IPS d.SIGN®

Instructions for Use

CE 0123

ivoclar vivadent® technical

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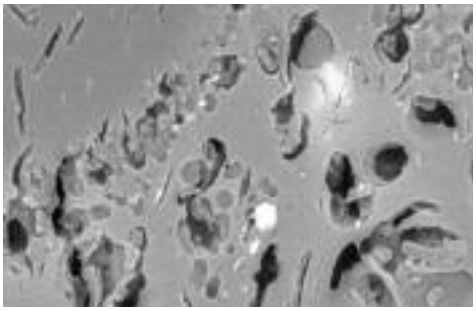
The requirements for functionality and aesthetic appearance of ceramic restorations are continuously rising. To meet these requirements manufacturers are faced with the challenge of developing materials that satisfy the needs of experienced ceramists, by offering them a multitude of design possibilities, and less experienced users by enabling them to have a successful start in the field of porcelain-fused-to-metal restorations. In order to give a high end ceramic the ease of handling that customers expect, the range of indications of IPS d.SIGN was given top priority during the development phase.
With a well designed basic assortment and the various additional assortments of IPS d.SIGN, beginners and specialists alike will have all the materials they need to restore lost tooth structure in a true-to-nature, highly aesthetic fashion. IPS d.SIGN is a material suitable for basic types of restorations, as well as restorations having sophisticated morphological structures. In this way, all the demands placed on the material prior to its development have been fully met.
With IPS d.SIGN, highly aesthetic restorations that are virtually undetectable among their natural counterparts may be fabricated by easy, efficient layering of the material. Moreover, expert ceramists are provided with a comprehensive range of additional materials.
The shades of IPS d.SIGN are based on the Chromascop and A–D shade guides. Shade tabs fired from the actual material are supplied with each assortment.

Comprehensive Treatment System

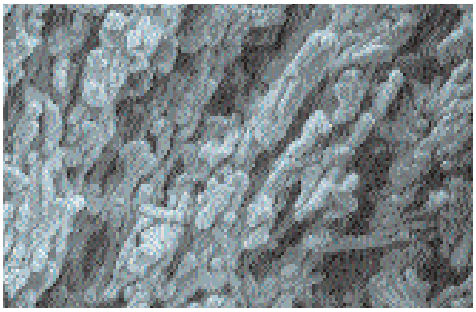
Ivoclar Vivadent provides you with a comprehensive treatment system that consists of the following components:
– Alloys
– Veneering ceramic
– Cementation system
This system was developed with the objective that all of the materials should be coordinated with each other so that optimum results are achieved. The IPS d.SIGN fluorapatite leucite ceramic is an innovative ceramic material that offers new ways of processing and application. These properties of IPS d.SIGN are based on its new material specifications. What does that means in practical work?

Fluorapatite leucite glass-ceramic

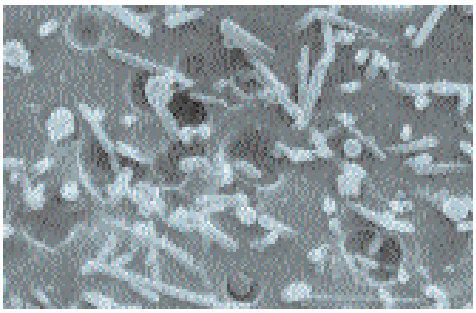
IPS d.SIGN fluorapatite leucite glass-ceramic has been developed taking nature as the standard, with the most important properties of natural teeth serving as models. The main inorganic component of a natural tooth are apatite crystals, in which hydroxyl and sometimes carbonate groups are embedded. In addition to this composition, IPS d.SIGN fluorapatite glass-ceramics also contains fluoride ions that provide the material with a very high chemical resistance. Moreover, the above mentioned compositions results in IPS d.SIGN demonstrating exceptional optical properties, which is yet another distinct advantage of this new type of glass-ceramic material. Increased brightness and brilliance, clearly enhanced stability of shade, and true-to-nature fluorescence are the results of these development efforts.



SEM – Conventional feldspar ceramic

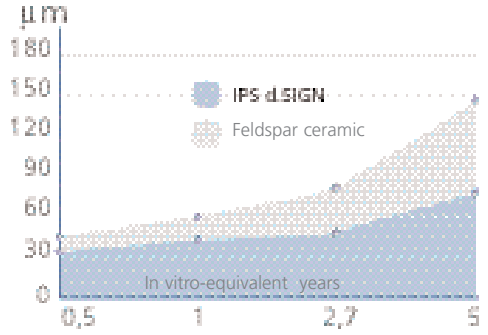


SEM – Natural tooth



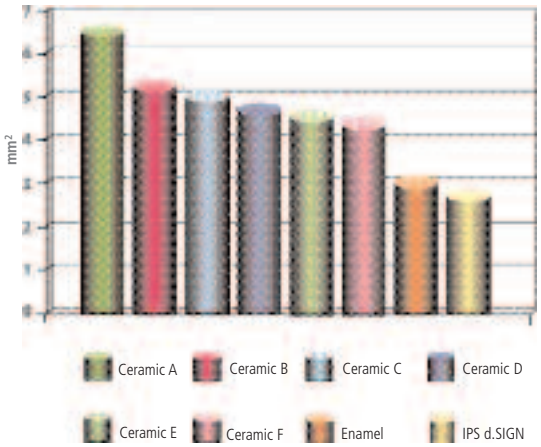
SEM (after surface etching) – IPS d.SIGN

Another property that this new type of surface structure exhibits is excellent polishability and limited abrasion to opposing natural tooth structure. The IPS d.SIGN materials demonstrate outstanding stability and are fired at temperatures below 900 °C/1652 °F.



Vertical abrasion to the enamel of the antagonist.
Internal investigation, R&D Ivoclar Vivadent AG (1998)

Abrasion to antagonist enamel



This bar diagram depicts the abrasion to antagonist enamel compared to other dental ceramic materials.
John A. Sorensen, DMD, PhD (1999)

Alloys

Each metal supported restoration starts with the fabrication of a metal framework. For that purpose, various IPS d.SIGN alloys are available. The IPS d.SIGN alloy selection ranges from high gold alloys and gold-reduced alloys to base metal alloys. These alloys meet the international requirements of ISA and ADA and were developed in combination with IPS d.SIGN.
The coefficient of thermal expansion (CTE) is a significant parameter for dental materials. It is vitally important to ensure the thermal compatibility between alloy and ceramic material. In the 25–500 °C temperature range, the CTE values of the IPS d.SIGN alloys range between 13.8 and 14.8 x 10^{-6} K^{-1}, depending on the alloy's composition. The coefficient of thermal expansion of the IPS d.SIGN ceramic is 12.0–12.6 x 10^{-6} K^{-1}.

The IPS d.SIGN alloys
– IPS d.SIGN 98 (high gold)
– IPS d.SIGN 96 (high gold)
– IPS d.SIGN 91 (gold-reduced)
– IPS d.SIGN 84 (palladium-based)
– IPS d.SIGN 67 (palladium-based)
– IPS d.SIGN 59 (palladium-based)
– IPS d.SIGN 53 (palladium-based)
– IPS d.SIGN 30 (chrome-cobalt)
– IPS d.SIGN 15 (nickel-chrome)

The compatibility of the IPS d.SIGN ceramic and IPS d.SIGN alloys was thoroughly tested. When using other alloys, please ask your alloy manufacturer if they are compatible with IPS d.SIGN ceramic.

The product range may vary from country to country.

Cementation

Select an appropriate cementation material from the Ivoclar Vivadent range of products. Hybrid ionomer and glass ionomer cements (Vivaglass® CEM), for example, are suitable for conventional cementation and offer a number of advantages such as:

– Low expansion
– High translucency
– High radiopacity
– Continuous fluoride release
– Aesthetic advantages for ceramic shoulders
– Minimum solubility

	Variolink® Esthetic Resin Cements		Multilink® Universal Resin Cement	Vivaglass® CEM Glass ionomer Cement
Cement	**Variolink® Veneer**	**Variolink® II**	**Multilink® Automix**	**Vivaglass® CEM PL**
Curing Mode	**Light-cure**	**Light/Dual-cure**	**Dual-cure**	**Self-cure**
Cementation Method	**Adhesive:** Syntac or Excite total-etch	**Adhesive:** Syntac or Excite DSC total-etch	**Adhesive:** Multilink Primer A/B self-etch	**Conventional**
IPS d.SIGN	–	–	✓	✓

Please observe the corresponding Instructions for Use

✓ recommended product combination
– not recommended/combination impossible

Indication

– Metal-ceramic veneers
– Veneers on refractory dies

Contraindication

– If patients are known to be allergic to any of the ingredients of IPS d.SIGN, the material should not be used.

Important processing restrictions

– Mixing with other metal-ceramic powders (e.g. IPS Classic®, IPS InLine®)
– Mixing with metal-free veneering ceramic powders (e.g. IPS Empress®, IPS e.max®)
– Use of liquids or separating agents other than the ones provided with the IPS d.SIGN assortments.
– Mixing of IPS d.SIGN materials in powder form (e.g. Dentin, Incisal, etc.) with IPS d.SIGN paste materials (e.g. Shades, Stains).
– Firing of IPS d.SIGN onto incompatible alloys

Important note

– Ceramic furnaces of other manufacturers often feature opening mechanisms different from that of Ivoclar Vivadent furnaces. Therefore, the firing conditions may also differ. Make sure to take these varying firing conditions into account when working with IPS d.SIGN.

Warning

– Finishing ceramic restorations results in grinding dust. Avoid inhalation. Use suction equipment or protective masks.

Composition

The IPS d.SIGN glass-ceramic materials and liquids contain the following main components:

– IPS d.SIGN ceramic materials
SiO_2: 50–65 wt.%
Additional contents are: Al_2O_3, K_2O, Na_2O, CaO, P_2O_5, F, Li_2O, ZrO_2 and pigments

– Opaquer pastes, Stains, and glazing materials also contains 25–40 wt. % glycols

– IPS d.SIGN Opaquer Liquid, 15 ml
Components: Polymer, butylene glycol, and glycerine

– IPS d.SIGN Build-Up Liquid, 60 ml and 250 ml
Components: Water, butylene glycol, and additives

– IPS d.SIGN Glaze and Stain Liquid, 15 ml
Components: Butylene glycol

– IPS d.SIGN Margin Build-Up Liquid, 60 ml
Components: Water, cellulose derivative

– IPS Margin Sealer, 20 ml
Components: Wax dissolved in hexane

– IPS Model Sealer, 50 ml
Components: Ethyl acetate, nitro-cellulose, softener

– IPS Ceramic Separating Liquid, 15 ml
Componets: Paraffin oil

IPS d.SIGN – Product overview

Chromascop

Basic Kit	Opaquer pastes, intensive opaquer pastes, dentin, incisal, transparent, add-on, and glazing materials, as well as all the necessary liquids. The Kit also contains a materials shade guide for the most popular Chromascop shades.
Deep Dentin Kit	Deep dentin materials in the 10 most popular Chromascop shades. They are used to intensify the chroma in layers of limited thickness.
Margin Kit	Margin materials in the 10 most popular Chromascop shades and 4 intensive materials for special effects. 1 margin add-on material is used for final adjustment of the ceramic shoulder.
Bleach Kit	The ultra-light shades enable optimum integration of the restoration in a bleached environment. 2 opaquers, 2 margin materials, 4 dentin materials, 1 incisal material.

A–D

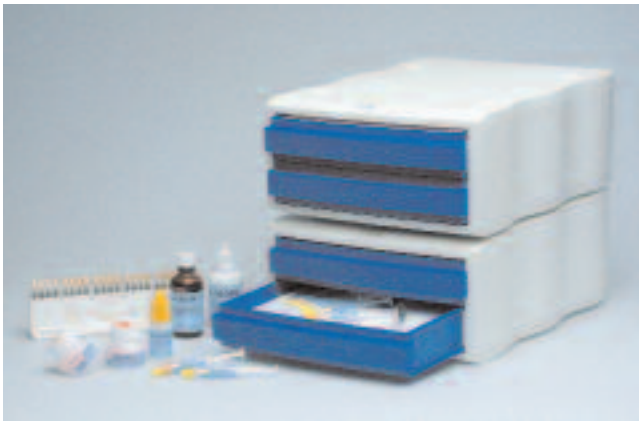
Basic Kit	Opaquer pastes, intensive opaquer pastes, dentin, incisal, transparent, add-on, and glazing materials, as well as all the necessary liquids. The Kit also contains a materials shade guide for the most popular A–D shades.
Deep Dentin Kit	Deep dentin materials in the 7 most popular A-D shades. They are used to intensify the chroma in layers of limited thickness.
Margin Kit	Margin materials in the 8 most popular A-D shades and 4 intensive materials for special effects. 1 margin add-on material is used for final adjustment of the ceramic shoulder.

Assortments independent of any shade system

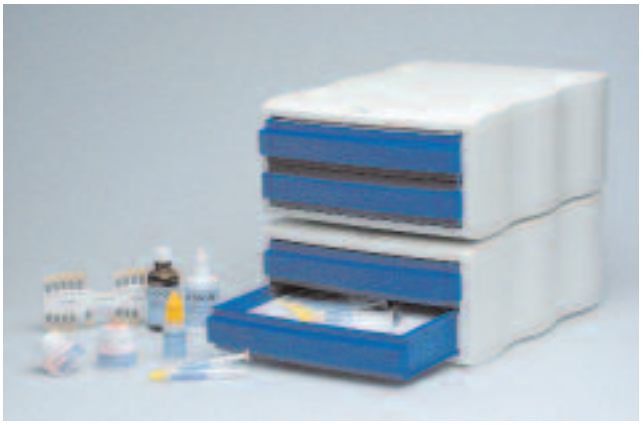
Bleach Kit BL	Four accurately coordinated shades meet the highest demands related to contemporary “white aesthetics”.
Impulse Kit 1	15 ready-mixed individual fluorapatite leucite ceramic materials ranging from Mamelon to Opal materials facilitate the application of true-to-nature effects.
Impulse Kit 2	14 ready-mixed Impulse materials based on the inspiration and philosophies of renowned experts, such as Enrico Steger, Donald F. Cornell, and Dr. Robert R. Winter.
Gingiva Kit	5 true-to-nature gingival materials that can be individually used for each patient situation in combination with the 4 gingival modifiers.
Essence Kit	4 ceramic stains in powder form. They may be applied alone or mixed with other materials.
Stains Kit	14 intensive stains in paste form to reproduce natural characteristics on the ceramic surface.
Shade Kit	7 dentin stains in paste form for subsequent shade adjustments of IPS d.SIGN restorations.

IPS d.SIGN – Description of the assortments

IPS d.SIGN Basic Kits



IPS d.SIGN Basic Kit Chromascop

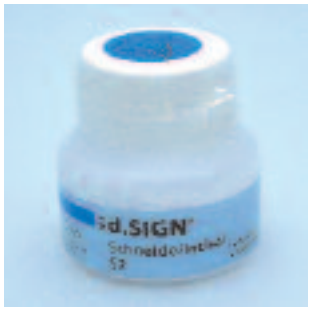


IPS d.SIGN Basic Kit A–D

IPS d.SIGN Dentin

The apatite glass-ceramic material is distinguished for its lifelike appearance. Apatite is also a component of natural teeth and supports the light optical properties, such as translucency, brightness, and light scattering. Page 48 contains a detailed description on the use of Cervical Dentin D2/D3.

IPS d.SIGN Incisal



The six IPS d.SIGN Incisal materials (S1–S3 and TS1-TS3) demonstrate a shade gradation similar to that of natural incisal areas. The materials are coordinated with the Chromascop and the A–D shade guides (see Materials Combination Tables on page 62 ff).

IPS d.SIGN Add-On

This add-on material with its medium incisal opacity can be used alone or mixed with other IPS d.SIGN layering materials. Observe a mixing ratio of max. 1:1.

IPS d.SIGN Opaquer

Opaquer pastes in the most popular shades. The materials demonstrate excellent stability and outstanding masking capabilities, even when applied in thin layers (see also Material Combination Table on page 62 ff).

IPS d.SIGN Glaze
IPS d.SIGN Glaze and Stain Liquid

A life-like lustre can be achieved easily and conveniently with IPS d.SIGN Glaze in combination with the IPS d.SIGN Glaze and Staine liquid.

Delivery form

Chromascop
IPS d.SIGN Basic Kit
– 10 IPS d.SIGN Opaquers, 3 g each
  Shades: 130, 140, 210, 220, 230, 310, 410, 420, 430, 510
– 4 IPS d.SIGN Intensive Opaquers, 3 g each
  Shades: white, purple, brown, incisal
– 10 IPS d.SIGN Dentin materials, 20 g each
  Shades: 130, 140, 210, 220, 230, 310, 410, 420, 430, 510
– 3 IPS d.SIGN Incisal materials, 20 g each
  Gradations: S1, S2, S3
– 1 IPS d.SIGN Transparent material, neutral, 20 g
– 1 IPS d.SIGN Glaze, 3 g
– 1 IPS d.SIGN Add-On material, 20 g
– 1 IPS d.SIGN Opaquer liquid, 15 ml
– 2 IPS d.SIGN Build-up liquid (Medium and Optimum 2), 60 ml
– 1 IPS d.SIGN Glaze and Stain liquid, 15 ml
– 1 IPS Model Sealer, 50 ml
– 1 IPS Ceramic Separating Liquid, 15 ml
– 1 IPS d.SIGN Opaquer material shade guide
– 1 IPS d.SIGN Dentin material shade guide
– 1 IPS d.SIGN Incisal material shade guide
– 1 Chromascop shade guide

A–D
IPS d.SIGN Basic Kit
– 8 IPS d.SIGN Opaquers, 3 g each
  Shades: A2, A3, A3.5, B2, B3, C3, D2, D3
– 4 IPS d.SIGN Intensive Opaquers, 3 g each
  Shades: white, purple, brown, incisal
– 8 IPS d.SIGN Dentin materials, 20 g each
  Shades: A2, A3, A3.5, B2, B3, C3, D2, D3
– 1 IPS d.SIGN Cervical Dentin D2/D3
– 3 IPS d.SIGN Incisal materials, 20 g each
  Gradations: TS1, TS2, TS3
– 1 IPS d.SIGN Transparent material, neutral, 20 g
– 1 IPS d.SIGN Glaze, 3 g
– 1 IPS d.SIGN Add-on material, 20 g
– 1 IPS d.SIGN Opaquer liquid, 15 ml
– 2 IPS d.SIGN Build-up liquid (Medium and Optimum 2), 60 m
– 1 IPS d.SIGN Glaze and Stain liquid, 15 ml
– 1 IPS Model Sealer, 50 ml
– 1 Ceramic Separating Liquid, 15 ml
– 1 IPS d.SIGN Opaquer material shade guide A–D
– 1 IPS d.SIGN Dentin material shade guide A–D
– 1 IPS d.SIGN Incisal material shade guide A–D

The IPS d.SIGN Basic Kits contain the most popular shades and are suitable for reproducing the most popular basic tooth shades without any difficulties. In this way, rarely used shades do not increase the initial investment but are available as refills.

Refills
– IPS d.SIGN Opaquer, 3 g each
  Shades: 110, 120, 130, 140, 210, 220, 230, 240, 310, 320, 330, 340, 410, 420, 430, 440, 510, 520, 530, 540
– IPS d.SIGN Opaquer F, 1 g
– IPS d.SIGN Dentin material, 20 g each / 100 g each / 250 g each; Shades: 110, 120, 130, 140, 210, 220, 230, 240, 310, 320, 330, 340, 410, 420, 430, 440, 510, 520, 530, 540
– IPS d.SIGN Incisal material, 20 g each / 100 g each / 250 g each; Gradations: S1, S2, S3
– IPS d.SIGN Transparent material, neutral, 20 g each / 100 g each / 250 g each

Refills
– IPS d.SIGN Opaquer, 3 g each
  Shades: A1, A2, A3, A3.5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3, D4
– IPS d.SIGN Opaquer F, 1 g
– IPS d.SIGN Dentin materials, 20 g each / 100 g each / 250 g each; Shades: A1, A2, A3, A3.5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3, D4
– IPS d.SIGN Cervical Dentin D2/D3
– IPS d.SIGN Transparent Incisal material, 20 g each / 100 g each / 250 g each; Gradations: T-S1, T-S2, T-S3

IPS d.SIGN Trial Kit

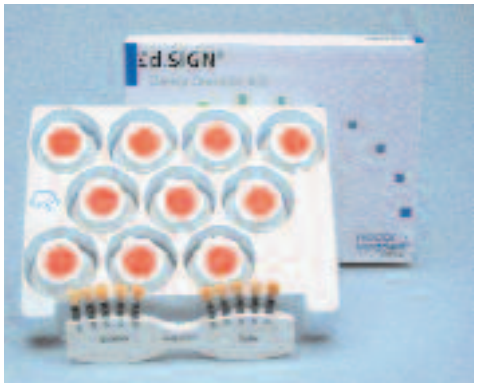
IPS d.SIGN Trial Kit

Delivery form

Chromascop
IPS d.SIGN Trial Kit
– 1 IPS d.SIGN Opaquer, 3 g; Shade: 210
– 1 IPS d.SIGN Dentin, 3 g; Shade: 210
– 1 IPS d.SIGN Incisal, 3 g; Gradation: S2
– 1 IPS d. SIGN Deep Dentin, 3 g; Shade: 210
– 1 IPS d.SIGN Margin, 3 g; Shade: 210
- 1 IPS d.SIGN Transpa, 3 g; Shade: neutral
– 1 IPS d.SIGN Occlusal Dentin, 3 g; Shade: orange
– 2 IPS d.SIGN Effect, 3 g each; Shades: 1, 3
– 1 IPS d.SIGN Mamelon, 3 g; Shade: light
– 1 IPS d.SIGN Glaze, 3 g
– 1 IPS d.SIGN Build-up liquid Medium, 5 ml
– 1 IPS d.SIGN Glaze and Stain liquid, 5 ml
– 1 IPS d.SIGN Margin Build-Up liquid, 5 ml
– 1 Material shade guide

A–D
IPS d.SIGN Trial Kit
– 1 IPS d.SIGN Opaquer, 3 g; Shade: A33
– 1 IPS d.SIGN Dentin, 3 g; Shade: A3
– 1 IPS d.SIGN Incisal, 3 g; Gradation: TS2
– 1 IPS d. SIGN Deep Dentin, 3 g; Shade: A3
– 1 IPS d.SIGN Margin, 3 g; Shade: A3
- 1 IPS d.SIGN Transpa, 3 g; Farbe: neutral
– 1 IPS d.SIGN Occlusal Dentin, 3 g; Farbe: orange
– 2 IPS d.SIGN Effect, 3 g each; Shades: 1, 3
– 1 IPS d.SIGN Mamelon, 3 g; Shade: light
– 1 IPS d.SIGN Glaze, 3 g
– 1 IPS d.SIGN Build-Up liquid Medium, 5 ml
– 1 IPS d.SIGN Glaze and Stain liquid, 5 ml
– 1 IPS d.SIGN Margin Build-Up liquid, 5 ml
– 1 Material shade guide

IPS d.SIGN Deep Dentin Kits



IPS d.SIGN Deep Dentin Kit Chromascop

IPS d.SIGN Deep Dentin Kit A–D

IPS d.SIGN Deep Dentin

With the IPS d.SIGN Deep Dentin materials, restorations that demonstrate true-to-nature shade effects can be achieved even with limited layer thicknesses. Particularly if space is limited, IPS d.SIGN Deep Dentin materials can be used to intensify the chroma (see 'Materials Combination Table' on page 62 ff).

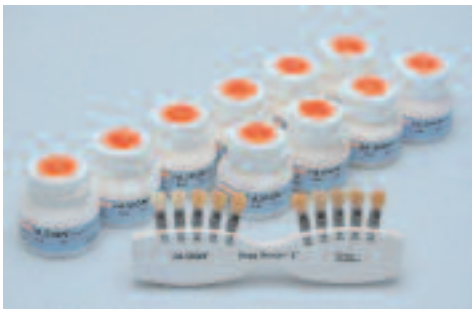
Delivery form

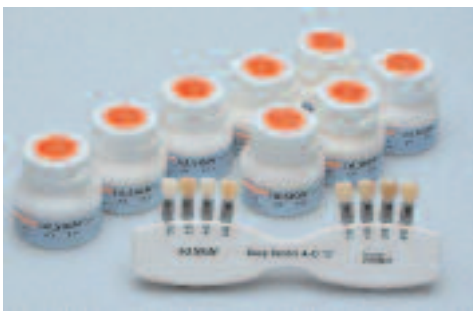
Chromascop
IPS d.SIGN Deep Dentin Kit
– 10 IPS d.SIGN Deep Dentin materials, 20 g each
Shades: 130, 140, 210, 220, 230, 310, 410, 420, 430, 510
– 1 IPS d.SIGN Deep Dentin material shade guide

Refill
– IPS d.SIGN Deep Dentin material, 20 g each
Shades: 110, 120, 130, 140, 210, 220, 230, 240, 310, 320, 330, 340, 410, 420, 430, 440, 510, 520, 530, 540
– IPS d.SIGN Deep Dentin '2' material shade guide

A–D
IPS d.SIGN Deep Dentin Kit
– 7 IPS d.SIGN Deep Dentin materials, 20 g each
Shades: A2, A3, A3.5, B2, B3, C3, D2/D3
– 1 IPS d.SIGN Deep Dentin material shade guide

Refill
– IPS d.SIGN Deep Dentin material, 20 g each
Shades: A1, A2, A3, A3.5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2/D3, D4
– IPS d.SIGN Deep Dentin '2' material shade guide A-D





The various product range may vary from country to country.

IPS d.SIGN Margin Kits

IPS d.SIGN Margin Kit Chromascop

IPS d.SIGN Margin Kit A–D

IPS d.SIGN Margin

The IPS d.SIGN Margin material permits the design of a ceramic shoulder. They are available in Chromascop and A–D shades. Additionally, there are 4 Intensive Margin materials to achieve special effects. The Margin Add-On material is used for subsequent adjustments of the shoulder area and the corresponding accuracy of fit (see 'Materials Combination Table' on page 62 ff).

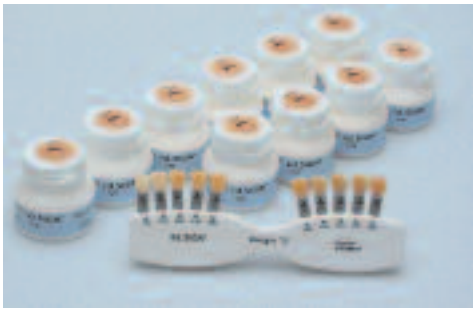
Delivery form

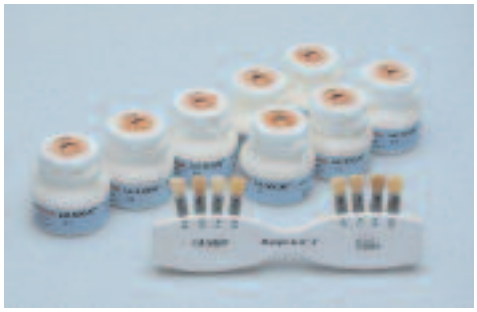
Chromascop
IPS d.SIGN Margin Kit
– 10 IPS d.SIGN Margin materials, 20 g each
  Shades: 130, 140, 210, 220, 230, 310, 410, 420, 430, 510
– 4 IPS d.SIGN Intensive Margin material, 20 g each
  Shades: yellow, orange, orange-pink, opaque
– 1 IPS d.SIGN Margin Add-On material, 20 g
– 1 IPS d.SIGN Margin Build-Up liquid, 60 ml
– 1 IPS d.SIGN Margin Separating liquid, 20 ml
– 1 IPS d.SIGN Ceramic separating liquid with brush, 15 ml
– 1 IPS d.SIGN Margin material shade guide

Refill
– IPS d.SIGN Margin material, 20 g each
  Shades: 110, 120, 130, 140, 210, 220, 230, 210, 320, 330, 340, 410, 420, 430, 440, 510, 520, 530, 540
– IPS d.SIGN Margin '2' material shade guide

A–D
IPS d.SIGN Margin Kit
– 7 IPS d.SIGN Margin materials, 20 g each
  Shades: A2, A3, A3.5, B2, B3, C3, D2/D3
– 4 IPS d.SIGN Intensive Margin materials, 20 g each
  Shades: yellow, orange, orange-pink, opaque
– 1 IPS d.SIGN Margin Add-On material, 20 g
– 1 IPS d.SIGN Margin Build-Up liquid, 60 ml
– 1 IPS d.SIGN Margin Separating liquid, 20 ml
– 1 IPS d.SIGN Ceramic separating liquid with brush, 15 ml
– 1 IPS d.SIGN Margin material shade guide

Refill
– IPS d.SIGN Margin material, 20 g each
  Shades: A1, A2, A3, A3.5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2/D3, D4
– IPS d.SIGN Margin '2' material shade guide A-D





The various product range may vary from country to country.

IPS d.SIGN Bleach Kit

IPS d.SIGN Bleach

The ultra-light shades enable optimum integration of the restoration in a bleached environment (see 'Materials Combination Table' on page 62 ff).

Delivery form

IPS d.SIGN Bleach Kit
- 2 IPS d.SIGN Opaquers, 3 g each
  Shades: 010/020, 030/040
- 2 IPS d.SIGN Margin materials, 20 g each
  Shades: 010/020, 030/040
- 4 IPS d.SIGN Dentin materials, 20 g each
  Shades: 010, 020, 030, 040
- 1 IPS d.SIGN Transparent-Incisal material, 20 g, T-S1
- IPS d.SIGN Bleach material shade guide

IPS d.SIGN Bleach Refill
- IPS d.SIGN Deep Dentin material, 20 g
  Shade 010

IPS d.SIGN Bleach Kit BL

Four accurately coordinated shades meet the highest demands related to contemporary "white aesthetics" (see page 67 Combination table).

Delivery form

IPS d.SIGN Bleach Kit BL
- 2 IPS d.SIGN Opaquer 3 g each; Shades: BL1/BL2, BL3/BL4
- 4 IPS d.SIGN Dentin 20 g each; Shades: BL1, BL2, BL3, BL4
- IPS d.SIGN Incisal, 20 g; Shade: BL
- IPS d.SIGN Margin 20 g each; Shade: BL1, BL4*
- IPS d.SIGN Deep Dentin 20 g each; Shades: BL1, BL4*
- IPS d.SIGN Add-On, 20 g; Shade: BL
- IPS d.SIGN/IPS InLine material shade guide BL
- Shade guide Bleach BL

* The Margin and Deep Dentin materials are only available in shades BL1 and BL4. Shades BL2 and BL3 can be achieved by mixing the materials as following:
BL2: 2/3 BL1 : 1/3 BL4
BL3: 1/3 BL1 : 2/3 BL4

Refill
- All products are also available as Refill

IPS d.SIGN Impulse 1 Kit

15 ready-mixed individual fluorapatite leucite ceramic materials ranging from Mamelon to Opal materials facilitate the application of true-to-nature effects.

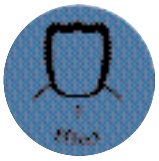
IPS d.SIGN Occlusal Dentin

The Occlusal Dentin materials are available in two different shades. They are used to provide the basic shade for occlusal surfaces and to intensify the chroma (see 'Materials Combination Table' on page 66).

IPS d.SIGN Mamelon

The Mamelon materials are available in three different shade gradations. They demonstrate high opacity and optimum masking capabilities even when applied in very thin layers. Depending on the working habits of the user, the material is applied in thin stripes on reduced dentin. In this way, an individualized appearance of the incisal third can be achieved (see 'Materials Combination Table' on page 66).

IPS d.SIGN Effect



Users may chose between six shade gradations of the IPS d.SIGN Effect materials. Starting with Effect 1, which demonstrates true-to-nature opalescence in conjunction with high translucency, the value gradually increases from Effect 2 to Effect 5. In contrast, the violet material reduces the value in the incisal area (see 'Material Combination Table' on page 66).

IPS d.SIGN Transparent

The Transparent materials are available in three shade nuances. They are suitable to reproduce shaded, transparent areas, particularly in the incisal third (see 'Materials Combination Table' on page 66).

IPS d.SIGN Incisal Edge

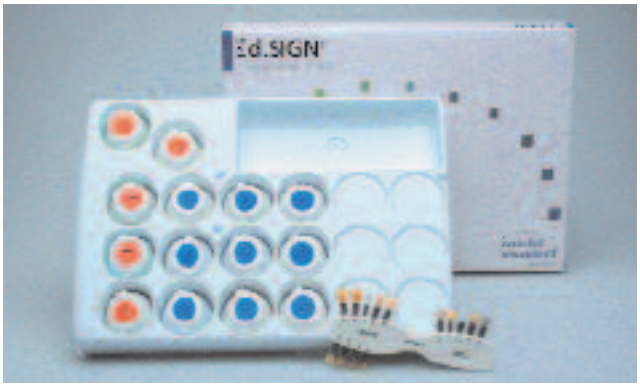
This material is used to achieve what is known as the 'halo effect', which is caused in natural teeth by light refraction at the incisal edge (see 'Materials Combination Table' on page 66).

Delivery form

IPS d.SIGN Impulse 1 Kit

- 2 IPS d.SIGN Occlusal Dentin materials, 20 g each
  Shades: orange, brown
- 3 IPS d.SIGN Mamelon materials, 20 g each
  Shades: light, yellow-orange, salmon
- 6 IPS d.SIGN Effect materials, 20 g each
  Gradation: Effect 1, Effect 2, Effect 3, Effect 4, Effect, 5, violet
- 3 IPS d.SIGN Transparent materials, 20 g each
  Shades: blue, brown-grey, orange-grey
- 1 IPS d.SIGN Incisal Edge material, 20 g
- 1 IPS d.SIGN Impulse 1 material shade guide

IPS d.SIGN Impulse 2 Kit



14 ready-mixed Impulse materials based on the inspiration and philosophies of renowned experts, such as Enrico Steger, Donald F. Cornell, and Dr. Robert R. Winter.

IPS d.SIGN Brilliant Dentin

In order to highlight the shade of certain areas of the tooth, IPS d.SIGN Brilliant Dentin is applied on the opaquer in very thin layers. These special dentin materials demonstrate outstanding opacity and colour saturation (see 'Material Combination Table' on page 66).

IPS d.SIGN Palatinal Dentin

These dentin materials have been especially developed for use in palatal areas where space is limited. They only need to be covered with Incisal materials and provide the required colour saturation for the palatal fossa (see 'Materials Combination Table' on page 66).

IPS d.SIGN Insert

IPS d.SIGN Insert materials are mainly used in incisal areas and are applied between the incisal and dentin materials for shade characterization purposes. With Insert grey, a true-to-nature in-depth effect can be achieved (see 'Materials Combination Table' on page 66).

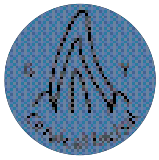
IPS d.SIGN Special Incisal

These two special incisal materials may either be mixed with IPS d.SIGN Incisal materials to modify and intensify the shade or applied directly (see 'Materials Combination Table' on page 66).

IPS d.SIGN Inter Incisal

This special incisal material is used when high brightness values in the incisal area are needed or to increase the brightness value in the incisal third when space is limited. It can be applied alone or mixed with other materials (see 'Materials Combination Table' on page 66).

IPS d.SIGN Cervical Incisal



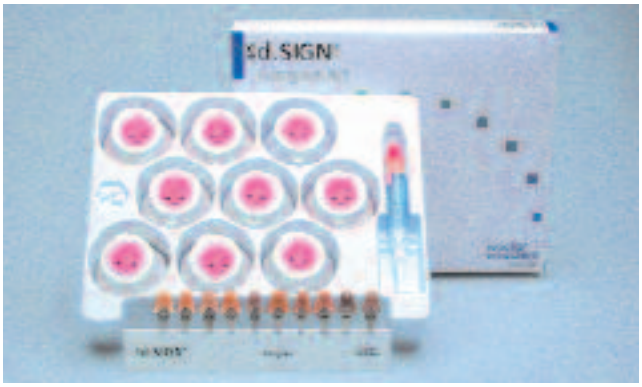
These very transparent cervical incisal materials are used to achieve true-to-nature effect of depth in the cervical third. In contrast to conventional Transparent materials, these special materials demonstrate a strong white fluorescence (see 'Materials Combination Table' on page 66).

Delivery form

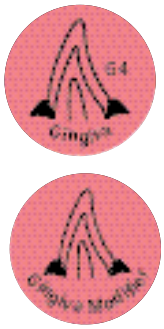
IPS d.SIGN Impulse 2 Kit

- 3 IPS d.SIGN Brilliant Dentin materials, 20 g each
  Shades: yellow, orange, white
- 2 IPS d.SIGN Palatinal Dentin material, 20 g each
  Shades: yellow, red
- 2 IPS d.SIGN Insert materials, 20 g each
  Shades: orange, grey
- 2 IPS d.SIGN Special Incisal materials, 20 g each
  Shades: yellow, grey
- 1 IPS d.SIGN Inter Incisal material, 20 g
  Shade: white-blue
- 4 IPS d.SIGN Cervical Incisal materials, 20 g each
  Shades: yellow, orange-pink, khaki, orange
- IPS d.SIGN Impulse 2 material shade guide

IPS d.SIGN Gingiva Kit



IPS d.SIGN Gingiva and Gingiva Modifier



These special Gingiva materials are used in combination with the Gingiva Modifiers depending on the individual situation of the patient. The shade gradations range from orange to reddish to bluish (see 'Materials Combination Table' on page 67).

Delivery form

IPS d.SIGN Gingiva Kit
– 1 IPS d.SIGN Gingiva Opaquer, 3 g
– 5 IPS d.SIGN Gingiva materials, 20 g each
  Gradations: G1, G2, G3, G4, G5
– 4 IPS d.SIGN Gingiva Modifiers, 20 g each
  Gradations: GM1, GM2, GM3, GM4
– IPS d.SIGN Gingiva material shade guide

IPS d.SIGN Essence Kit

IPS d.SIGN Essence materials are ceramic stains in powder form that may be mixed with IPS d.SIGN layering materials in order to intensify the shade. Furthermore, IPS d.SIGN Essence can be used for surface characterizations to reproduce the special characteristics of the natural tooth (see 'Materials Combination Table' on page 67)

Delivery form

IPS d.SIGN Essence Kit
– 1 IPS d.SIGN Essence, 1 g, orange
– 1 IPS d.SIGN Essence, 1 g, yellow
– 1 IPS d.SIGN Essence, 1 g, grey
– 1 IPS d.SIGN Essence, 1 g, brown
– 1 IPS d.SIGN Glazing and Staining liquid, 15 ml

IPS d.SIGN Stains Kit

IPS d.SIGN Stains

These intensive stains in paste form are available in 14 different shades. They are used to reproduce natural characteristics on the ceramic surface. With the three primary colours basic blue, basic red, and basic yellow, custom shades may be developed (see 'Materials Combination Table' on page 67).

Delivery form

IPS d.SIGN Stains Kit

- 1 IPS d.SIGN Stains, 1 g, white
- 1 IPS d.SIGN Stains, 1 g, mahogany
- 1 IPS d.SIGN Stains, 1 g, khaki
- 1 IPS d.SIGN Stains, 1 g, orange
- 1 IPS d.SIGN Stains, 1 g, grey
- 1 IPS d.SIGN Stains, 1 g, vanilla
- 1 IPS d.SIGN Stains, 1 g, crackliner
- 1 IPS d.SIGN Stains, 1 g, olive
- 1 IPS d.SIGN Stains, 1 g, yellow
- 1 IPS d.SIGN Stains, 1 g, black
- 1 IPS d.SIGN Stains, 1 g, maroon
- 1 IPS d.SIGN Stains, 1 g, basic blue
- 1 IPS d.SIGN Stains, 1 g, basic red
- 1 IPS d.SIGN Stains, 1 g, basic yellow
- 1 IPS d.SIGN Glaze, 3 g
- 1 IPS d.SIGN Glaze and Stain liquid, 15 ml

IPS d.SIGN Shade Kit

IPS d.SIGN Shade

These 7 dentin stains in paste form make shade adjustments to IPS d.SIGN restorations possible. They are coordinated with the 20 Chromascop shades and the 16 A–D shades (see 'Materials Combination Table' on page 67).

Delivery form

IPS d.SIGN Shade Kit

- 1 IPS d.SIGN Shade 1, 3 g
- 1 IPS d.SIGN Shade 2, 3 g
- 1 IPS d.SIGN Shade 3, 3 g
- 1 IPS d.SIGN Shade 4, 3 g
- 1 IPS d.SIGN Shade 5, 3 g
- 1 IPS d.SIGN Shade 6, 3 g
- 1 IPS d.SIGN Shade 7, 3 g

Combination table

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

IPS d.SIGN – Liquids

IPS d.SIGN Opaquer Liquid, 15 ml

This liquid is used to adjust the consistency of IPS d.SIGN Paste Opaquer materials. Do not excessively dilute the paste opaquer with the opaquer liquid.

Components: Polymer, butylene glycol, and glycerine

The Opaquer Liquid must not be used to mix opaquers, as it is the case in power/liquid opaquer systems.

IPS d.SIGN Margin Build-Up Liquid, 60 ml

Use to mix the IPS d.SIGN Margin materials.

Components: Water, cellulose derivative

IPS d.SIGN Glaze and Stain Liquid, 15 ml

This liquid is used to adjust the consistency of IPS d.SIGN Stains, IPS d.SIGN Shade, IPS d.SIGN Essence, and IPS d.SIGN Glaze.

Components: Butylene glycol

Warning
Butylene glycol is irritating. Avoid contact. Do not inhale vapours.

IPS d.SIGN Build-Up Liquid *Medium*, 60 and 250 ml

This liquid is suitable for mixing IPS d.SIGN materials for most layering techniques and restorations. The Build-Up Liquid Medium is particularly suitable for technicians who prefer a longer working time and enhanced stability of IPS d.SIGN. In this way, IPS d.SIGN may be processed in smaller increments, without the constant need of moistening. Given the longer working time than with the Build-Up Light, a longer closing time (pre-drying time) is required for the firing procedure.

Components: Water, butylene glycol, and additives

IPS d.SIGN Build-Up Liquid *Light*, 60 and 250 ml

This liquid is suitable for mixing IPS d.SIGN materials that will be used for smaller restorations or when smaller amounts of material are needed for 2nd dentin and incisal firings (corrective firing). The Build-Up Liquid Light is suitable for those who prefer a drier working consistency, thus avoiding the need for constant blotting since the liquid evaporates much quicker. In this way, IPS d.SIGN can be easily manipulated with an instrument.

Components: Water, butylene glycol, and additives

IPS d.SIGN Build-Up Liquid *Premium*, 60 and 250 ml

This liquid is suitable for mixing IPS d.SIGN materials that will be used for fabricating larger restorations where a longer working time and smooth consistency is desired. The Build-Up Liquid Premium is suitable for technicians who prefer a long working time and moist material coupled with high stability. In this way, IPS d.SIGN can be processed without the need for constant moistening. Since the material stays moist for a longer period of time controlled blotting is required as well as a longer closing time (pre-drying time) for the firing procedure.

Components: Water, butylene glycol-chloride solution

IPS d.SIGN Build-Up Liquid *Optimum 1,* 60 and 250 ml

Excellently suitable for mixing IPS d.SIGN, with its outstanding firing behaviour and lowest possible shrinkage. The materials are easily suctioned off and condensed and are particularly suitable for the manual reduction of materials with the help of instruments.

Components: Water, polyethylene glycol (PEG), and additives

IPS d.SIGN Build-Up Liquid *Optimum 2,* 60 and 250 ml

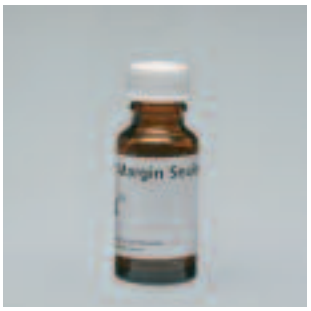
Excellently suitable for mixing IPS d.SIGN, with its properties that support the build-up, as well as the optimized firing properties with low shrinkage. This liquid is particularly suitable for targeted material application without continuous suction.

Components: Water, polyethylene glycol (PEG), and additives

IPS Margin Sealer, 20 ml

This separating liquid is used to seal the gypsum die when fabricating a ceramic shoulder with IPS d.SIGN Margin materials.

Components: 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 the vapours. Keep the material away from open fire.

IPS Model Sealer, 50 ml

This separator is used to seal the pontic tissue areas and interproximal contact area when working with IPS d.SIGN layering materials. The IPS Model Sealer closes the pores of the gypsum and prevents the moisture in the ceramic material from being absorbed by the gypsum.

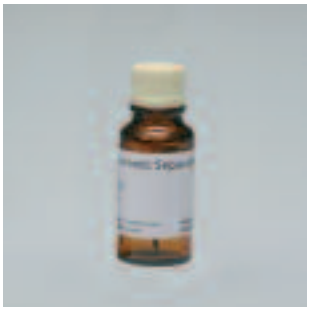
Components: Ethyl acetate, nitro-cellulose, softener

Warning
Ethyl acetate is highly flammable. Keep material away from open fire. Do not inhale the vapours.

IPS Ceramic Separating Liquid, 15 ml

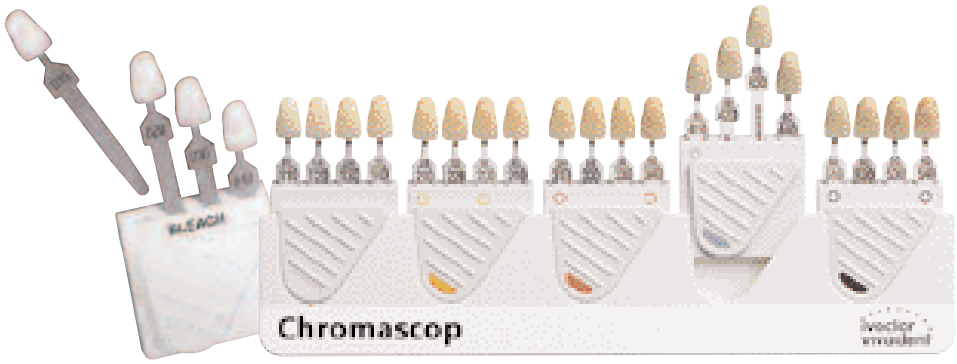
This Separating Liquid is used on areas that have been sealed with either the IPS Margin Sealer Liquid or the IPS Model Sealer. Use of this liquid will ensure a clean separation between the ceramic material and the gypsum model and/or die.

Components: Paraffin oil



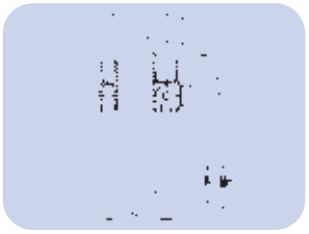
Other build-up liquids or separating liquids must not be used. They may contain organic additives that do not burnout at the firing temperatures used for IPS d.SIGN and leave a residue that will cause discoloration in the ceramic.

IPS d.SIGN – Shade selection



The Chromascop shade guide represents the shade standard for Ivoclar Vivadent products. With the logical arrangement of the individual shades, the Chromascop permits exact and efficient shade determination. The 20 shades are divided into five detachable shade groups.

IPS d.SIGN material shade guides



The shade guides fired from original materials are also an integrated part of the IPS d.SIGN product system. For reasons of light refraction, the new shade tabs have been given an anatomical shape and a certain surface structure. On the reverse side, the teeth are smooth, i.e. without any texture whatsoever, which facilitates shade comparison with the prepared die and shaded cementation media. The smooth side of shade tabs may be individually ground to determine the layering. The shade tabs are fired from original materials under laboratory-type conditions. In this way, they correspond with the desired result.


IPS d.SIGN Opaquer material shade guide
Chromascop and A–D


IPS d.SIGN Dentin material shade guide
Chromascop and A–D


IPS d.SIGN Incisal/Transparent material shade guide
Chromascop and A–


IPS d.SIGN Bleach material shade guide


IPS d.SIGN Deep Dentin material shade guide
Chromascop and A–D


IPS d.SIGN Deep Dentin '2' material shade guide
Chromascop and Deep Dentin A–D '2'


IPS d.SIGN Margin material shade guide
Chromascop and A–D


IPS d.SIGN Margin '2' material shade guide
Chromascop and Margin A–D '2'


IPS d.SIGN Impulse 1 material shade guide
Chromascop and A–D


IPS d.SIGN Impulse 2 material shade guide
Chromascop and A–D


IPS d.SIGN Gingiva material shade guide
Chromascop and A–D

IPS d.SIGN – Layering diagram

Chromascop – ideal space

Chromascop – limited space

In Chromascop layering, the incisal material extends up to the cervical third. The indications on the right are reference values.

	ideal space	limited space
Framework	0.3 mm	0.3 mm
Opaquer	0.1 mm	0.1 mm
Deep Dentin		
cervical	–	0.3 mm
incisal	–	0.1 mm
Dentin		
cervical	1.0 mm	0.5 mm
incisal	0.7 mm	0.3 mm
Incisal		
cervical	0.2 mm	0.1 mm
incisal	0.5 mm	0.4 mm

A–D – ideal space

A–D – limited space

In A–D layering, the incisal material extends to the center of the cervical third. The indications on the right are reference values.

	ideal space	limited space
Framework	0.3 mm	0.3 mm
Opaquer	0.1 mm	0.1 mm
Deep Dentin		
cervical	–	0.3 mm
incisal	–	0.1 mm
Dentin		
cervical	0.9 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

IPS d.SIGN – Framework design

	Inlays	Onlays	3/4 crowns	Telescope and conus crowns	Root canal posts	Ceramic crowns	Long span bridges	Short span bridges	Implant Superstructures	Partial dentures
Alloy										
Implant Series										
Callisto Implant 78	–	●	●	●	●	●	●	●	●	●
IS-85	–	●	●	●	●	●	●	●	●	●
IS-64	–	●	●	●	●	●	●	●	●	●
Callisto Implant 60	–	●	●	●	●	●	●	●	●	●
High gold content										
Brite Gold	●	●	●	–	–	●	–	–	–	–
Brite Gold XH	●	●	●	●	●	●	●	●	–	–
Golden Ceramic	–	●	●	●	–	●	●	–	–	–
Aquarius Hard	●	●	●	●	●	●	●	●	–	●
Aquarius	●	●	●	●	–	●	●	–	–	–
IPS d.SIGN 98	●	●	●	●	●	●	●	●	●	●
Y	–	●	●	●	●	●	●	●	–	–
Aquarius XH	–	●	●	●	●	●	●	●	●	●
Y-Lite	–	●	●	●	●	●	●	●	–	●
Sagittarius	–	●	●	●	●	●	●	●	●	●
IPS d.SIGN 96	●	●	●	●	●	●	●	●	–	–
Reduced gold content										
IPS d.SIGN 91	–	●	●	●	●	●	●	●	●	●
W	–	●	●	●	●	●	●	●	–	●
W-5	–	●	●	●	●	●	●	●	●	●
Lodestar	–	●	●	●	●	●	●	●	●	●
W-3	–	●	●	●	●	●	●	●	●	●
Evolution Lite	–	●	●	●	●	●	●	–	–	–
Palladium based										
Capricorn 15	–	●	●	●	●	●	●	●	●	●
IPS d.SIGN 84	–	●	●	●	●	●	●	●	●	●
IPS d.SIGN 67	–	●	●	●	●	●	●	●	●	●
Spartan Plus	–	●	●	●	●	●	●	●	●	●
IPS d.SIGN 59	–	●	●	●	●	●	●	●	●	●
IPS d.SIGN 53	–	●	●	●	●	●	●	●	●	●
Ni based										
Pisces Plus	–	–	–	●	●	●	●	●	–	●
4all	–	–	–	●	●	●	●	●	–	–
IPS d.SIGN 15	–	–	–	●	●	●	●	●	–	–
Co based										
IPS d.SIGN 30	–	–	–	●	●	●	●	●	●	●

The product lines may vary from country to country.

When designing frameworks to be veneered with ceramic materials, the following parameters have to be observed:

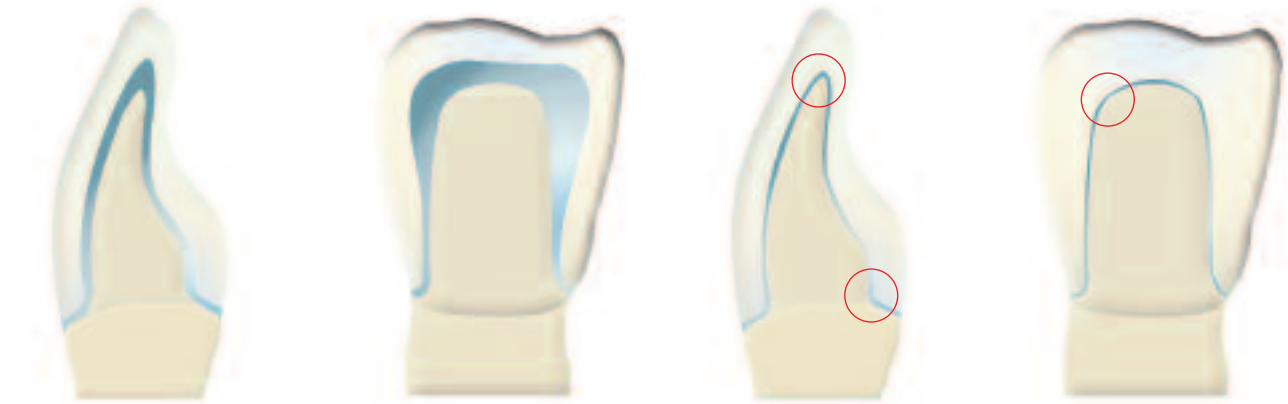
1. **Functional support of the veneering ceramic**
2. **Framework design for porcelain shoulders**
3. **Framework stability**
4. **Framework design for bridges**
5. **Design of bridge pontics**
6. **Interface between metal and ceramic**

1. Functional support of the veneering ceramic

The framework should reflects the shape of the tooth in a reduced form. The framework should be designed in such a way that it supports the cusps so that an even layer of the veneering ceramic can be used in the cusp/fissure area. In this way, the masticatory forces are exerted on the framework rather than on the veneering ceramic. Furthermore, the framework should not have any sharp angles or edges (see diagram), so that the masticatory forces do not cause stress peaks, which may cause delamination or cracks. Sharp angles or edges should be rounded in the wax-up so that the minimum framework thickness is not compromised. The wall thickness of the metal framework for single crowns after finishing should be at least 0.3 mm and 0.5 mm for bridge abutments (see diagram). For further information, please refer to the Instructions for Use of the alloy being used.

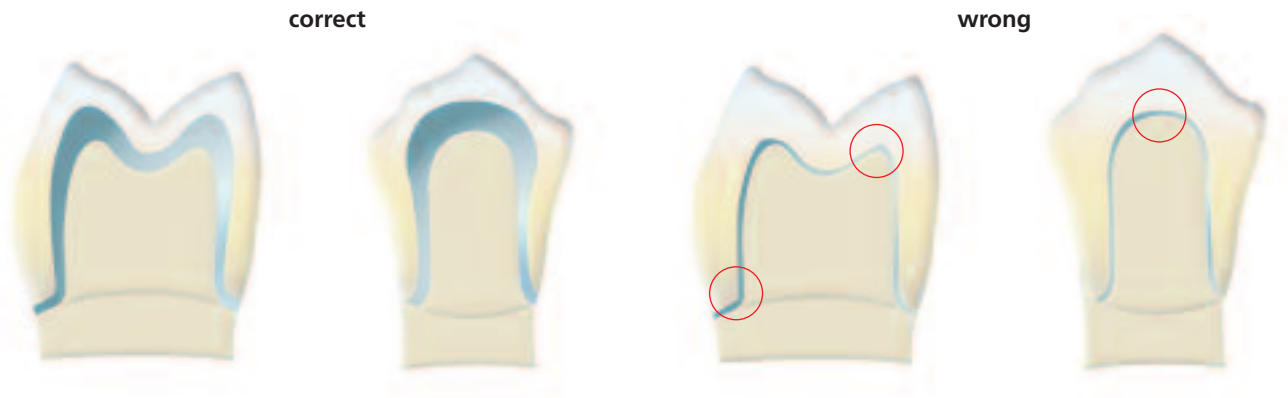
Anterior crowns

correct **wrong**



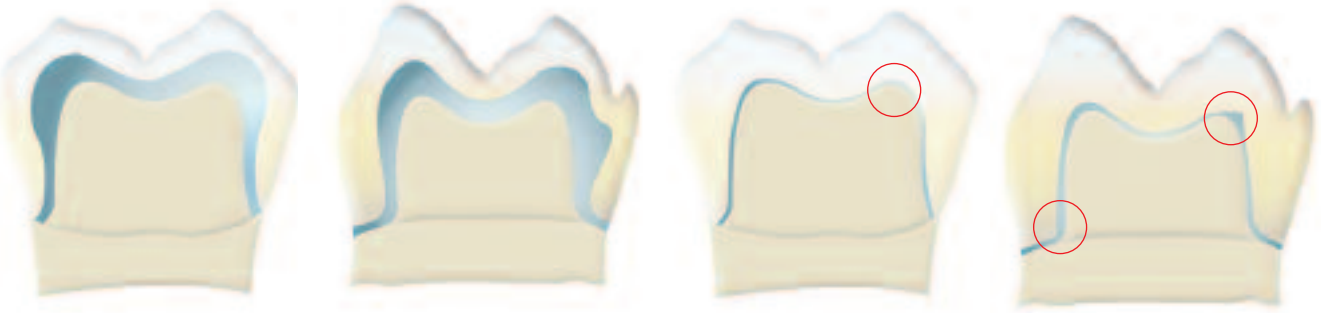
Premolar crowns

correct **wrong**



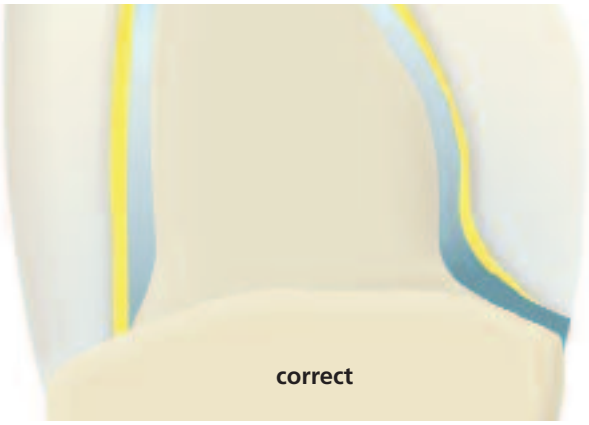
Molar crowns

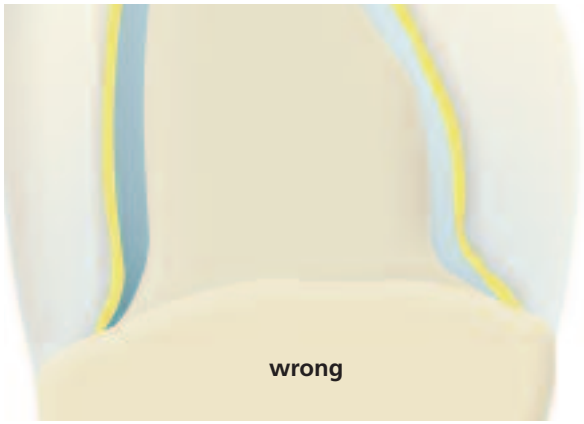
correct **wrong**



2. Framework design for porcelain shoulders

When fabricating porcelain shoulders, make sure that the framework is supported by the prepared tooth rather than the veneer. To achieve this the framework is reduced exactly to the inner edge of the chamfer or shoulder preparation. In this way, functional support of the framework by the prepared tooth is achieved. A framework that accuractly fits the prepared tooth is essential in order to keep the ceramic material from getting on the inner surface of the framework.





3. Framework stability

The dimensions of the interproximal connector greatly influences the stability of the restoration during the laboratory procedure as well as the clinical long-term success after cementation. Therefore, the dimension of the connector area must be adequate for the alloy being used. This is especially important if a bio-alloy or high-gold alloy is to be used.

Double the width of the connector
= double the stability

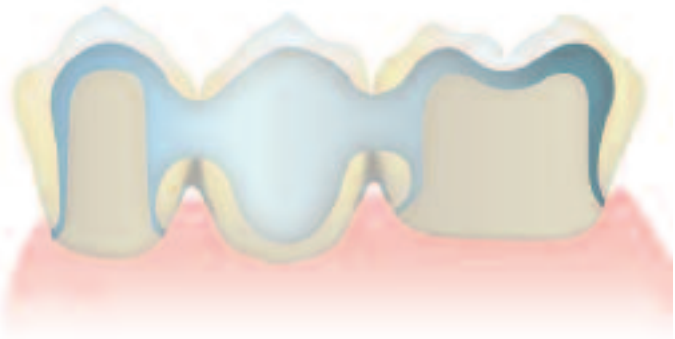
Single connector width
= single stability

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

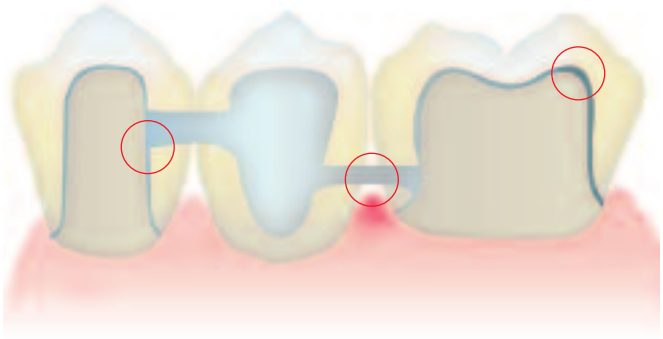
4. Framework design for bridges

Frameworks veneered with ceramic materials are subject to thermal stress during the firing procedures and to masticatory stress after cementation. Therefore, the corresponding forces must be transferred to the framework rather than the veneer. In particular, adequate framework thickness must be ensured in the connector area between the abutment and the pontic in bridge reconstructions.
The design of the framework must meet the visual, functional and periodontal hygiene requirements of the patient. A functional wax-up reduced to allow space for the ceramic material is the optimum prerequisite. During the laboratory procedures the framework is repeatedly exposed to high temperatures. These firing temperatures may cause the framework to distort and compromise the accuracy of fit if it has not been properly designed and the required thickness observed. A scallop-type design with interproximal reinforcement will provide the necessary strength needed to avoid deformation of the framework. Also, this type of proper framework design (e.g. with cooling grooves) will ensure even cooling of the restoration once it is removed from the porcelain furnace after firing. This is particularly important if bio-alloys or high-gold alloys are used. The corresponding failures can be prevented as described under point 1.
In order to ensure proper oral hygiene with bridges, the design of the interdental areas should be given special attention. Adequate opening of the interdental area should be considered when designing the framework without creating black triangles. In this way, periodontal hygiene may be performed using interdental brushes and dental floss.

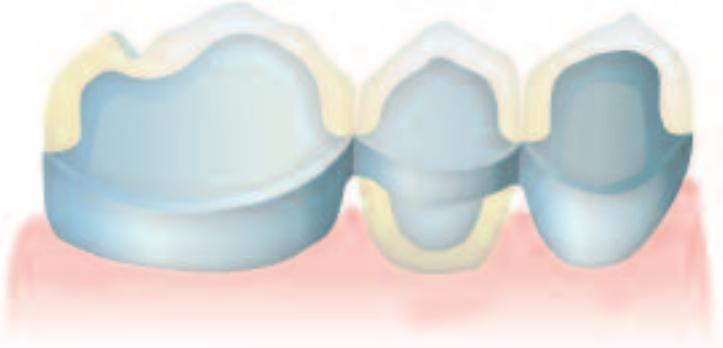
correct



wrong



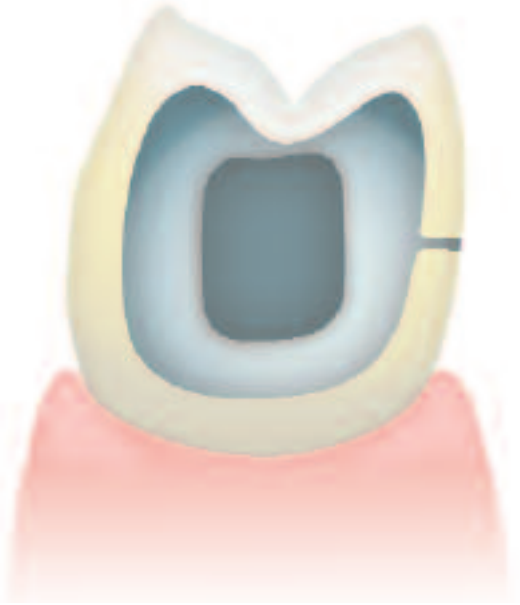
correct



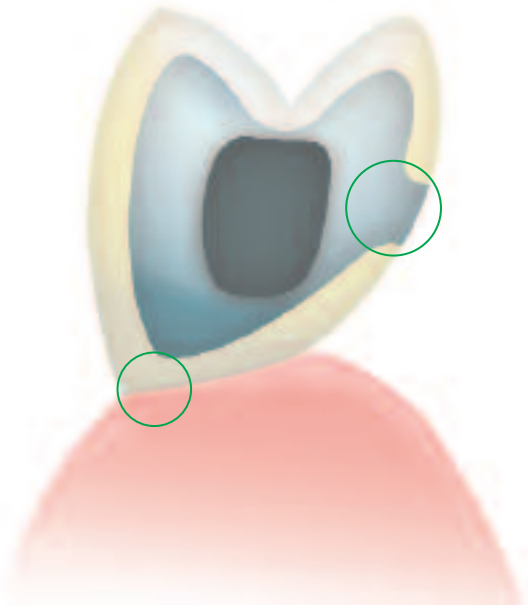
5. Design of bridge pontics

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

Bridge pontic design – ovate pontics

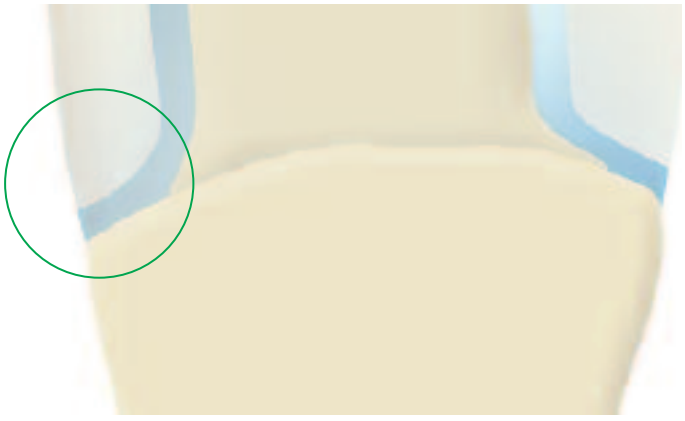


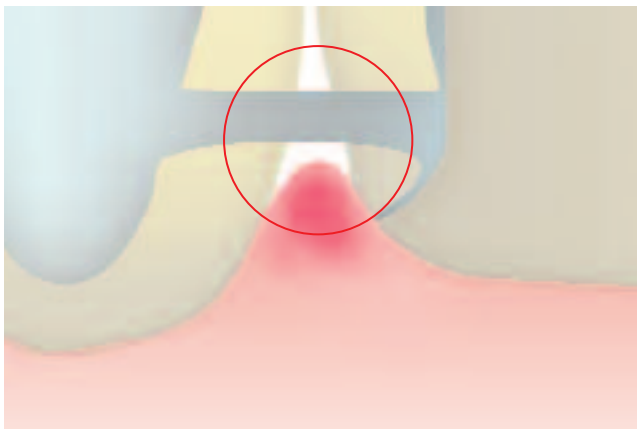
Bridge pontic design – saddle-type pontics



6. Interface between metal and ceramic

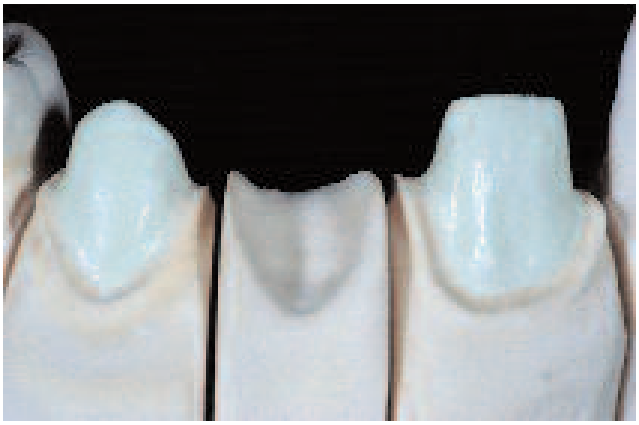
The interface between the metal framework and the veneering ceramic must be clearly defined and, if possible, incorporate a right angle finish line. The juncture between the metal framework and the veneering ceramic must not be located in the contact area nor on surfaces involved in masticatory functions. Furthermore, make sure that the interface in the marginal area does not come into contact with the gingiva, particularly if a tapered crown margin is designed (e.g. no metal margin and no ceramic shoulder). In this way, irritation of the gingiva can be prevented. The interface in the interdental area should be designed in such a way that cleaning of these difficult-to-access areas is possible.





Starting situation

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



A model with detachable segments is used as the basis.

Dies isolated with a sealer, followed by a spacer layer.

Fabricating the framework

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

Recommended procedure

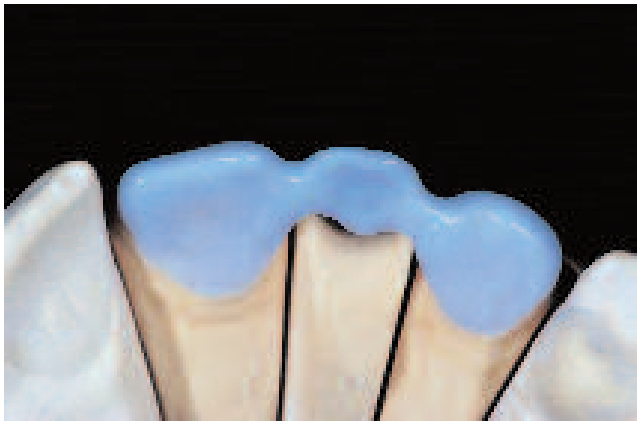
1. Complete modelling of the anatomical tooth shape
2. Reduce to make room for the veneering materials
3. Waxing of the contact points and connector areas
4. Checking the occlusal and proximal contact points

Contouring

The framework reflects the reduced anatomical tooth shape (see 'Functional support of the veneering ceramic' on page 24). In this way, the ceramic material may be applied in even layers and is adequately supported. For that purpose, the properties of the different alloys (e.g. firing stability) must be taken into consideration.

- **Undersized metal frameworks result in increased shrinkage of the veneering ceramic and require additional corrective firings.**
- **If the metal framework is too small, the veneering ceramic is not adequately supported, which may lead to cracks and delamination, particularly in very thick ceramic layers.**

The frameworks are contoured according to the static requirements…



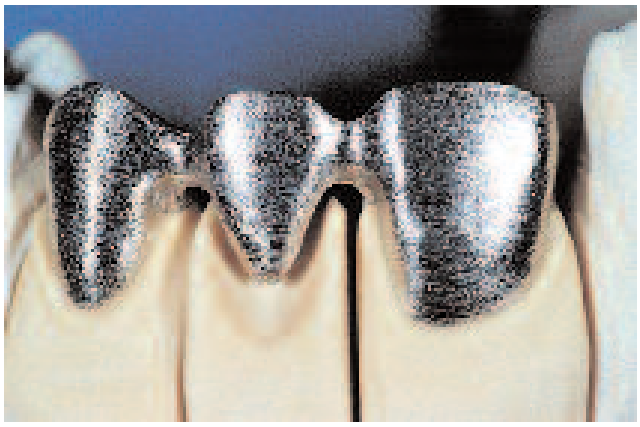
… and the properties of the alloy used.

Finishing the metal framework

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

- **Use reduced pressure when working with softer alloys.**
- **Work in one direction only to avoid overlapping and inclusions in the metal surface.**
- **Do not use diamond grinding instruments. Diamond particles may be trapped in the alloy and cause bubbles in the ceramic material during firing.**

Cast metal frameworks are finished using tungsten carbide metal burs…



… or ceramic-bonded grinding instruments.

Oxide firing

After grinding, carefully blast the framework with type 80–100 aluminium oxide (Al_2O_3). (Ivoclar Vivadent special jet medium). When using IPS d.SIGN alloys, the required pressure is 1.5–2.0 bar.

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

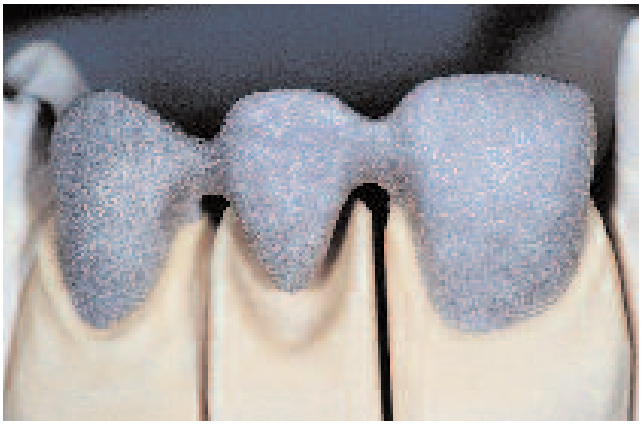
Blasting improves the mechanical bond. It results in the object surface being roughened and considerably enlarged. In order to prevent inclusions of blasting medium residue in the ceramic, we recommend blasting the alloys with the indicated pressure while keeping the nozzle at a flat angle to the object surface. A contaminated metal surface may result in the formation of bubbles during ceramic firing.

Schematic diagram of the blasting direction

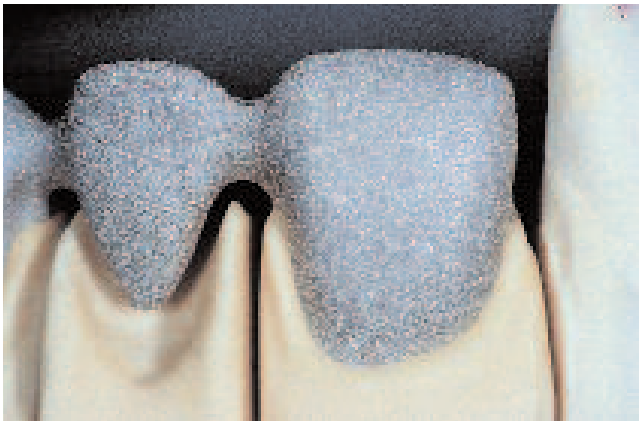
Correct angle for blasting the alloy surface.

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

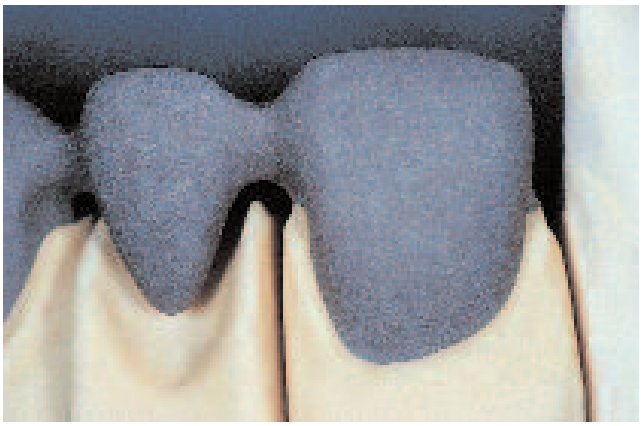
When conditioning the frameworks, the instructions of the alloy manufacturer must be observed at all times. Oxidation is carried out according to the instructions of the alloy manufacturer.



After grinding, the framework is carefully blasted with type 100 aluminium oxide Al_2O_3,…



… thoroughly cleaned, …

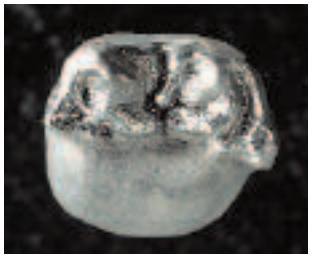


… and oxidized according to the instructions of the alloy manufacturer.

Correctly oxidized IPS d.SIGN alloys

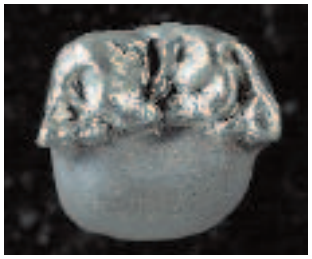
Firing parameters for the oxide firing of IPS d.SIGN 98

T	B	S	t ↗	H	V_1	V_2
925°C 1697°F	403°C 757°F	1 min. 1 min.	80°C 144°F	5 min. 5 min.	– –	– –



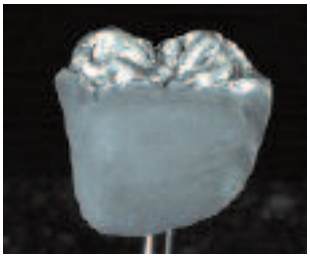
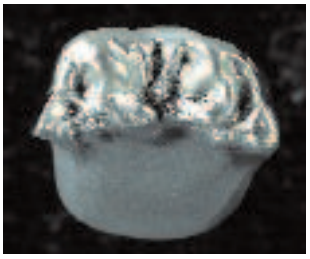
Firing parameters for the oxide firing of IPS d.SIGN 96

T	B	S	t ↗	H	V_1	V_2
950°C 1742°F	403°C 757°F	1 min. 1 min.	80°C 144°F	5 min. 5 min.	450°C 842°F	950°C 1742°F



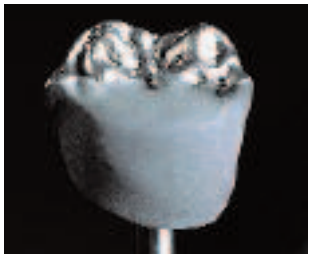
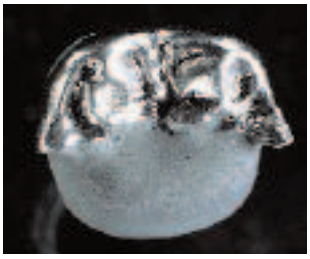
Firing parameters for the oxide firing of IPS d.SIGN 91

T	B	S	t ↗	H	V_1	V_2
1010°C 1850°F	403°C 757°F	1 min. 1 min.	80°C 144°F	5 min. 5 min.	450°C 842°F	1010°C 1850°F

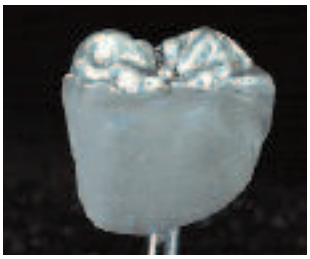
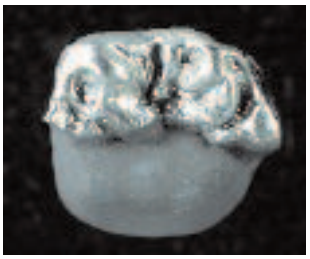
Firing parameters for the oxide firing of IPS d.SIGN 53

T	B	S	t ↗	H	V_1	V_2
1010°C 1850°F	403°C 757°F	1 min. 1 min.	80°C 144°F	10 min. 10 min.	– –	– –

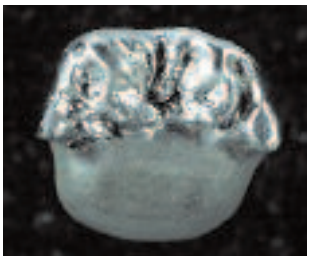
Firing parameters for the oxide firing of IPS d.SIGN 84

T	B	S	t ↗	H	V_1	V_2
1010°C 1850°F	403°C 757°F	1 min. 1 min.	80°C 144°F	5 min. 5 min.	450°C 842°F	1010°C 1850°F

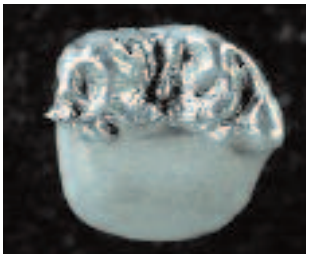
Firing parameters for the oxide firing of IPS d.SIGN 30

T	B	S	t ↗	H	V_1	V_2
925°C 1697°F	403°C 757°F	1 min. 1 min.	80°C 144°F	5 min. 5 min.	450°C 842°F	925°C 1697°F

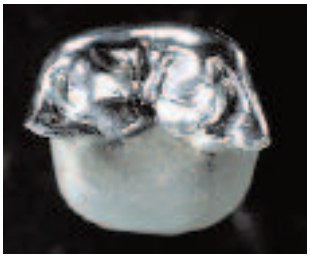
Firing parameters for the oxide firing of IPS d.SIGN 67

T	B	S	t ↗	H	V_1	V_2
1010°C 1850°F	403°C 757°F	1 min. 1min.	80°C 144°F	5 min. 5 min.	– –	– –

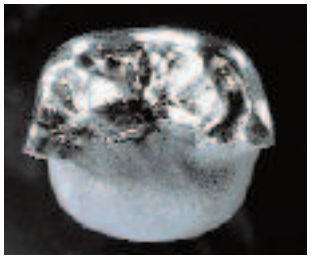
Firing parameters for the oxide firing of IPS d.SIGN 15

T	B	S	t ↗	H	V_1	V_2
950°C 1742°F	403°C 757°F	1 min. 1 min.	80°C 144°F	1 min. 1 min.	– –	– –

Firing parameters for the oxide firing of IPS d.SIGN 59

T	B	S	t ↗	H	V_1	V_2
1010°C 1850°F	403°C 757°F	1 min. 1 min.	80°C 144°F	10 min. 10 min.	– –	– –

Explanation of firing parameter symbols

T = Top temperature
B = Low temperature
S = Dry time
H = hold time a top temperature
t↗ = heat rate of climb
V_1 = Vacuum start temperature
V_2 = Vacuum off temperature

The product lines may vary from country to country.

Some alloy types require pickling after oxide firing and/or blasting of the oxide layer (observe instructions of the alloy manufacturer). After that, thoroughly clean the framework with steam or in the ultrasonic bath. Oxidation can be considered a 'cleaning firing' and is also used to check the quality of the framework surface.

1st opaquer firing (wash firing)

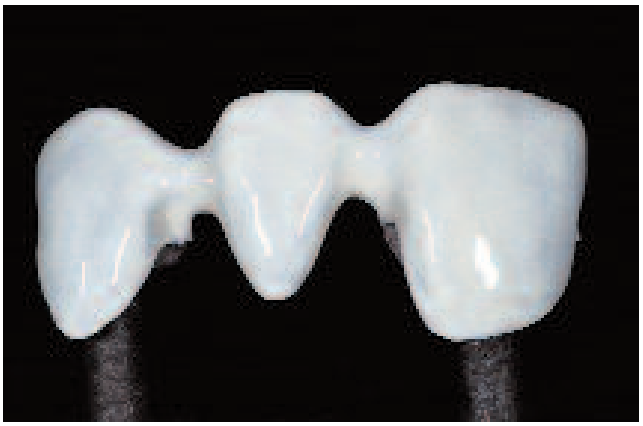
Extrude the desired amount of the ready-to-use opaquer paste from the syringe and mix thoroughly. Unlike with powder/liquid systems, the opaquer paste **must not** be excessively mixed with opaquer liquid. The opaquer liquid is **exclusively** used to adjust the consistency of the paste opaquer and to rewet dried opaquer that has been used several times. Caution: Do not excessively dilute the paste opaquer with the opaquer liquid. Do not dilute the material with water.

Extrude opaquer from the syringe and mix thoroughly.

Unlike with powder/liquid systems, the opaquer paste must not be excessively mixed with opaquer liquid.

Apply the first opaquer layer (wash) thinly using a brush. Smooth out any roughness on the metal surface since the wash is the most important connection between the metal oxide surface and the ceramic.

Make sure to smooth out any roughness on the metal surface.



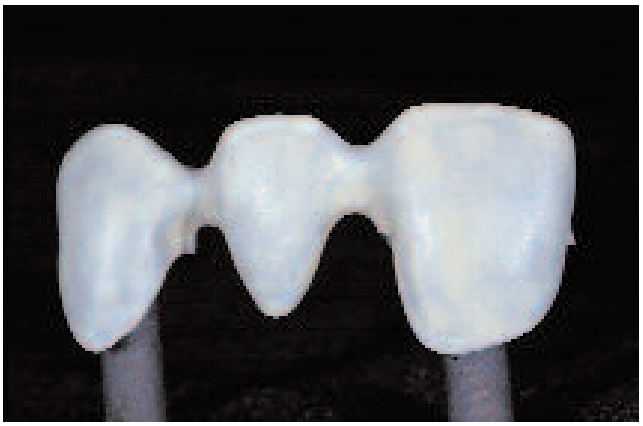
Apply wash in a thin layer.

Firing parameters for the 1st opaquer firing (wash firing)

T	B	S	t ↗	H	V_1	V_2
900°C 1652°F	403°C 757°F	6 min. 6 min.	80°C 144°F	1 min. 1 min.	450°C 842°F	899°C 1650°F

Important
If furnaces from other manufacturers are used, these parameters have to be adjusted accordingly.

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



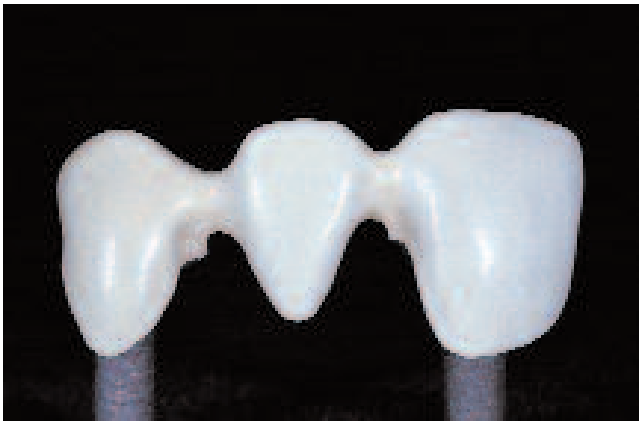
Subsequently, the restoration is fired using the stipulated firing parameters.

2nd opaquer firing

Apply the second opaquer layer in such a way that the metal framework is entirely covered with opaquer, i.e. as much as necessary and as little as possible.
For each individual situation, five ready-mixed Intensive Opaquers are available to meet exacting, aesthetic requirements. The Intensive Opaquers are applied before the second opaquer firing in the desired areas (e.g. in the cervical, incisal, occlusal, or palatal area).

Apply the 2nd opaquer layer so that it covers the entire framework.

TIP:
To enhance in-depth fluorescence and to improve the bond between the ceramic and opaquer, the applied, unfired opaquer surface may be sprinkled with the desired shade of IPS d.SIGN Margin material. Carefully blow off any excess materials after a short reaction time of the IPS d.SIGN Margin powder on the opaquer surface.



Subsequently, the restoration is fired using the stipulated firing parameters.

Fired opaquer layer on the model with detachable segments.

The fired opaquer should have a silky-mat appearance (egg-shell gloss). The appearance of the fired opaquer can be compared with the corresponding material shade guide. If the gloss is too high, the firing temperature of the 2nd opaquer firing may be reduced to the firing temperature of the subsequent firing.

Firing parameters for the 2nd opaquer firing

T	B	S	t ↗	H	V_1	V_2
890°C 1634°F	403°C 757°F	6 min. 6 min.	80°C 144°F	1 min. 1 min.	450°C 842°F	889°C 1632°

Important
If furnaces of other manufacturers are used, these parameters have to be adjusted accordingly. The temperature increase for the 2nd opaquer firing must not be below 80 °C/144 °F / min.

IPS d.SIGN Opaquer F

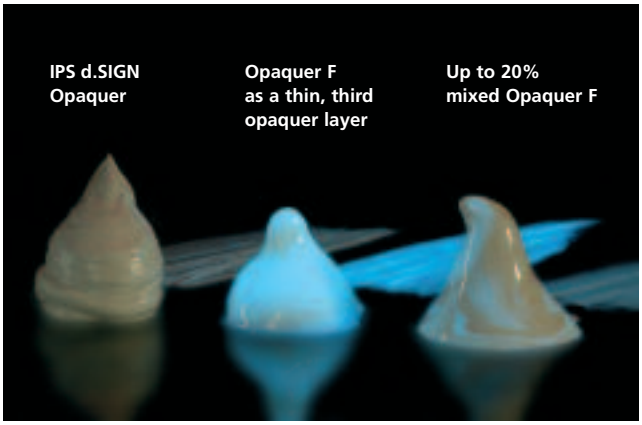
For more in-depth fluorescence.

As a 3rd firing:
Apply the IPS d.SIGN Opaquer F as a very thin, third opaquer layer and fire separately.
Important: dilute the paste opaquer with an adequate amount of IPS d.SIGN Opaquer Liquid.

Mix with current IPS d.SIGN opaquers:
Mix up to 20 % of Opaquer F with the conventional IPS d.SIGN Opaquer before the second layer is applied.

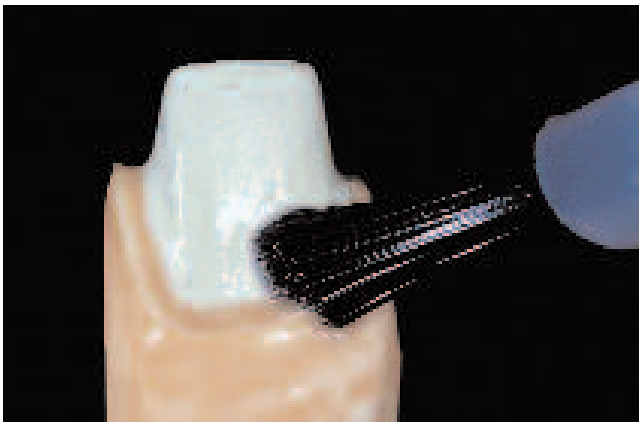
Firing parameters for the IPS d.SIGN Opaquer F

T	B	S	t ↗	H	V_1	V_2
890°C 1634°F	403°C 757°F	6 min. 6 min.	80°C 144°F	1 min. 1 min.	450°C 842°F	889°C 1632°



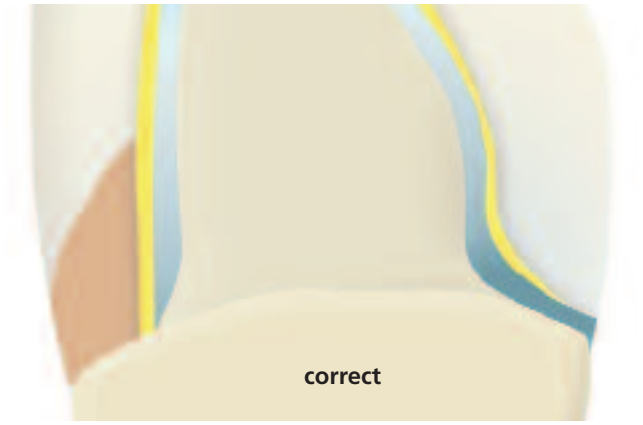
1st shoulder firing

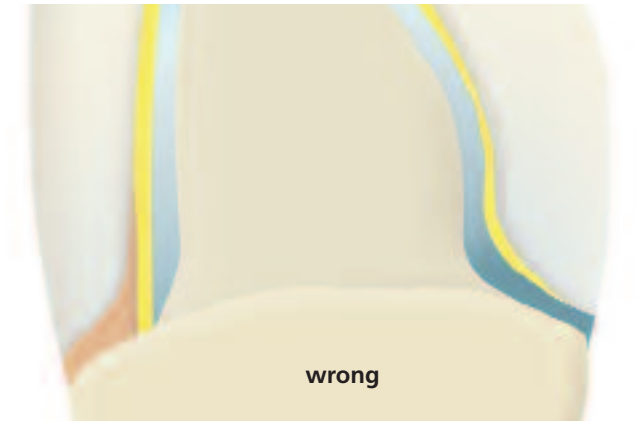
A porcelain shoulder can be fabricated on the metal framework after the opaquer firing if the necessary space has been provided during finishing. First, isolate the gypsum die with IPS Margin Sealer. Once this material has dried, apply IPS Ceramic Separating Liquid.



Isolate the model die using IPS Margin Sealer and IPS Ceramic Separating Liquid.

After that, generously apply the IPS d.SIGN Margin material in the desired tooth shade in the cervical area in the shape of a drop (i.e. the outer surface of the ceramic material is given a convex design) and dry. For aesthetically exacting work, four intensive Margin materials are available. They may either be mixed or applied alone.



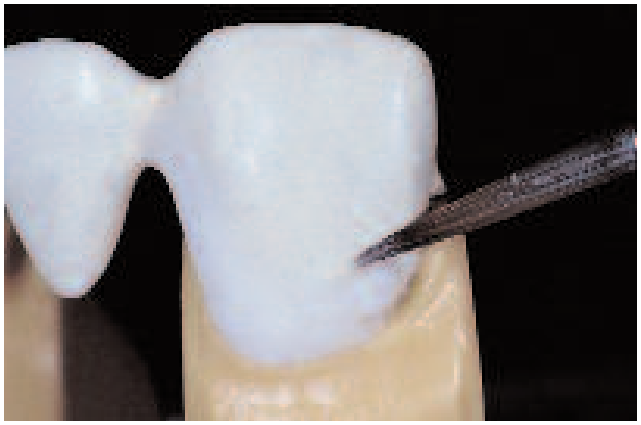


Tip:
When designing a ceramic shoulder (particularly for bridges), the Margin material may be applied higher up in the proximal areas. This will reduce interdental shrinkage during the subsequent dentin and incisal firings.

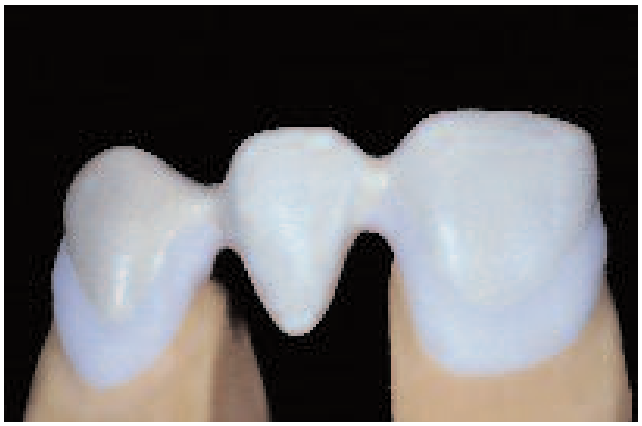
Firing parameters for the 1st shoulder firing

T	B	S	t ↗	H	V_1	V_2
890°C 1634°F	403°C 757°F	6 min. 6 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	889°C 1632°F

Important
If furnaces from other manufacturers are used, these parameters have to be adjusted accordingly.

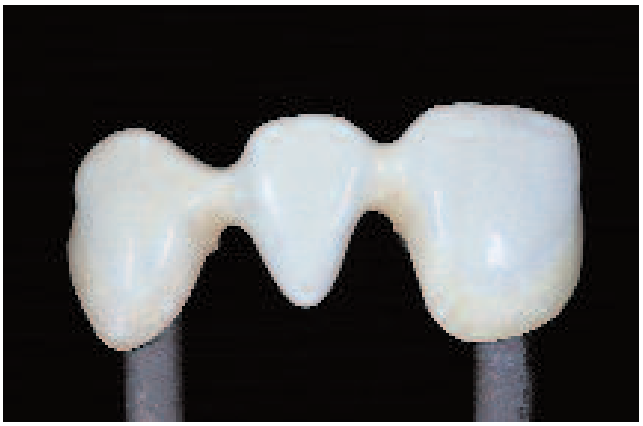


Apply IPS d.SIGN Margin material generously in the cervical area in the shape of a drop…



… and dry.

Carefully remove the framework with the applied and dried shoulder material from the die.

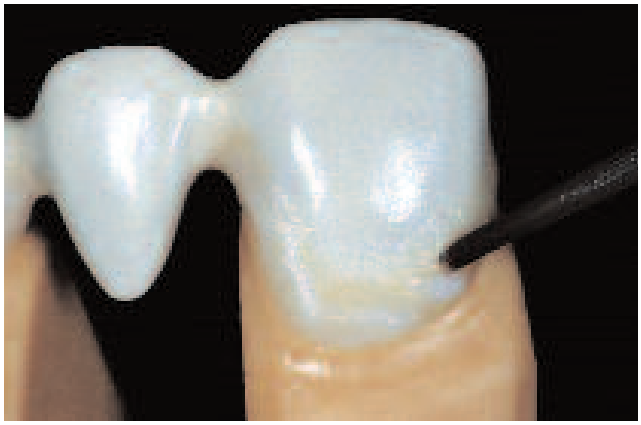


Fire the restoration using the firing parameters for the 1st shoulder firing.

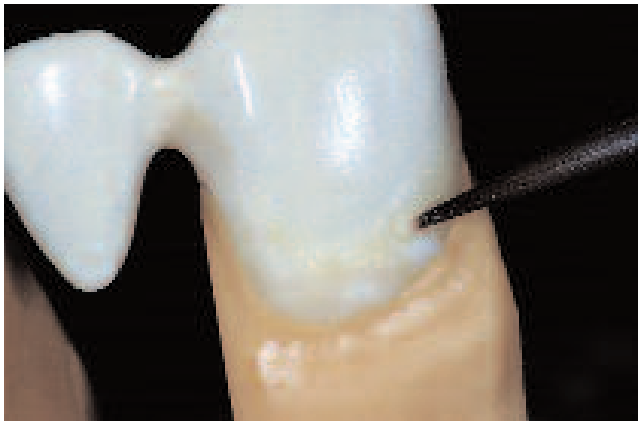
Sinter shrinkage of the shoulder after the 1st shoulder firing.

2nd shoulder firing

After the firing, the shoulder may have to be slightly adjusted by grinding. The accuracy of fit (sinter shrinkage) has to be reestablished by means of a 2nd shoulder firing. Use the same Margin materials as for the 1st shoulder firing for that purpose. First, however, isolate the die again with IPS Ceramic Separating Liquid. Then, supplement the missing areas by carefully applying the shoulder material in the space resulting from the 1st shoulder firing, thus providing optimum accuracy of fit of the ceramic shoulder. After that, complete the shoulder, dry, carefully remove the framework from the die, and place it on the firing tray.



Apply the shoulder material ...



... to reestablish the cervical accuracy of fit of the shoulder.

Framework with applied and dried shoulder material.

Firing parameters for the 2nd shoulder firing

T	B	S	t ↗	H	V_1	V_2
890°C 1634°F	403°C 757°F	6 min. 6 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	889°C 1632°F

Important
If furnaces of other manufacturers are used, these parameters have to be adjusted accordingly.

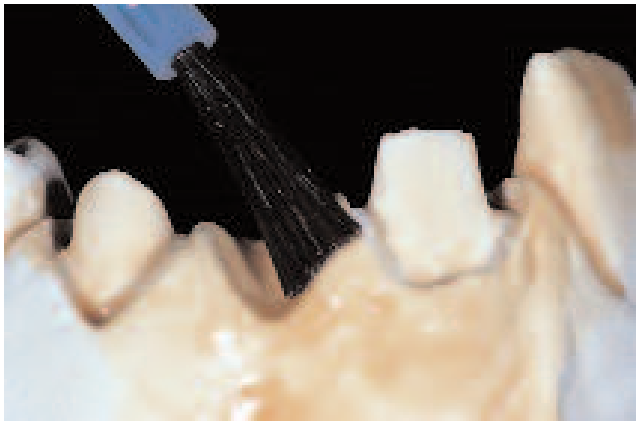
The restoration is fired using the firing parameters for the 2nd shoulder firing.

Framework with fired ceramic shoulder.

Any necessary adjustments of the ceramic shoulder may be carried out using IPS d.SIGN Margin Add-On material. The use of this material is explained under 'Corrective Firing' on page 47.

1st dentin and incisal firing

Before layering the Dentin and Incisal materials, sealing the model is a very important step. In this way, the ceramic material is prevented from drying out or sticking to the model. Use the IPS Model Sealer and the IPS Ceramic Separating Liquid to seal and lubricate the gypsum die and the adjoining areas of the model.



Use the IPS Model Sealer and the IPS Ceramic Separating Liquid to seal and lubricate the gypsum die and the adjoining areas of the model.

Five different IPS d.SIGN build-up liquids are available, which are used according to the individual requirements (see page 18 for a detailed description). Depending on the type of build-up liquid used, various closing times are possible.

Recommended drying times:

IPS d.SIGN mixed with	
Build-Up Liquid Light	approx. 4–5 minutes
Build-Up Liquid Medium	approx. 6–7 minutes
Build-Up Liquid Premium	approx. 8–9 minutes
Build-Up Liquid Optimum 1	approx. 6–7 minutes
Build-Up Liquid Optimum 2	approx. 6–7 minutes

The recommended drying times depend on how much moisture was absorbed by the ceramic and on whether or not the restorations was predried.

For large restorations, such as bridges and implant superstructures, the number of corrective firings can be reduced by conducting a preliminary firing using either Deep Dentin or dentin material. When using this technique apply the Deep Dentin or dentin material in areas where maximum sintering shrinkage is anticipated. Fire this material using the 1st dentin and incisal firing parameters.

To achieve an optimum bond between the ceramic materials and the opaquer surface, apply the ceramic material in small increments, particularly in the cervical and interdental areas (for bridges) and slightly roughen it. In this way, the adaption of the Deep Dentin or Dentin materials on the opaquer surface is enhanced.

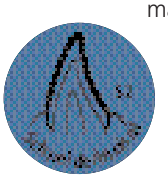
IPS d.SIGN Deep Dentin

In order to achieve true-to-nature shade effects in areas where space is limited, IPS d.SIGN Deep Dentin materials are used. They are directly applied on the opaquer layer. For pontics and crowns margins thinning towards the metal, Deep Dentin material of the appropriate tooth shade is applied in the cervical or basal area to enhance the shade.

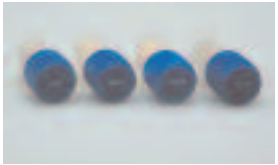
Deep Dentin layering to enhance the shade in the cervical area.

IPS d.SIGN Dentin, Incisal, and Transparent materials

Next, outline the mamelon area with a layer of Dentin material. Individually. Another option is to contour the fully anatomical shape of the tooth. If this procedure is used, the contoured crown has to be reduced in the labial, incisal-mesial, and distal areas. The mamelon shape is, once again, only outlined. Irrespective of the method used, make sure to provide adequate space for the subsequent application of the Incisal and Transparent materials.



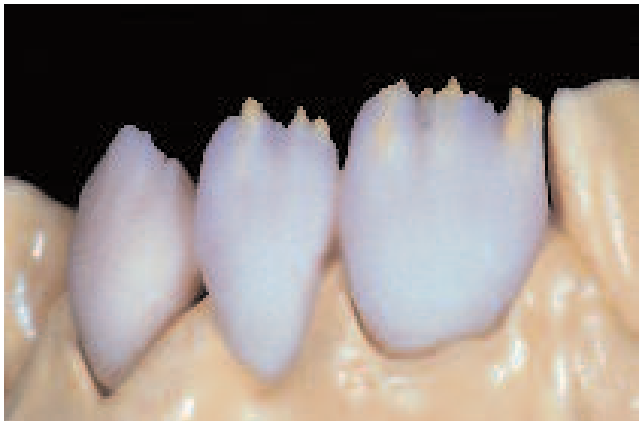
IPS d.SIGN Essence



IPS d.SIGN Essence ceramic stains may be added to any IPS d.SIGN layering materials for characterization. The mixing ratio depends on the desired shade effect of the layering material. While IPS d.SIGN Stains and Shades are only suitable for surface characterization, IPS d.SIGN Essence stains may be used for both intensifying the shade of the layering material and surface characterization of the fired restoration.

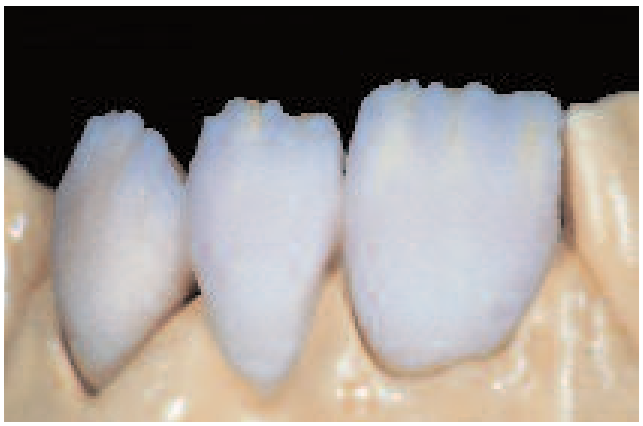
Labial layering

The fully anatomical shape contoured with dentin material …..

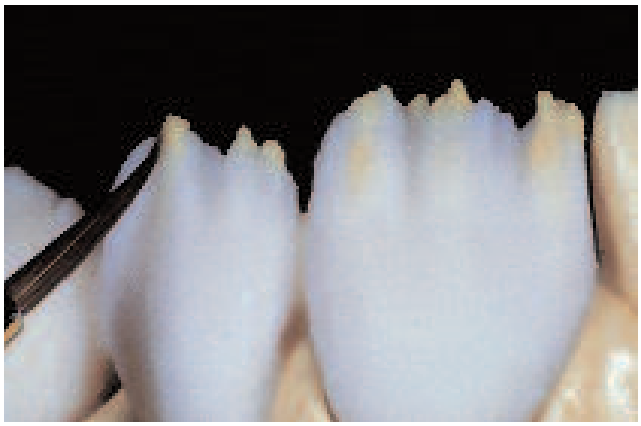


…..using Mamelon materials salmon and light.

….is reduced to provide adequate space for the subsequent application of the incisal material.



Completion of the incisal third using opalescent materials (Effect 1)….

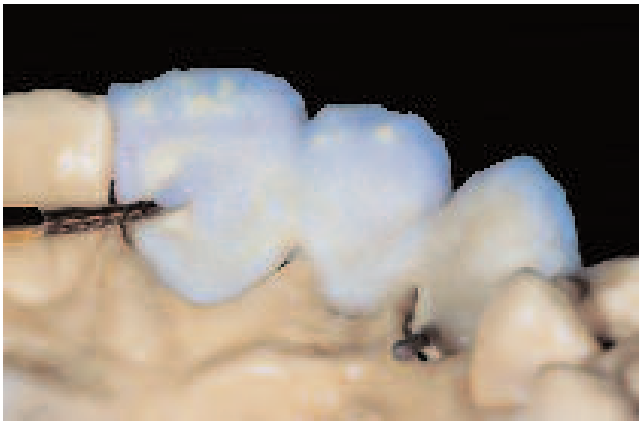


Individual and easy build-up of the incisal area …..

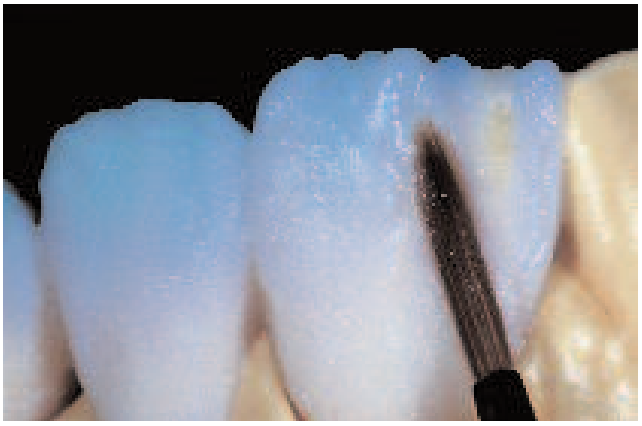
….and Special Incisal or Insert materials.

Palatal layering

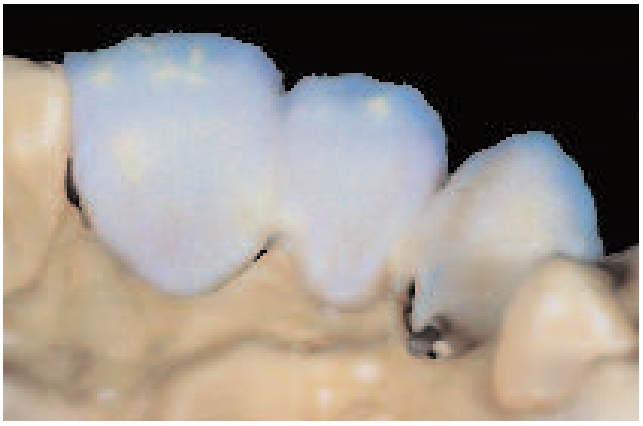
In the labial area, the restoration is completed using Incisal and ……



The palatal fossa of the restoration is covered with Palatal Dentin material.

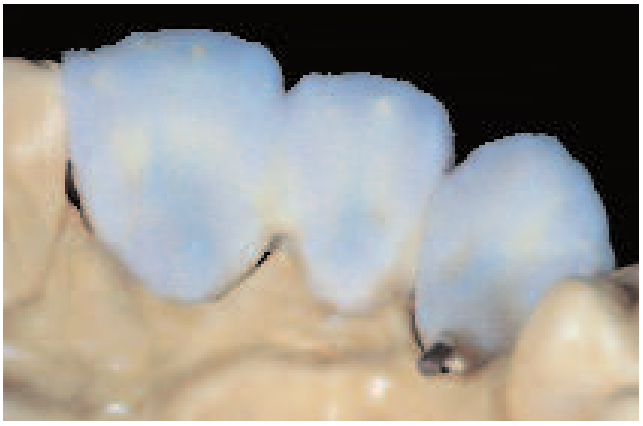


…..Transparent materials by means of over-contouring the labial….



The marginal ridges are lined with Dentin material.

….and incisal areas.



Then, the tuberculum and the marginal ridges are covered with Incisal and Transparent materials.

Once the contact points have been provided, the bridge restorations…..

are separated in the interdental spaces down to the opaquer using a sharp instrument (e.g. thin scalpel, razor blade).

Condensing the ceramic surface (after contouring) using a large, dry brush, makes it more homogeneous, which prevents the ceramic from pulling away from the margin. Before firing, the entire bridge units must be separated using a thin blade and cutting through the ceramic down to the opaquer. Moreover, a visual check must be made to make sure that all areas are properly covered with ceramic prior to firing.

– Make sure that the IPS d.SIGN ceramic materials do not dry out during layering.

– If necessary, the build-up liquids may be diluted with distilled water in a 1:1 ratio

– The materials should not be excessively condensed during layering.

– Blot the completely layered restoration using an absorbent tissue.

– Do not dry the restoration with a hair dryer, since this will dry out the surface thus preventing the underlying liquid from escaping. This may result in delamination of the ceramic material in the interdental area, particularly in bridge reconstructions.

– Basically, a prolonged pre-drying time is advantageous: The required period is approx. 10 minutes on the cooling tray. If slow-evaporating liquids (Build-Up Liquid Premium) are used, this drying period is very important

– Provide adequate support for bridges on the firing tray.

– Position the firing tray in the furnace only after the head has completed its opening sequence (once the buzzer has sounded).

Firing parameters for the 1st dentin and incisal firing

T	B	S	t ↗	H	V_1	V_2
870°C 1598°F	403°C 757°F	4–9 min. 4–9 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	869°C 1596°F

Important
Depending on the size of the object and the build-up liquid used, the closing time ranges between 4 and 9 minutes. If furnaces of other manufacturers are used, these parameters have to be adjusted accordingly.

Then the restoration is fired using the firing parameters for the 1st dentin and incisal firing.

The fired restorations demonstrate a slight gloss.

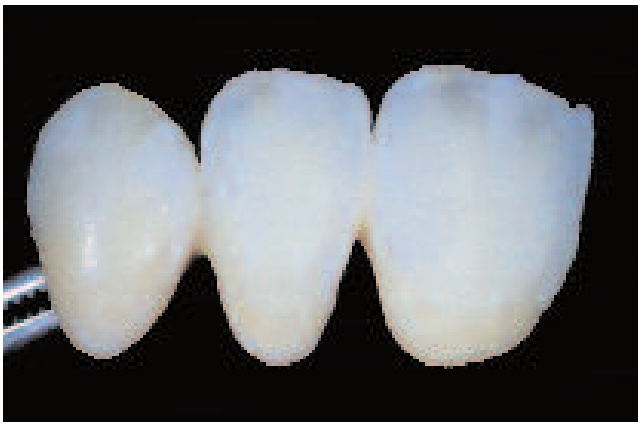
2nd dentin and incisal firing

After the first dentin firing, the restoration is contoured and cleaned. After that, any deficient areas are supplemented with the same materials used for the 1st dentin and incisal firing. The interdental areas and proximal contact points must be given special attention.
Conduct the corrective firing/2nd dentin and incisal firing following the same firing parameters used for the 1st dentin and incisal firing.

Clean the restoration thoroughly before the 2nd dentin and incisal firing. Polishing beads must not be used under any circumstances.

... and fired using the firing parameters for the 2nd dentin and incisal firing.

Before completion of the restoration, the fired restoration can be tried in to make sure that the shade, shape, and function of the layered restoration corresponds with the patient's individual situation.



The proximal areas are supplemented with the same materials used for the 1st dentin and incisal firing.

The restoration is then adjusted using Incisal and Transparent materials...

Firing parameters for the 2nd dentin and incisal firing

T	B	S	t ↗	H	V_1	V_2
870°C 1598°F	403°C 757°F	4–9 min. 4–9 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	869°C 1596°F

Important
If furnaces of other manufacturers are used, these firing parameters have to be adjusted accordingly.

Preparing the restoration for glaze firing

Prepare the restoration for glaze firing by providing a true-to-nature surface textures, such as growth lines and convex/concave areas.

Providing a true-to-nature surface texture…..

including growth lines and convex/concave areas.

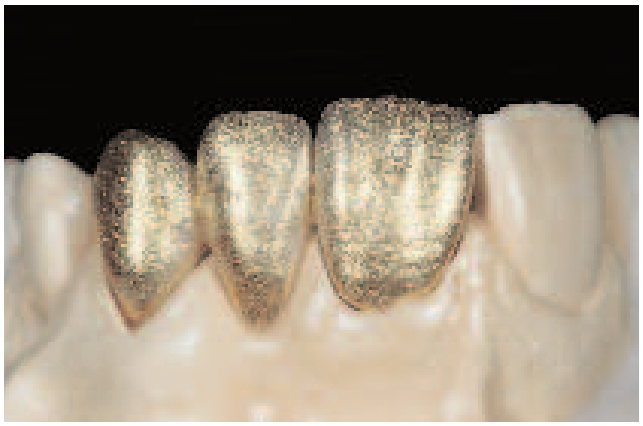
Prepolish the prominent areas using silicone polishers.

Completed restoration…..

…..features a true-to-nature surface texture.

TIP:
This surface texture may be made visible with the help of gold and/or silver dust.

Subsequently, the restoration is cleaned with steam so that the surface is free of dirt and grease.
Make sure that the entire gold/silver dust is removed.



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

Stains and characterization firing

To apply shade corrections and individual characterizations, a wide shade range is available.

IPS d.SIGN Shades

These dentin stains are used for subsequent shade adjustments of IPS d.SIGN restorations. They are exclusively used for surface staining, not for internal shading of the layering materials.

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

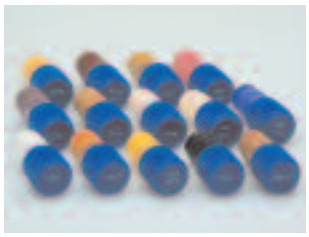
Remove the desired amount of Shade from the syringe and mix with IPS d.SIGN Glazing and Staining liquid to the desired consistency.

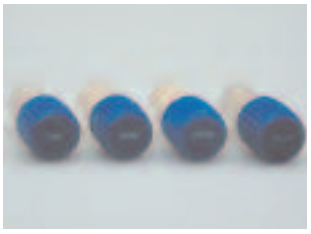
Apply IPS d.SIGN Shade in the cervical area and the body of the restoration. Check the shade adjustment achieved with the help of the shade guide.

If only minor shade adjustments are required, they may be done during the glaze firing.

Shade adjustment using IPS d.SIGN Shade.

IPS d.SIGN Stains and IPS d.SIGN Essence

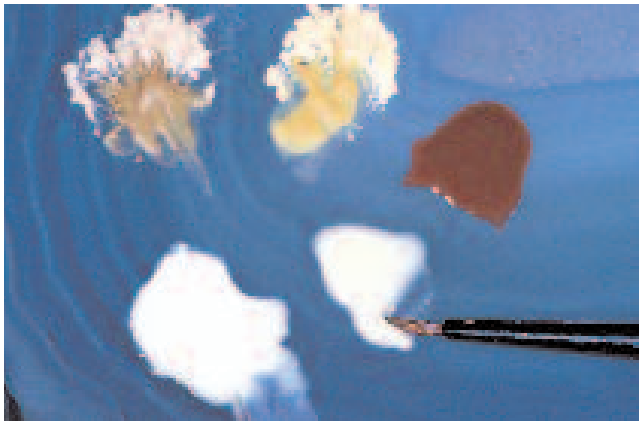




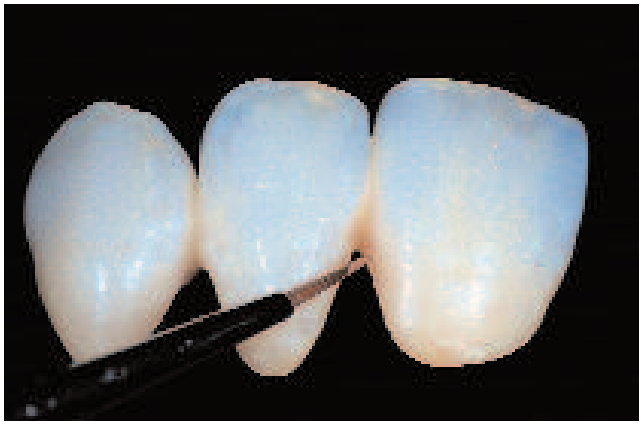
An extensive range of paste and powder stains for individualized characterizations on the tooth surface. IPS d.SIGN Stains are exclusively used for surface characterizations, not for mixing with the layering materials.

Important
Materials in paste form must not be mixed with powder materials.

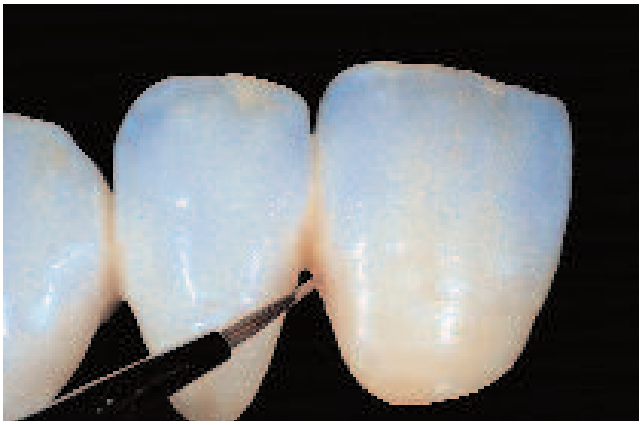
Remove the desired Stains and Essence material from their container and slightly thin to the desired consistency using IPS d.SIGN Glaze and Stain liquid and mix.



Apply individualized characterizations on the ceramic surface, e.g. discoloration or enamel stains.



Application of individualized characterizations on the ceramic surface,…..



… such as discoloration or enamel stains.

Subsequently, the restoration is fired using the firing parameters for the stain and characterization firing.

The stains may be fired with a separate stain firing. If only minor shade adjustments and individualized characterizations are applied, however, the materials may be fired together with the glaze firing.

Avoid pooling and the application of too thick layers.

More intensive shades are achieved by several staining procedures, not by applying thicker layers.

If the desired shade is not achieved, repeat the stain firing using the same firing parameters.

Firing parameters for the stain and characterization firing

T	B	S	t ↗	H	V_1	V_2
830°C 1526°F	403°C 757°F	4 min. 4 min.	60°C 108°F	1–2 min. 1–2 min.	450°C 842°F	829°C 1524°F

Important
If furnaces of other manufacturers are used, these parameters have to be adjusted accordingly.

Check the shade after the stain and characterization firing.

Glaze firing

For the glaze firing, you have several options, depending on the desired working procedure:
- Glaze firing **without** IPS d.SIGN Glazing material for a true-to-nature, silky-mat gloss.
- Glaze firing **with** IPS d.SIGN Glazing material for a high gloss.
- Glaze firing **without** IPS d.SIGN Glazing material and simultaneous adjustment of the ceramic shoulder using IPS d.SIGN Margin Add-On (see page 47).
- Glaze firing **with** IPS d.SIGN Glazing material and simultaneous adjustment of the ceramic shoulder using IPS d.SIGN Margin Add-On (see page 47).

Method 1

Glaze firing without glazing material

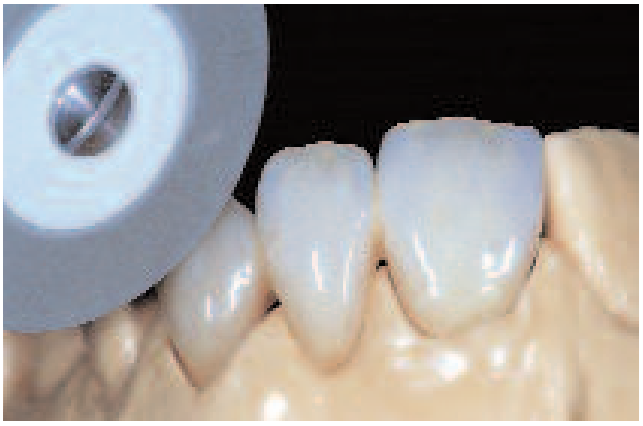
Slightly wet the restoration using IPS d.SIGN Glaze and Stain liquid and apply shade adjustments and/or individualized characterizations. Position the restoration on the honey-combed firing try and fire.
If the glaze firing is conducted without glazing materials, the stains should not cover too large an area.
After firing, the gloss of the restoration may be adjusted to meet the patient's individual requirements by polishing with rubber polishers, felt wheels, and pumice.

Firing parameters for glaze firing without glazing material

T	B	S	t ↗	H	V_1	V_2
870°C 1598°F	403°C 757°F	4 min. 4 min.	60°C 108°F	0.5–1 min. 0.5–1 min.	450°C 842°F	869°C 1596°F

The following basic rule applies: The longer the hold time (H), the higher the gloss. Depending on the desired gloss, the holding time is 0.5–1 min.

Important
If furnaces of other manufacturers are used, these parameters have to be adjusted accordingly.



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

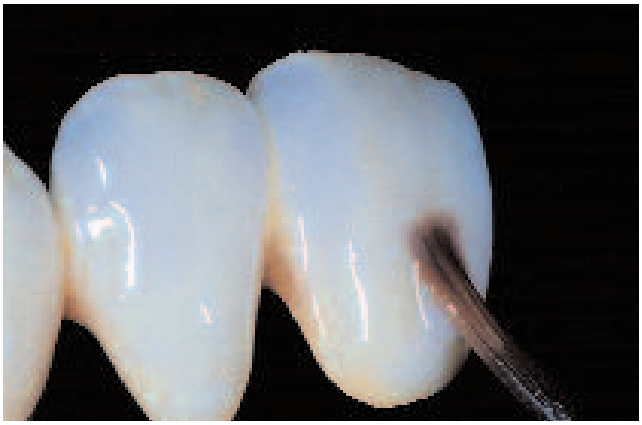
Method 2

Glaze firing with glazing material

Remove IPS d.SIGN Glazing material from it's container and mix thoroughly. If another consistency is desired, the material can be slightly diluted with IPS d.SIGN Glazing and Staining liquid. After that, apply glazing material in the usual manner using a brush. Avoid pooling and the application of too thick layers. If desired, make minor shade adjustments on the applied glazing material using IPS d.SIGN Shade, Stains, and Essence.

Apply minor shade adjustments on the applied glazing material using IPS d.SIGN Shade, Stains, and Essence.

Apply glazing material in the usual manner using a brush.



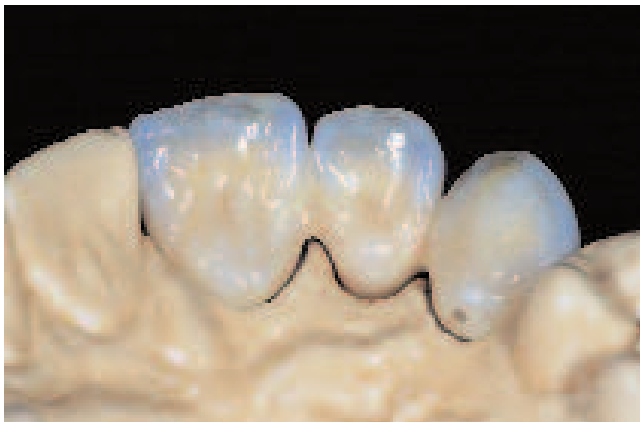
Avoid pooling and the application of too thick layers.

Firing parameters for glaze firing with glazing material

T	B	S	t ↗	H	V_1	V_2
830°C 1526°F	403°C 757°F	4 min. 4 min.	60°C 108°F	1–2 min. 1–2 min.	450°C 842°F	829°C 1524°F

Important
If furnaces of other manufacturers are used, these parameters have to be adjusted accordingly.

Completed IPS d.SIGN restorations



IPS d.SIGN – Corrective firings (Add-On)

After the try-in of a restoration, minor shape adjustments, e.g. contact points, tissue side of pontic, shoulder adjustments, may be necessary. There are two add-on materials to meet different requirements:
– IPS d.SIGN Margin Add-On material
– IPS d.SIGN Add-On material

1. Shoulder adjustment with IPS d.SIGN Margin Add-On
To make adjustments to the shoulder porcelain, the IPS d.SIGN Margin add-on materials is available. It is slightly shaded and, depending on the application, can be fired using the same parameters as those used for glaze firing (with or without glazing material).

Before the final adjustments to the porcelain shoulder are applied, isolate the gypsum die with IPS d.SIGN Margin separating liquid and IPS d.SIGN Ceramic separating liquid.

Depending on the individual preference, IPS d.SIGN Margin add-on can be processed using two different methods:

Method 1
– Mix IPS d.SIGN Margin Add-On with the IPS d.SIGN Margin material in a 1:1 ratio and then mix with IPS d.SIGN Margin build-up liquid. Make the necessary adjustments to the porcelain shoulder and then fire the restoration using the same firing parameters as those used for glaze firing **without** glazing material.

Firing parameters for corrective firing with IPS d.SIGN Margin Add-on (1:1) (glaze firing **without** glazing material)

T	B	S	t ↗	H	V_1	V_2
870°C 1598°F	403°C 757°F	4 min. 4 min.	60°C 108°F	0.5–1 min. 0.5–1 min	450°C 842°F	869°C 1596°F

Method 2
– Mix IPS d.SIGN Margin Add-on (alone) with IPS d.SIGN Margin build-up liquid and make the necessary adjustments to the porcelain shoulder. After that, fire the restoration using the same firing parameters as those used for glaze firing **with** glazing material.

Firing parameters for corrective firing with IPS d.SIGN Margin Add-on (alone) (glaze firing **with** glazing material)

T	B	S	t ↗	H	V_1	V_2
830°C 1526°F	403°C 757°F	4 min. 4 min.	60°C 108°F	1–2 min. 1–2 min.	450°C 842°F	829°C 1524°F

2. Corrective firing with IPS d.SIGN Add-On material
For any necessary corrective firing, e.g. contact areas or tissue side of pontic , IPS d.SIGN Add-on is available. This low firing add-on material demonstrates medium incisal opacity. Depending on your preference, you may chose between two different methods when working with IPS d.SIGN Add-on material.

Method 1 (dentin/incisal adjustments)
– Mix IPS d.SIGN Add-on material with any dentin or incisal material in a 1:1 ratio and then mix with the desired build-up liquid. Make adjustments and fire.

Firing parameters for the corrective firing with IPS d.SIGN Add-on material (1:1)

T	B	S	t ↗	H	V_1	V_2
810°C 1490°F	403°C 757°F	4 min. 4 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	809°C 1488°F

Method 2 (contact areas)
– Mix IPS d.SIGN Add-on material with the desired build-up liquid. Make adjustments and fire.

Firing parameters for the corrective firing with IPS d.SIGN Add-on material (alone)

T	B	S	t ↗	H	V_1	V_2
750°C 1382°F	403°C 757°F	4 min. 4 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	749°C 1380°F

Important
If furnaces of other manufacturers are used, these parameters have to be adjusted accordingly.

After corrective firing, especially those involving large adjustments, the restorations will have to be polished with suitable rubber polishers.

Correct use of IPS d.SIGN Cervical Dentin D2/D3

If shades D2 or D3 have to be reproduced with IPS d.SIGN, Cervical Dentin D2/D3 is used. As the following images show (from top to bottom), the Cervical Dentin D2/D3 is directly layered onto the opaquer. Depending on the shade being reproduced, the dentin core is layered using either Dentin D2 or Dentin D3. After dentin build-up is complete the incisal layer is added using D.SIGN Incisal TS3.

IPS d.SIGN – Firing parameters

Firing parameters for the 1st opaquer firing (wash firing)

T	B	S	t ↗	H	V_1	V_2
900°C 1652°F	403°C 757°F	6 min. 6 min.	80°C 144°F	1 min. 1 min.	450°C 842°F	899°C 1650°F

Firing parameters for the 2nd opaquer firing

T	B	S	t ↗	H	V_1	V_2
890°C 1634°F	403°C 757°F	6 min. 6 min.	80°C 144°F	1 min. 1 min.	450°C 842°F	889°C 1632°

Firing parameters for the IPS d.SIGN Opaquer F

T	B	S	t ↗	H	V_1	V_2
890°C 1634°F	403°C 757°F	6 min. 6 min.	80°C 144°F	1 min. 1 min.	450°C 842°F	889°C 1632°

Firing parameters for the 1st shoulder firing

T	B	S	t ↗	H	V_1	V_2
890°C 1634°F	403°C 757°F	6 min. 6 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	889°C 1632°F

Firing parameters for the 2nd shoulder firing

T	B	S	t ↗	H	V_1	V_2
890°C 1634°F	403°C 757°F	6 min. 6 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	889°C 1632°F

Firing parameters for the 1st dentin and incisal firing

T	B	S	t ↗	H	V_1	V_2
870°C 1598°F	403°C 757°F	4–9 min. 4–9 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	869°C 1596°F

Firing parameters for the 2nd dentin and incisal firing

T	B	S	t ↗	H	V_1	V_2
870°C 1598°F	403°C 757°F	4–9 min. 4–9 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	869°C 1596°F

Firing parameters for the stain and characterization firing

T	B	S	t ↗	H	V_1	V_2
830°C 1526°F	403°C 757°F	4 min. 4 min.	60°C 108°F	1–2 min. 1–2 min.	450°C 842°F	829°C 1524°F

Firing parameters for glaze firing without glazing material

T	B	S	t ↗	H	V_1	V_2
870°C 1598°F	403°C 757°F	4 min. 4 min.	60°C 108°F	0.5–1 min. 0.5–1 min.	450°C 842°F	869°C 1596°F

Firing parameters for glaze firing with glazing material

T	B	S	t ↗	H	V_1	V_2
830°C 1526°F	403°C 757°F	4 min. 4 min.	60°C 108°F	1–2 min. 1–2 min.	450°C 842°F	829°C 1524°F

Firing parameters for corrective firing with IPS d.SIGN Margin Add-on (1:1) (glaze firing **without** glazing material)

T	B	S	t ↗	H	V_1	V_2
870°C 1598°F	403°C 757°F	4 min. 4 min.	60°C 108°F	0.5–1 min. 0.5–1 min	450°C 842°F	869°C 1596°F

Firing parameters for corrective firing with IPS d.SIGN Margin Add-on (alone) (glaze firing **with** glazing material)

T	B	S	t ↗	H	V_1	V_2
830°C 1526°F	403°C 757°F	4 min. 4 min.	60°C 108°F	1–2 min. 1–2 min.	450°C 842°F	829°C 1524°F

Firing parameters for the corrective firing with IPS d.SIGN Add-on material (1:1)

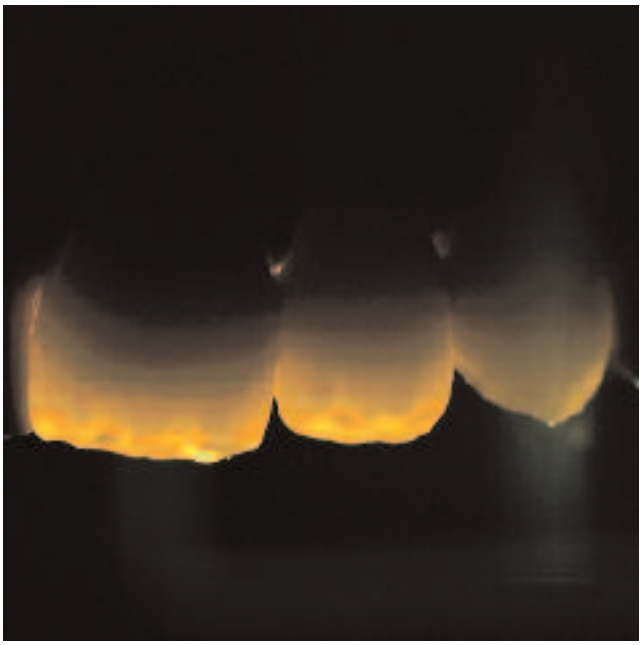
T	B	S	t ↗	H	V_1	V_2
810°C 1490°F	403°C 757°F	4 min. 4 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	809°C 1488°F

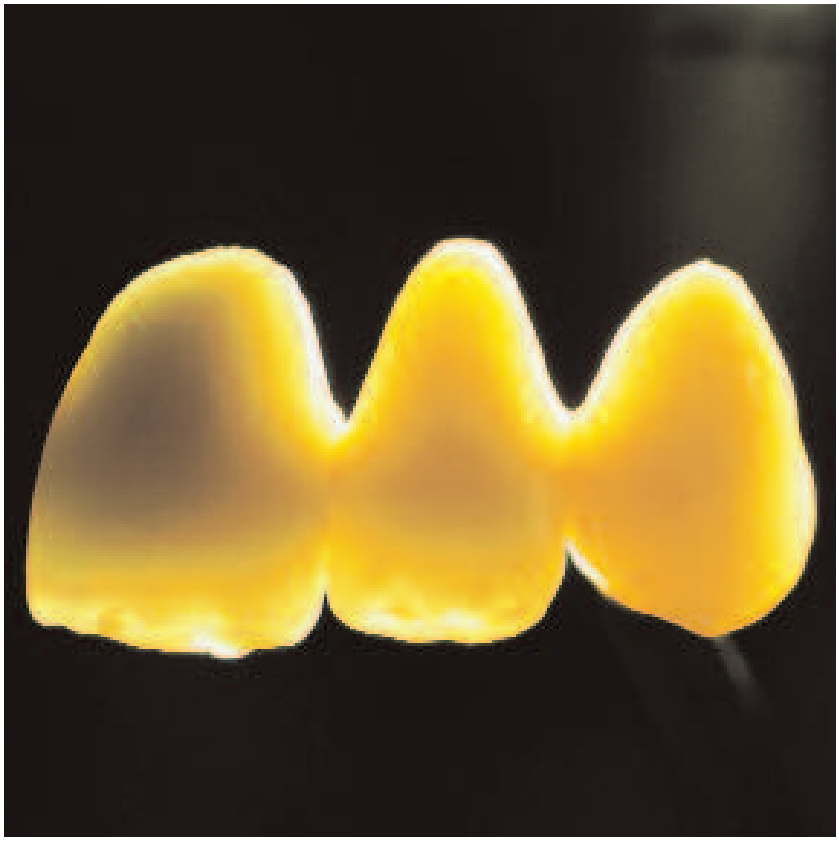
Firing parameters for the corrective firing with IPS d.SIGN Add-on material (alone)

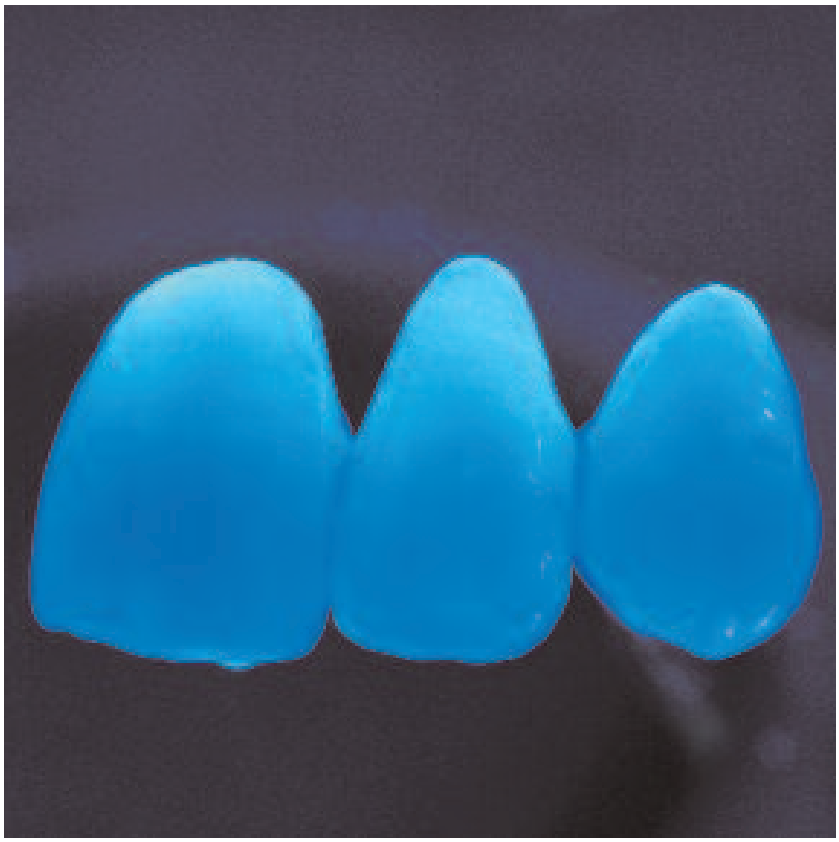
T	B	S	t ↗	H	V_1	V_2
750°C 1382°F	403°C 757°F	4 min. 4 min.	60°C 108°F	1 min. 1 min.	450°C 842°F	749°C 1380°F

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.

Feel the difference –

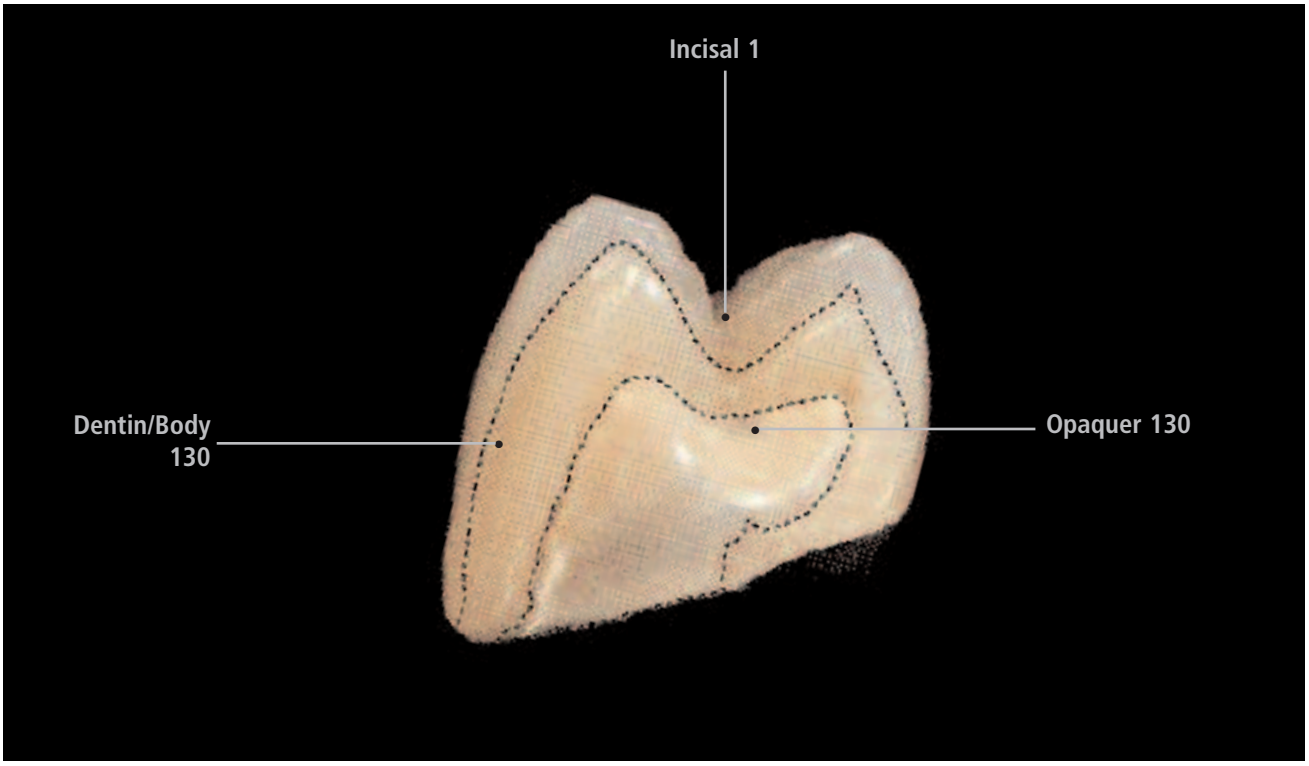


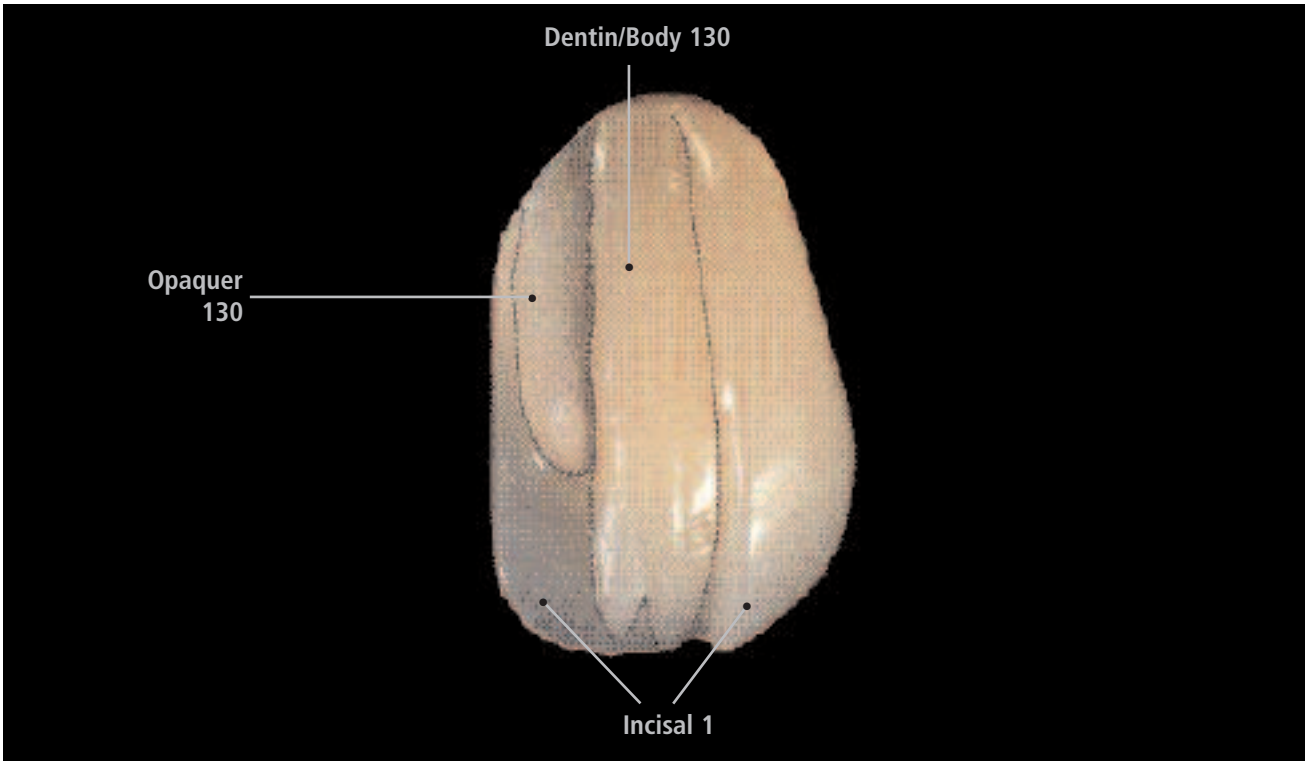




A look over the shoulder

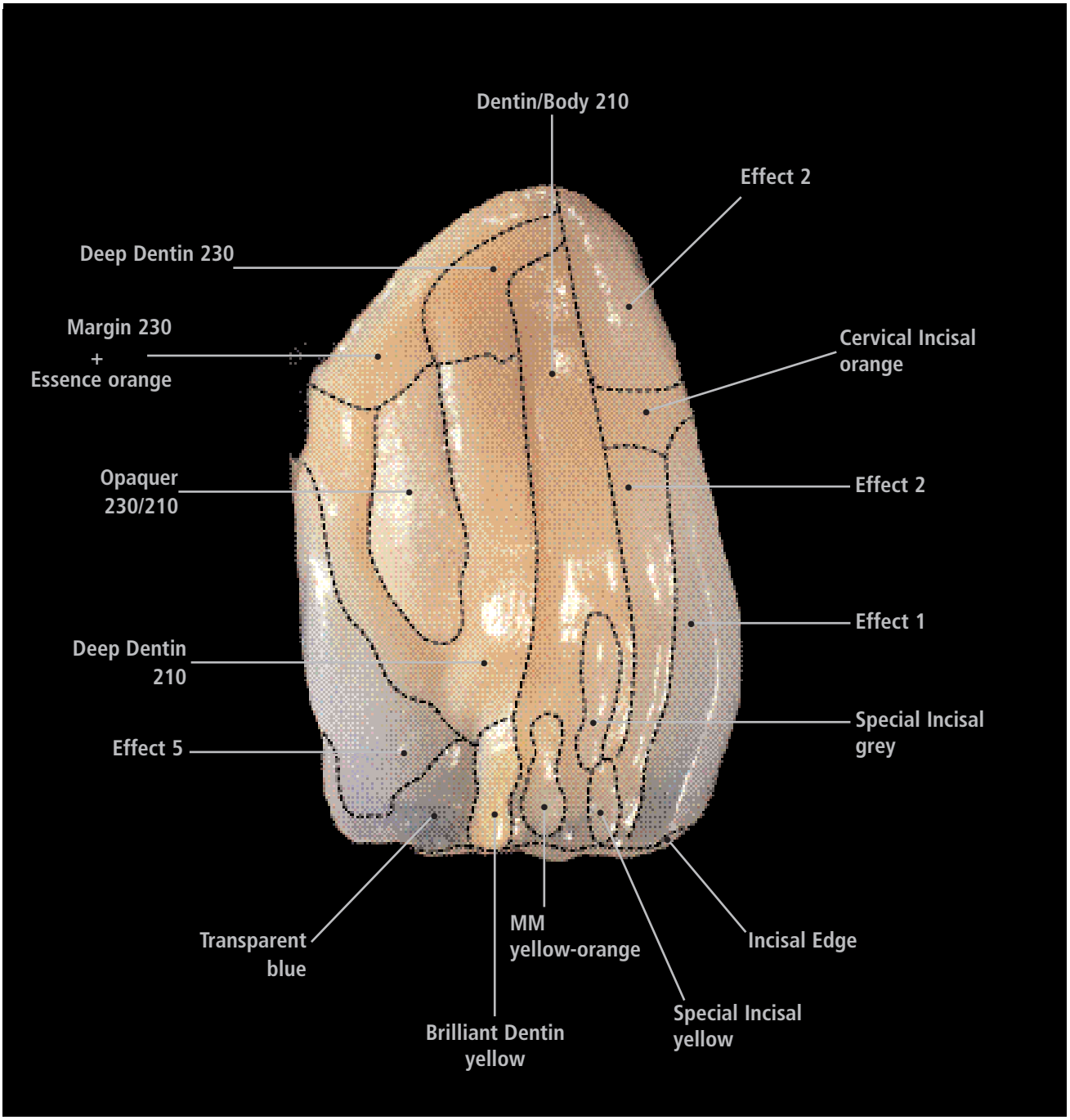
Examples of simple yet effective layering



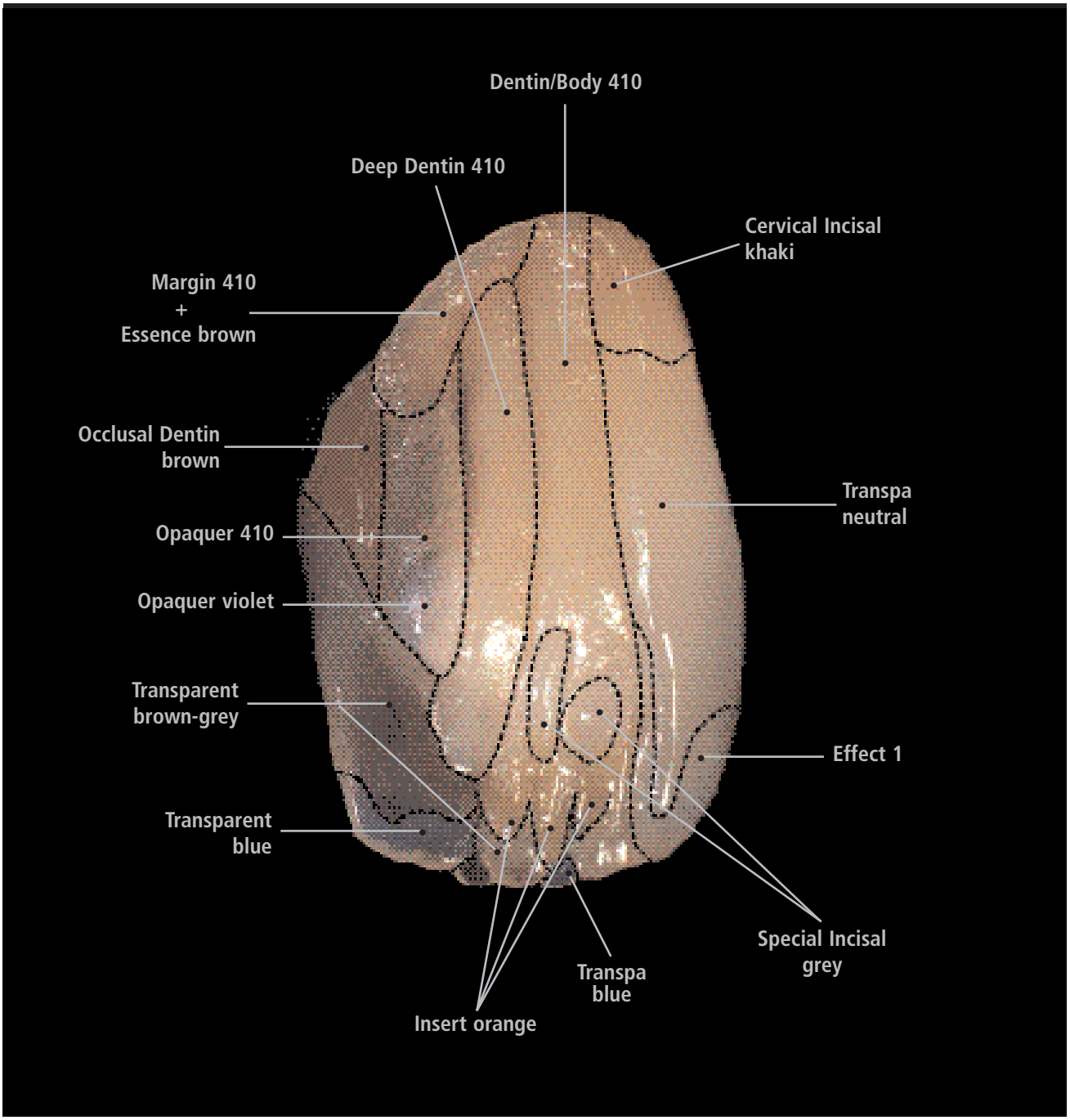


A beautiful result

Ceramists have a wealth of design possibilities

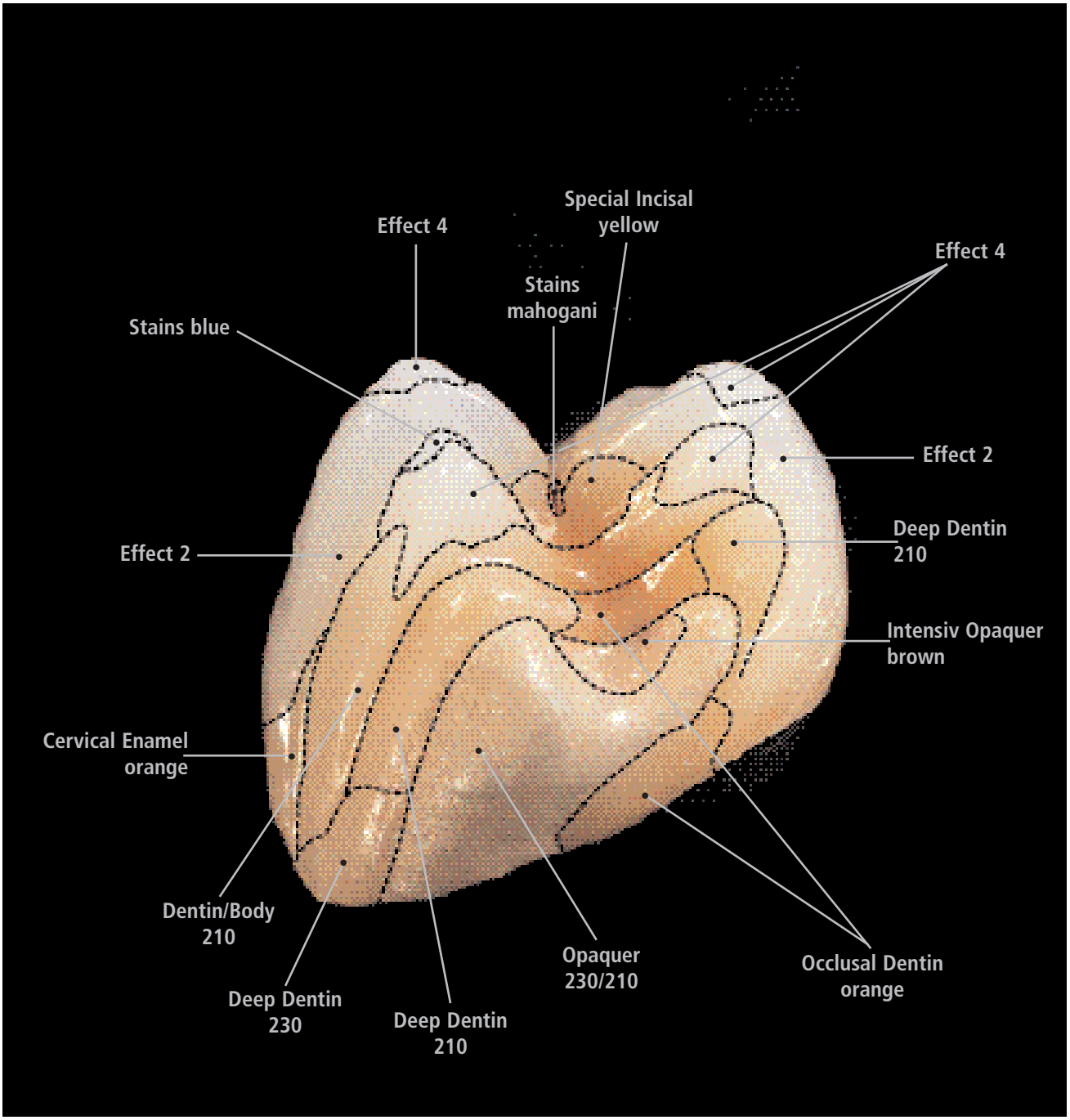


IPS d.SIGN Impulse layering

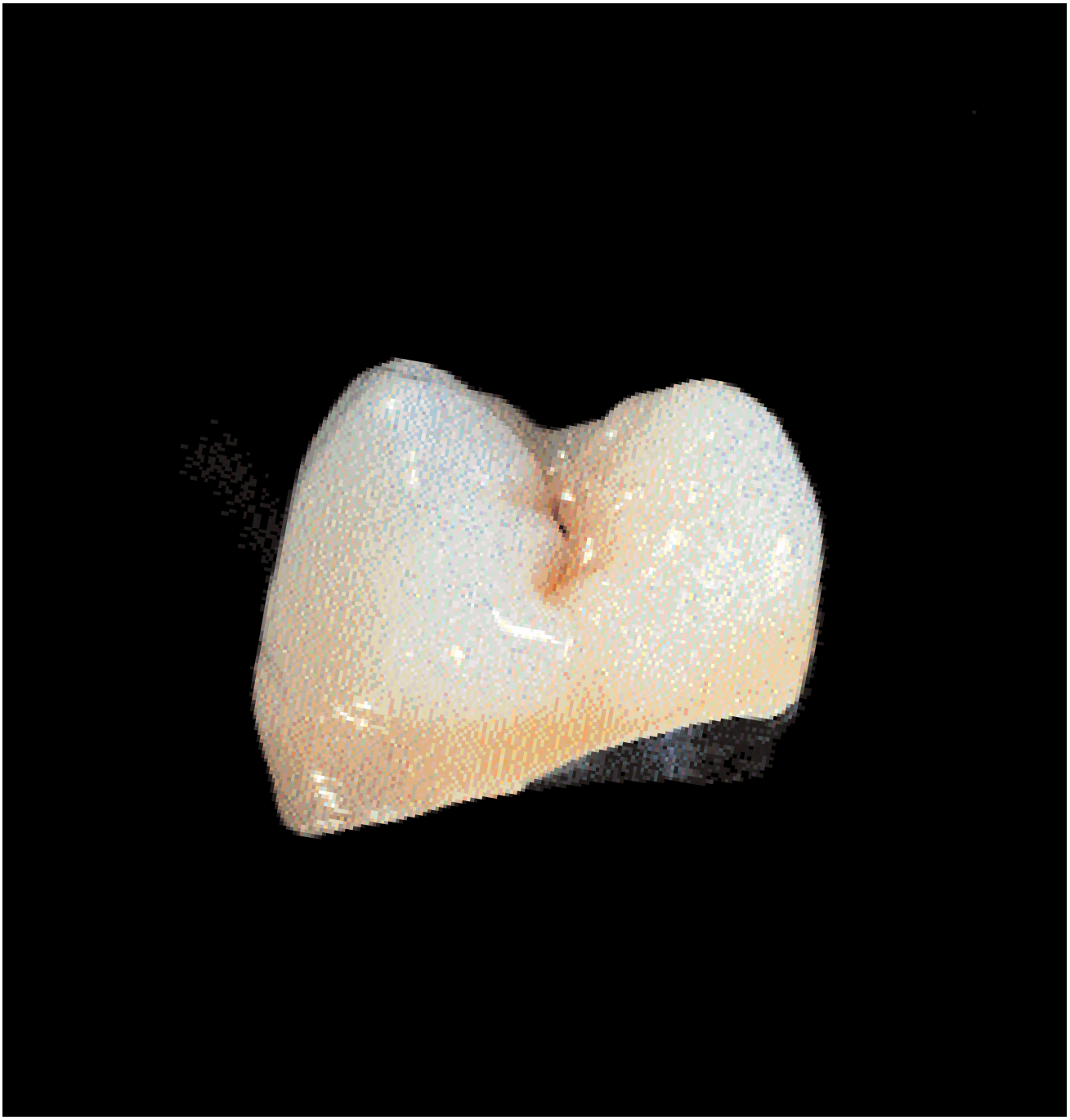


The result

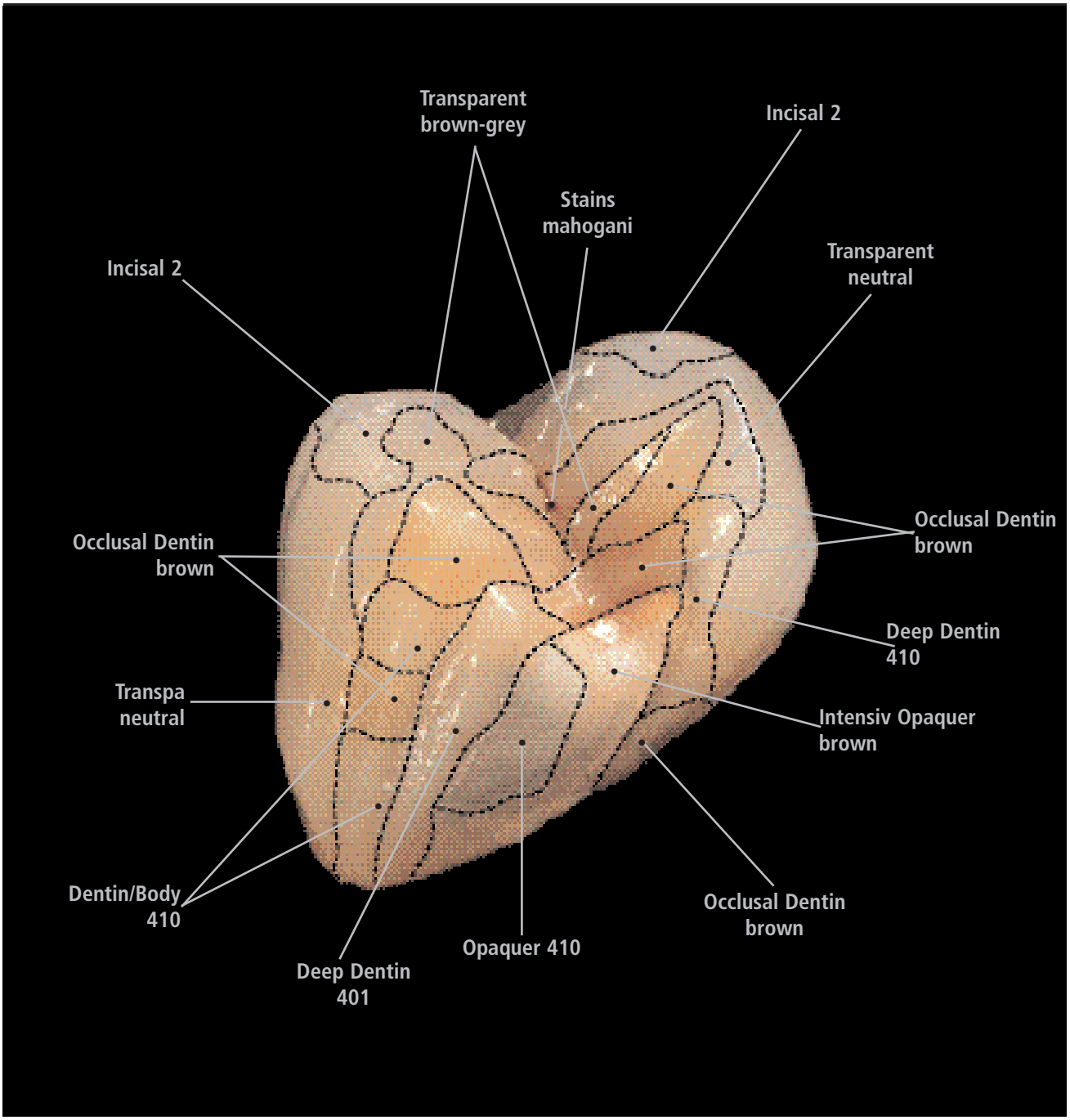
IPS d.SIGN Impulse layering



The result



IPS Impulse layering



The result

IPS d.SIGN – Materials combination table

Chromascop shades


light-brown
grey
dark-brown
310 320 330 340
410 420 430 440
510 520 530 540
brown
incisal
310 320 330 340
410 420 430 440
510 520 530 540
add-on
opaque
orange
310 320 330 340
410 420 430 440
510 520 530 540
310 320 330 340
410 420 430 440
510 520 530 540
S3 S3 S3 S3
S3 S3 S3 S3
S3 S3 S3 S3
neutral
neutral
neutral

A–D shades


reddish-brown
reddish-yellow
IPS d.SIGN
Opaquer
A1
A2
A3
A3.5
A4
B1
B2
B3
B4
Intenisv Opaquer
white
violet
Margin
A1
A2
A3
A3.5
A4
B1
B2
B3
B4
Intensiv 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
Incisal
T-S1
T-S1
T-S2
T-S2
T-S3
T-S1
T-S1
T-S1
T-S2
Transparent
neutral
neutral


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
T-S1
T-S3
T-S3
T-S3
T-S3
T-S3
T-S3
neutral
neutral

Shades independent of any shade system

IPS d.SIGN Impulse Kit 1

Occlusal Dentin

Mamelon

Effect

Transparent

Incisal Edge

IPS d.SIGN Impulse Kit 2

Brilliant Dentin

Palatinal Dentin

Insert

Inter Incisal

Special Incisal

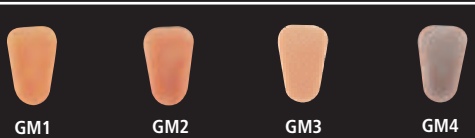
Cervical Enamel

IPS d.SIGN Gingiva Kit

Gingiva Opaquer

Gingiva

Modifier



IPS d.SIGN Essence Kit

Essence

brown | grey | orange | yellow

IPS d.SIGN Stains Kit

Stains

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

mahogany | maroon | olive | orange | vanille | white | yellow

IPS d.SIGN Shade Kit

Shade

1 | 2 | 3 | 4 | 5 | 6 | 7

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

Bleach Kit BL

Opaquer

BL1/BL2 | BL3/BL4

Margin

BL1 | BL4

The Margin materials are only available in shades BL1 and BL4. Shades BL2 and BL3 can be achieved by mixing the materials as following.

– 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. Shades BL2 and BL3 can be achieved by mixing the materials as following.

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

Dentin

BL1 | BL2 | BL3 | BL4

Incisal

BL

Add-On

BL

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