 310, 320, 330, 340 | 410, 420, 430, 440 | 510, 520, 530, 540 |
| Ingots |  |  |  |  |  |  |  |
| Touch-Up |  |  |  |  |  |  |  |

# IPS InLine® One

| Opaquer AD | BL1, BL2, BL3, BL4 | A1, B1 | A2, B2, C1, D2 | A3, A3.5 | B3, B4 | C2, D3, D4 | A4, C3, C4 |
|---|---|---|---|---|---|---|---|
| Opaquer Chromascop | | 110, 120, 130, 140 | 210, 220, 230, 240 | | 310, 320, 330, 340 | 410, 420, 430, 440 | 510, 520, 530, 540 |
| Dentcisal |  |  |  |  |  |  |  |

## Finished metal, shape and shade

The dental lab work was carried out by
Dieter Grübel, ICDE/Schaan.

# Ivoclar Vivadent worldwide


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

**Ivoclar Vivadent Pty. Ltd.**
1 – 5 Overseas Drive
P.O. Box 367
Noble Park, Vic. 3174
Australia
Tel. +61 3 979 595 99
Fax +61 3 979 596 45
www.ivoclarvivadent.com.au

**Ivoclar Vivadent GmbH**
Bremschlstr. 16
Postfach 223
A-6706 Bürs
Austria
Tel. +43 5552 624 49
Fax +43 5552 675 15
www.ivoclarvivadent.com

**Ivoclar Vivadent Ltda.**
Rua Geraldo Flausino Gomes,
78 – 6.º andar Cjs. 61/62
Bairro: Brooklin Novo
CEP: 04575-060 São Paulo – SP
Brazil
Tel. +55 11 3466 0800
Fax +55 11 3466 0840
www.ivoclarvivadent.com.br

**Ivoclar Vivadent Inc.**
2785 Skymark Avenue, Unit 1
Mississauga
Ontario L4W 4Y3
Canada
Tel. +1 905 238 5700
Fax +1 905 238 5711
www.ivoclarvivadent.us

**Ivoclar Vivadent Marketing Ltd.**
Rm 603 Kuen Yang
International Business Plaza
No. 798 Zhao Jia Bang Road
Shanghai 200030
China
Tel. +86 21 5456 0776
Fax +86 21 6445 1561
www.ivoclarvivadent.com

**Ivoclar Vivadent Marketing Ltd.**
Calle 134 No. 7-B-83, Of. 520
Bogotá
Colombia
Tel. +57 1 627 33 99
Fax +57 1 633 16 63
www.ivoclarvivadent.com

**Ivoclar Vivadent SAS**
B.P. 118
F-74410 Saint-Jorioz
France
Tel. +33 450 88 64 00
Fax +33 450 68 91 52
www.ivoclarvivadent.fr

**Ivoclar Vivadent GmbH**
Dr. Adolf-Schneider-Str. 2
D-73479 Ellwangen, Jagst
Germany
Tel. +49 (0) 79 61 / 8 89-0
Fax +49 (0) 79 61 / 63 26
www.ivoclarvivadent.de

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

**Ivoclar Vivadent s.r.l. & C. s.a.s**
Via Gustav Flora, 32
39025 Naturno (BZ)
Italy
Tel. +39 0473 67 01 11
Fax +39 0473 66 77 80
www.ivoclarvivadent.it

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

**Ivoclar Vivadent S.A. de C.V.**
Av. Mazatlán No. 61, Piso 2
Col. Condesa
06170 México, D.F.
Mexico
Tel. +52 (55) 5062-1000
Fax +52 (55) 5062-1029
www.ivoclarvivadent.com.mx

**Ivoclar Vivadent Ltd.**
12 Omega St, Albany
PO Box 5243 Wellesley St
Auckland, New Zealand
Tel. +64 9 914 9999
Fax +64 9 814 9990
www.ivoclarvivadent.co.nz

**Ivoclar Vivadent Polska Sp. z.o.o.**
Al. Jana Pawla II 78
00-175 Warszawa
Poland
Tel. +48 22 635 54 96
Fax +48 22 635 54 69
www.ivoclarvivadent.pl

**Ivoclar Vivadent Marketing Ltd.**
Derbenevskaja Nabereshnaya 11, Geb. W
115114 Moscow
Russia
Tel. +7 495 913 66 19
Fax +7 495 913 66 15
www.ivoclarvivadent.ru

**Ivoclar Vivadent Marketing Ltd.**
171 Chin Swee Road
#02-01 San Centre
Singapore 169877
Tel. +65 6535 6775
Fax +65 6535 4991
www.ivoclarvivadent.com

**Ivoclar Vivadent S.L.U.**
c/ Emilio Muñoz Nº 15
Entrada c/ Albarracin
E-28037 Madrid
Spain
Tel. + 34 91 375 78 20
Fax + 34 91 375 78 38
www.ivoclarvivadent.es

**Ivoclar Vivadent AB**
Dalvägen 14
S-169 56 Solna
Sweden
Tel. +46 (0) 8 514 93 930
Fax +46 (0) 8 514 93 940
www.ivoclarvivadent.se

**Ivoclar Vivadent Liaison Office**
Ahi Evran Caddesi No 1
Polaris Is Merkezi Kat: 7
80670 Maslak
Istanbul
Turkey
Tel. +90 212 346 04 04
Fax +90 212 346 04 24
www.ivoclarvivadent.com

**Ivoclar Vivadent Limited**
Ground Floor Compass Building
Feldspar Close
Warrens Business Park
Enderby
Leicester LE19 4SE
United Kingdom
Tel. +44 116 284 78 80
Fax +44 116 284 78 81
www.ivoclarvivadent.com

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



**Date information prepared: 08/2010**





Printed in Liechtenstein



633561/0810/e/BVD


ivoclar vivadent® technical