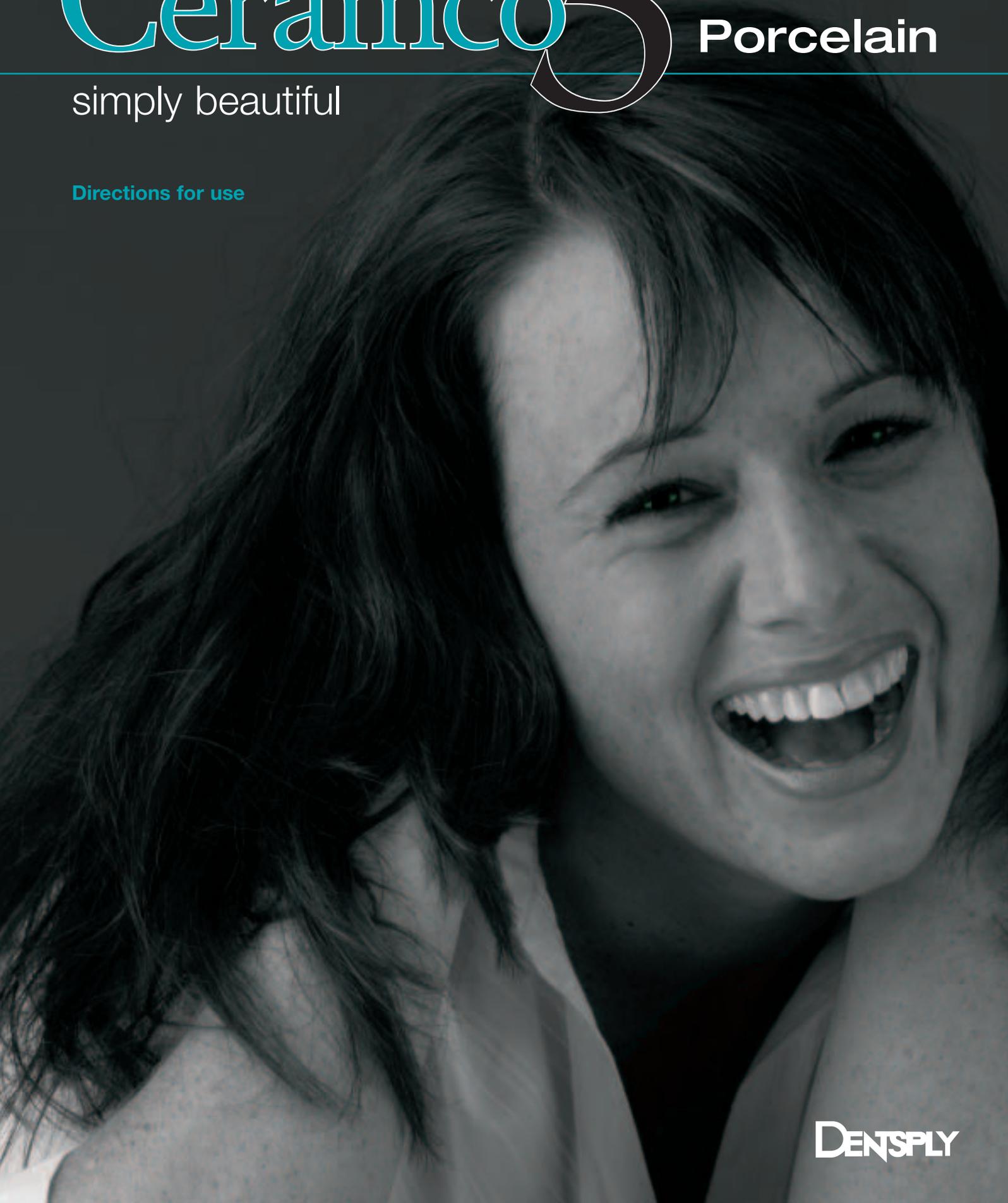


# Ceramco<sup>®</sup>3 Porcelain

simply beautiful

Directions for use



DENTSPLY

# Ceramco

## General Notes on Ceramco®3



### Indications

The Ceramco3 veneering porcelains may be used for all single and multiple unit porcelain fused-to-metal fixed prosthodontics using conventional high-fusing ceramic alloys with or without silver.

### Contraindications

Only the indications listed above are suitable.

### Technical Data

- CTE, dentin: 12.6  $\mu\text{m}/\text{m}\cdot\text{K}$  (25–500 °C)
- Dental ceramics, type 1, class 2–8 according to DIN EN ISO 6872
- Use only alloys with a solidus temperature of at least 1030 °C.

### Alloy Selection

Ceramco3 porcelain is compatible with high noble, noble and predominately base alloys. Be sure to consult the alloy manufacturer for alloy compositions and coefficient of thermal expansion data. By taking the cooling cycles (see page 8) into consideration, alloys within a CTE range between 13.9–15.1  $\times 10^{-6}\text{K}^{-1}$  (25–600 °C) are applicable.

Ceramco3 porcelain will resist discoloration on silver-containing alloys; however, routine purging of porcelain furnace and sagger trays is highly recommended.

### Warnings:

- Consult Ceramco3 product MSDSs (Material Safety Data Sheets) for safe handling and usage.
- Use only with recommended Ceramco3 System Components.
- Use protective equipment to guard against dust when grinding.
- For best results with Ceramco3 read the Directions for Use carefully.

### Adverse reactions/side effects

Do not inhale abrasive dusts.

### Transport and storage conditions

- Please protect fluids from frost. Store the closed containers at temperatures above 10 °C.  
10 °C ↓ Lower temperature limitation
- Shake well before use.
- Store porcelains in bottles with lid tightly sealed.
- Do not leave open bottles where dust and debris may contaminate the porcelain.
- The lot number is printed on each bottle; please refer to the lot number in all correspondence.
- Keep powders, pastes and pellets protected from high heat, light and moisture and store them free from vibrations.
- ☂ Keep dry.

### Please pay attention to the following symbols on the product labels:

- REF Product number
- LOT Batch number
- 🕒 Expiring date
- ⚠ Pay attention to the instructions for use.

### Liquids

Caution should be used in selecting modeling and staining liquids. Ceramco3 liquids are recommended for their ability to improve the handling and carving of the porcelain, to reduce slumping during build-up, and to prevent any silver discoloration. Distilled water may also be used. However, other build-up and/or stain liquids may leave a residue behind that could cause discoloration.

### Porcelain Furnace

For optimum results, be sure your porcelain furnace is accurately calibrated and manufacturer-recommended firing times and temperatures are followed. If necessary, adjust the furnace parameters to obtain the correct visual indicator.

### Sagger Trays

During the firing cycle, large sagger trays will absorb some of the sagger heat and may affect the appearance of the porcelain. For optimum results, only use the honeycomb-style trays with the metal firing pins.

# Ceramco<sup>®</sup> 3

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# Ceramco<sup>®</sup> 3

## Ceramco3 – simply beautiful

Ceramco3 is a complete porcelain-fused-to-metal system that has been designed according to the unsurpassed traditions of DENTSPLY/Ceramco3 ceramic technology, which combines consistent product reliability with excellent natural aesthetics.

The Research and Development team in the USA have taken the patented Colour Correlation system™ used in Finesse™ Low Fusing Ceramics and applied it to the Ceramco3 Porcelain System. This innovative manufacturing process ensures that every porcelain layer is exactly matched to the shade guide. The entire system – from the opaques, through the dentins – natural enamels and opal enamels impart the fluorescence of natural dentition.



#### Features and Benefits:

- Problem-free application to all high-fusing alloys with CTE values between 13.9 and 15.1  $\mu\text{m}/\text{m}\cdot\text{K}$
- Ease of handling
- High chroma and vitality for excellent aesthetics
- Neutral Powder (to reduce the chroma)
- White transparent powder for individual transparent effect for the incisal area
- Small and efficient full starter assortment
- Margin porcelains with high stability in layering
- Paste opaques with a smooth and creamy consistency
- Soft wear enamels
- Shade guides for easy shade matching
- Harmonized shade matching of the V-shades

# Ceramco® 3

# Assortment

The Ceramco 3 Assortments

## Ceramco 3 Single Components

- 20 Powder Opaques
- 9 Powder Opaque Modifiers
- 20 Paste Opaques  
+ 2 Base Paste Shades
- 9 Paste Opaque Modifiers
- 4 Crystals
- 24 Opaceous Dentins
- 24 Dentins
- 15 Dentin Modifiers
- 13 Natural Enamels
- 4 Opal Enamels
- 9 Soft wear Enamels
- 2 Mamelons
- 15 Margin Porcelains
- 9 Final Margin Porcelains
- 9 Add-On Porcelains
- 4 Opaque Correctors
- 18 Porcelain Stains
- Liquids
- Accessories

## 8 shade full starter assortment

### Paste Opaque

- 9x 2 ml Paste Opaque
- 8x 15 g Opaceous Dentin
- 8x 15 g Dentin
- 9x 15 g Dentin Modifier
- 2x 15 g Mamelon Dentin
- 5x 15 g Natural enamel
- 1x 15 g Glaze
- 8x 3 g Stains
- 1x Stain Pallet
- 5x C3 shade guides
- 3x 100 ml Liquids
- 2x Flat brushes
- 3x Collecting bowl
- 3x 10 g Crystals



Also available as 8 shade full starter  
assortment with Powder opaques

# ments



# Ceramco® 3



Alloy selection:

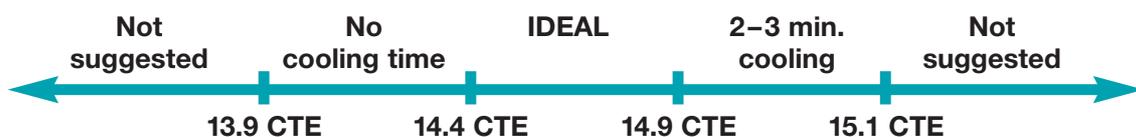
## Alloy selection

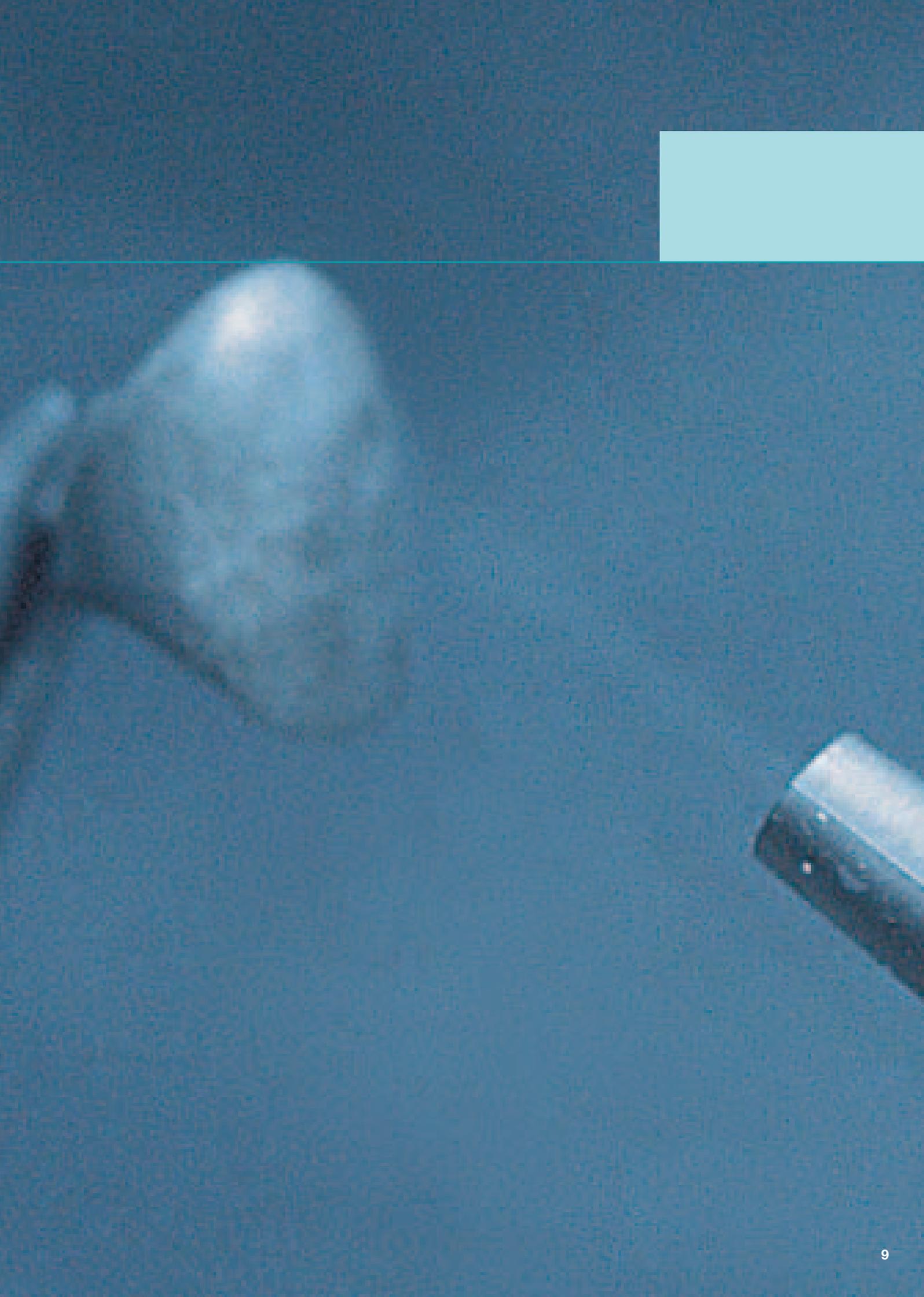
Ceramco3 porcelain is compatible with high noble, noble and predominately base alloys. Be sure to consult the alloy manufacturer for alloy compositions and coefficient of thermal expansion data. By taking the cooling cycles (see below) into consideration, alloys within a CTE range between  $13.9\text{--}15.1 \times 10^{-6}\text{K}^{-1}$  (25–600 °C) are applicable.

## Framework preparation

After finishing with tungsten-carbide cutters, unless otherwise recommended by the alloy manufacturer, sandblast the alloy framework with aluminium oxide (100–150  $\mu\text{m}$ ) at a pressure of 2 bars (non-precious alloys: up to 4 bars).

When creating a ceramic margin (such as the one shown above), use a carbide bur to reduce the crown margin so it ends 0.5–0.8 mm above the lowest part of the chamfer or shoulder. Also, care must be taken to ensure that the crown margin tapers off softly to avoid tension within the ceramic material.





# Ceramco® 3

## Paste and Powder Opaque Porcelain



**A1:**  
Base Paste  
Application

**A2:**  
Crystal  
Application

**A3:**  
First Firing

**A4:**  
Shaded Paste  
Application

**A5:**  
Modifier  
Application

## Paste and Powder Opaque Porcelain

The Ceramco3 porcelain system includes a paste opaque and/or a powder opaque in both the Vita Lumin®<sup>1</sup> and the Illuminé™ shades. Refer to the specific section in this manual for application and firing guidelines.

### Paste Opaque Application

1. Oxidize or degas and clean the alloy according to the alloy manufacturer's instructions.
2. Rinse a flat brush in distilled water and wipe it on a dry paper towel. Check all castings to make sure that all surfaces are dry.
3. Select the proper base paste depending on the shade. Regular base paste is used for the 16 Vita Lumin® shades and white base paste is used for the Illuminé™ shades.

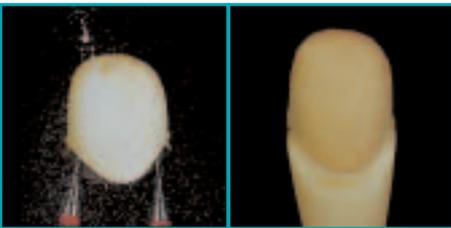
4. Dispense a small amount of the base paste onto a pallet. Water must not be mixed into the paste. If necessary, the paste may be thinned with Opaque Modifier Fluid. (**Do not** thin the Illuminé™ base paste.) Use a brush and a light touch to apply as even a paste coat as possible onto the metal substructure. Achieve an even coat and do not allow the material to build up or puddle. For the Illuminé™ base paste, vibrate to allow the base paste to smooth out. Brush strokes that are present will flatten out with light vibration from a serrated instrument.  
**A1** (Base Paste Application)

**Note:** At this point the metal should be masked out. An application of the base paste that is too thin will result in shades that are too gray or low in value.

<sup>1</sup> Vita® is a registered trademark of Vita Zahnfabrik H. Rauter GmbH & Co.

## Paste Opaque Application

Shades	Crystals used after the base paste	Crystals used after the shaded paste
I1	White	White
I2	White	White
I3	White	White
I4	White	White
I5	White	White
I6	White	White
I7	White	White
I8	White	White
A1	Medium	Light
A2	Medium	Light
A3	Medium	Light
A3.5	Dark	Light
A4	Dark	Light
B1	Medium	Light
B2	Medium	Light
B3	Dark	Light
B4	Dark	Light
C1	Medium	Light
C2	Dark	Light
C3	Dark	Light
C4	Dark	Light
D2	Medium	Light
D3	Dark	Light
D4	Medium	Light



**A6:**  
Crystals after the  
Shaded Paste

**A7:**  
Second Firing

- Use a hemostat and hold the restoration over the appropriate collecting bowl. Using the following chart, sprinkle the correct crystals onto the base paste. [A2](#) (Crystal Application)
- Tap the hemostat very lightly to remove excess crystals. Do not vibrate! Use a dry brush to remove any crystals from the inside of the coping and any non-porcelain bearing areas. Use a brush at a 45° angle to remove any crystals that may remain in the margin area.
- Dry and fire according to the recommended temperatures. The correct visual indicator is a sandpaper-like finish. [A3](#) (First Firing)

**Note:** Drying too rapidly results in small voids in the base paste under the crystals. These small voids may come to the surface during subsequent firings. Following the recommended dry and pre-dry times will

ensure this does not occur. It is also effective to place the restoration on a sagger tray and put the assembly on a warm surface or hot plate prior to placing in the porcelain furnace.

- Dispense a small amount of the prescribed shaded paste on a pallet. Using moderate pressure paint the base paste with a thin, even layer of the shaded paste. A light vibration or tapping may be used to smooth out the material. [A4](#) (Shaded Paste Application)
- If paste opaque modifiers are required, apply at this time. They may be used in full concentration or mixed with the shaded paste. Remove excess paste from the inside of the coping. [A5](#) (Modifier Application)

- Hold the restoration with a hemostat over the collecting bowl and dust all painted surfaces with the light or white crystals depending on the shade. Refer to the table on this page. Tap the hemostat lightly to remove excess crystals from the coping. [A6](#) (Crystals after the Shaded Paste)
- To achieve an extremely thin, yet opaque layer at the marginal areas, use a soft, dry, sable brush to draw off some of the crystals by brushing at a 45° angle to the margin. Do not use heavy pressure.
- Dry and fire according to the recommended temperatures. The correct visual indicator is a sandpaper-like finish. [A7](#) (Second Firing)

## Powder Opaque Application



**A8:**  
First Opaque  
Application



**A9:**  
First Opaque  
Fired



**A10:**  
Second Opaque  
Application



**A11:**  
Second Opaque  
Firing

## Powder Opaque Application

### First Opaque Porcelain Application

1. Oxidize or degas and clean the alloy according to the alloy manufacturer's instructions.
2. Mix the opaque powder with Ceramco3 Build-up Liquid E or U, or distilled water to a creamy consistency.
3. Apply the first opaque porcelain layer thinly and evenly with a brush or instrument.  
**A8** (First Opaque Application)
4. Tap the hemostat very lightly to condense and smooth the opaque porcelain surface. Do not use excessive vibration or allow thick layers of opaque porcelain to accumulate in occlusal, interproximal or marginal areas. Thick layers of opaque porcelain will tear or cause a fissure during the firing process.
5. Dry the opaque porcelain with warm, forced-air equipment or by holding the casework close to, but not in, the entrance of the furnace. Do not use extreme heat to dry the opaque layer. Excessive heat causes blisters, peeling or lifting of the opaque porcelain.
6. Dry and fire according to the recommended temperatures. Correct visual indicator: Slight sheen.  
**A9** (First Opaque Fired)

### Second Opaque Porcelain Application

1. Moisten the dried opaque porcelain mixture with distilled water only. The consistency for the second layer of opaque porcelain should be slightly thicker than the initial mix.
2. Apply the second opaque porcelain layer using the same technique as for the first layer. Make sure this layer is thick enough to completely mask the metal sub-structure.

**A10** (Second Opaque Application)

3. If opaque modifiers are required, apply them at this time.
4. Do not allow thick layers of opaque porcelains to accumulate on concave areas such as the occlusal grooves, interproximal areas or lingual shoulders. Excessive thickness of the opaque layer will fissure during firing.
5. Dry and fire according to the recommended temperatures. Correct visual indicator: Slight sheen.

**A11** (Second Opaque Firing)





## Opaceous Dentin, Dentin, Dentin Modifier, Natural Enamel, Opal Enamel, Soft wear Enamel, and Mamelon Porcelain Application

### General Principles

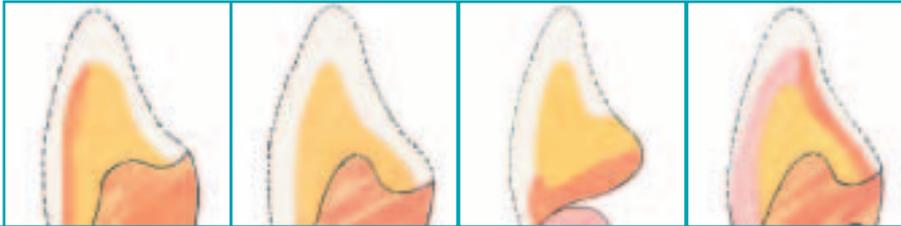
1. Mix the Ceramco3 porcelains with Ceramco Build-up Liquids E or U, or distilled water to a paste-like consistency. Build-up liquids E or U will make the porcelain more “plastic-like” as compared to using distilled water. Caution must be used when selecting other build-up liquids. Some liquids may not completely burn out during the firing cycle and cause the porcelain to discolor or turn yellow/green on silver containing alloys.
2. Ceramco3 is a fine-grained porcelain. The degree to which the porcelain is condensed is based on individual techniques. Additional condensing removes liquid and packs the porcelain particles more thoroughly. This results in porcelain with a higher chroma and less shrinkage. Less condensing results in additional shrinkage and shades with lower chroma. Normally only slight condensing of the porcelain is necessary.
3. Apply die sealer to the areas of the model that will come in contact with the porcelain. This will prevent the die stone from absorbing liquid from the porcelain.
4. Fire the porcelain on honeycomb sagger trays with metal pins.
5. Dry and fire according to the recommended temperatures.
6. Be sure the fired porcelain has the correct visual indicator.

**C1:**  
Thin Areas

**C2:**  
Facial Margin  
(Gingival Color)

**C4:**  
Pontics

**C4:**  
Lingual Fossas and  
Occlusal Surfaces



## Paste Opaque Application

## Applications of Ceramco3 Opaque Dentins

Dentin Modifier	Corresponding Shade
A1 A3.5	I1, I3, I5, I7, A1, A2, A3, D2 A3.5, A4
B1 B3	I2, I4, I6, I8, B1, B2, D3 B3, B4
C1 C3	C1, C2, C3, C4, D4

### Applications

The Ceramco3 Opaque Dentin porcelains are the same hue as the Ceramco3 dentin shades, but have approximately 10 % more opacity. They may be used undiluted, or mixed with the Ceramco3 dentins or dentin modifiers.

#### Thin Areas

Frequently insufficient dentin/incisal thickness exists (less than 1.0 mm) over the opaque porcelain. The shade in this thin area can be improved by applying a layer of the opaque dentin porcelain under the same dentin porcelain shade. When contouring, you will be able to reduce the area where the opaque dentin was layered and the prescribed shade will be maintained. Complete the building and firing of the restoration in the normal manner.

**C1** (Thin Areas)

#### Facial Margin (Gingival Color)

If the metal substructure has been designed with a feather margin, the opaque porcelain around the facial margin leaves minimal room for the dentin porcelain, and the opaque porcelain will be highlighted. Aesthetics will be improved by applying opaque dentin porcelain alone or as a blend with 10 % to 20 % of one of the opaque dentin

modifiers. This technique creates a chromatic cervical third, common in natural dentition.

**C2** (Facial Margin [Gingival Color])

#### Pontics

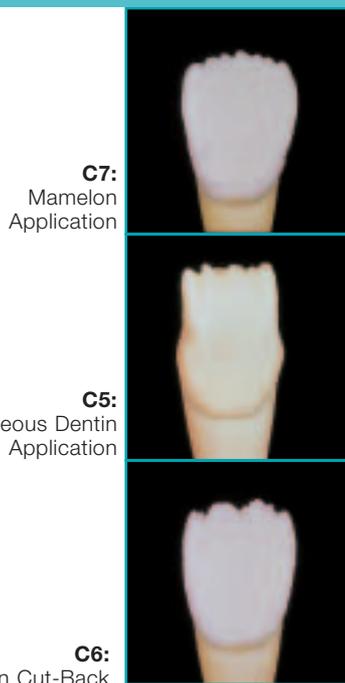
A color imbalance frequently occurs between the pontics and the abutments of a multiple-unit fixed partial denture. The color difference is caused by the absence of a full metal substructure in the pontic area. Ceramco3 opaque dentin porcelain applied to the bottom and the cervical area of the pontic creates a uniform color across the fixed partial denture. **C3** (Pontics)

#### Lingual Fossas and Occlusal Surfaces

Often, inadequate space is available on the lingual surface of an anterior unit, or on the occlusal surface of a posterior unit. Ceramco3 opaque dentin porcelain applied alone or as a blend with 10 % to 20 % opaque dentin modifiers in these thin areas prevents the opaque porcelain from being highlighted.

**C4** (Lingual Fossas and Occlusal Surfaces)

## Dentin Build-Up Technique



## Dentin Build-Up Technique

1. Areas on the model that the porcelain will contact should be completely sealed with Ceramco3 Die Sealer. Other sealers or oils may leave a residue that will cause discoloration and should not be used.
2. Mix the porcelains with Ceramco3 Build-up Liquids E or U, or distilled water to a paste-like consistency.
3. Build dentin porcelain or opaceous dentin/dentin modifier mixture around the cervical one third. Condense slightly. If building a multiple-unit fixed-partial denture, apply the dentin porcelain mixture to the saddle area of the pontic and seat the framework on the model. Continue to apply the dentin porcelain until full contour has been achieved. Condense slightly.  
**C5** (Opaceous Dentin Application)
4. Cut back the incisal one third to allow room for the enamel porcelains. If required, cut back to accentuate the lobe formation found in natural teeth. Be sure to remove adequate porcelain in the interproximal area.  
**C6** (Dentin Cut-Back)
5. If mamelons are required, place a small amount of mamelon porcelain on the dentin lobes. To simulate natural dentition, vary the length of the mamelons.  
**C7** (Mamelon Application)
6. Select the appropriate Natural Enamel Porcelain from Table 1. Apply the enamel porcelain to the incisal or occlusal one-third, overbuilding by approximately 10%. If desired layer the selected enamel porcelains in narrow vertical columns across the facial-incisal area to simulate the enamel rod formations found in natural teeth. Use Natural Enamel porcelains of different colors, the clear enamel porcelain, or the Opal Enamel porcelains arranged in discrete parallel columns to create contrast. Condense lightly.
  - 6.1 Table 1 can be used as a guideline for selecting an enamel porcelain. For the Illuminé™ shades, enamels will have a dramatic effect in the shade of the final restoration. As a rule of thumb:
    - 6.1.1 Any translucent porcelain (Clear, Opal Clear) will make the shade lower in value (gray).
    - 6.1.2 Due to the opalescence, any opal enamel will give the shade a very slight “warm” (yellow/orange) appearance.

**C8:**  
Basic Enamel  
Application

**C9:**  
Clear Enamel Overlay

**C10:**  
Vertical columns  
of Clear, Opal and  
Natural Enamels

**C11:**  
Completed Build-Up

**C12:**  
Correct Visual  
Indicator for  
First Firing



## Powder Opaque Application

**6.1.3** To achieve a white / bright enamel, use Natural White, or Extra Light enamel.

**6.1.4** To achieve a cold blue appearance, use Natural Blue enamel.

**C8** (Basic Enamel Application)

**C9** (Clear Enamel Overlay)

**C10** (Vertical Columns of Clear, Opal and Natural Enamels)

**C11** (Completed Build-Up)

7. Remove the coping from the model. Apply a small amount of enamel porcelain to the mesial/ distal contacts. Slightly condense the porcelain.

8. If building a multiple-unit fixed-partial denture, use a thin bladed instrument and cut slightly into the interproximals. It is not necessary to cut all the way down to the opaque.

9. Dry the build-up away from direct heat for at least five minutes before bringing it close to the open furnace entrance. Increase the drying time to ten minutes for large multiple-unit fixed-partial dentures.

10. Fire according to the recommended temperatures. A proper visual indicator is shiny with a small amount of surface texture.

**C12** (Correct Visual Indicator for First Firing)

### Contouring & Cleaning

1. After firing, use fine-grit, non-contaminating stones, discs, or diamond burs to refine the anatomy. If no porcelain additions are needed, the case may be glazed after thoroughly cleaning.

2. If additions are required or before glazing, lightly blast the porcelain surface with unrecycled 50-micron aluminum oxide at 1.4 bar. Clean the case with a steam cleaner or ultrasonic bath using distilled water.

### Second Application Of Dentin & Enamel Porcelains

Apply the additional porcelain using the same steps and techniques described for the initial application. Match the layering of the opal enamel porcelain over the dentin porcelain. Second applications of Ceramco3 porcelains require the same care in drying and firing as the first layer.

**TABLE 1**  
**SUGGESTED ENAMELS and MAMELONS**

Shade	Natural Enamel	Opal Effect Enamel	Mamelons
I1	Extra Light	Opal Light	Yellow-Orange
I2	Extra Light	Opal Light	Yellow-Orange
I3	Extra Light	Opal Light	Yellow-Orange
I4	White	Opal White	Yellow-Orange
I5	White	Opal White	Yellow-Orange
I6	White	Opal White	Yellow-Orange
I7	White	Opal White	Yellow-Orange
I8	White	Opal White	Yellow-Orange
A1	Extra Light	Opal Light	Yellow-Orange
A2	Extra Light	Opal Light	Yellow-Orange
A3	Light	Opal Light	Red-Orange
A3.5	Light	Opal Medium	Red-Orange
A4	Light	Opal Medium	Red-Orange
B1	Extra Light	Opal White	Yellow-Orange
B2	Extra Light	Opal Light	Yellow-Orange
B3	Light	Opal Light	Red-Orange
B4	Light	Opal Light	Red-Orange
C1	Light	Opal Light	Yellow-Orange
C2	Light	Opal Light	Yellow-Orange
C3	Medium	Opal Medium	Red-Orange
C4	Dark	Opal Medium	Red-Orange
D2	Extra Light	Opal Light	Yellow-Orange
D3	Light	Opal Light	Yellow-Orange
D4	Medium	Opal Light	Red-Orange

# Ceramco<sup>®</sup> 3

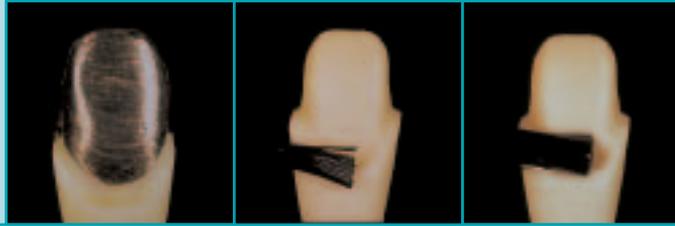
## Margin Application

Margin Porcelain	Corresponding Shade
I5 I1 I2	I5, I6, I7, I8 I1, I3 I2, I4
A1 A3 A4	A1, A2 A3, A3.5, B3, D3, D4 A4, B4
B2	B1, B2
C1 C3	C1, C2, D2 C3, C4

## Margin Application

### General Principles

1. Dispense only enough material for immediate use to avoid waste. Dried Ceramco3 margin porcelain prepared with the Ceramco3 Improved Margin and Opaque Correction Liquid can be reused. Select the correct margin porcelain from the following chart. Mixing some of the margin modifier porcelain into the shaded margin porcelain can easily change the porcelain shades.
2. Clean brushes with water after each margin application to prevent contamination.
3. Complete the 5 minute dry and 5 minute preheat cycles to remove organic material and avoid discoloration. For furnaces without a "preheat", dry for 10 minutes.
4. Fire the porcelain on honeycomb sagger trays with metal pins.
5. Properly fired Ceramco3 margin porcelain will have a shiny yet grainy appearance. Firing the dentin porcelain higher than the margin porcelain will result in rounded margins.
6. Be sure the fired porcelain has the correct visual indicator.



**B1:** Proper Metal Design      **B2:** Die Sealer Application      **B3:** Die Release Application

### Tooth Margin Preparation

1. A 90° shoulder preparation or deep chamfer is recommended.
2. Normal tooth reduction (1.5 mm) is recommended.

### Substructure Design

Extend the facial surface of the metal substructure so that the metal ends at the axial gingival corner of the margin preparation or extends slightly onto the gingival ledge.

**B1** (Proper Metal Design)

### Opaque Procedure

Apply and fire the Ceramco3 paste opaque or Ceramco3 powder opaque porcelain using your normal procedures.

Be sure the opaque completely covers the metal at the gingival margin. Failure to do so will make the completed porcelain margin appear gray.

### Die Sealer Application

1. Using the Ceramco3 die sealer, apply a thin, even layer of sealer over the die margin area. Blow off any excess die sealer and allow the liquid to thoroughly dry.
2. Reapply the die sealer at least 2 more times and allow to dry.
3. Mark the facial margin with a wax pencil. **B2** (Die Sealer Application)

### Die Release Application

1. Be sure the die margin is clean.
2. Using the Ceramco3 die release, apply a thin even layer of die release over the margin area. Blow off the excess die release.
3. Apply and allow to dry several more times until the die has a very slight sheen. **B3** (Die Release Application)

## Margin Application

### Margin Application

#### First Margin Application

1. Place a small amount of the shaded margin porcelain on a clean palette.
2. If modifier is necessary, add the modifier porcelain to the shaded margin porcelain.
3. Mix the Ceramco3 Improved Margin and Opaque Correction Liquid with the Improved Margin Porcelain to a thick creamy consistency. This mixture will air harden in approximately 5 minutes. If additional working time is required, mix in a small amount of distilled water.
4. Place the porcelain mixture in the gingival area, pushing the mixture down to but not over the gingival margin. Do not over build.

**Note:** All porcelains shrink by volume. The larger the porcelain mass the more apparent the firing shrinkage. Better results are achieved by applying a small amount of porcelain on the first porcelain application.

5. Do not allow the restoration to become completely dry before lifting off the model.

6. Carefully lift the coping from the die. **B5** (First Shoulder Lift-Off)

**Note:** If inspection reveals the need for adjustment, carefully return the coping to the die and add fresh material. It is not necessary to remove the unfired porcelain.



**B4:**  
First Shoulder  
Application

7. Dry and fire the restoration according to the recommended temperatures.

8. The correct visual indicator will be shiny yet grainy. **B6** (First Shoulder Fired)

#### Second Margin Application

1. Be sure the die is clean and re-apply the die release. Allow to dry.
2. Place the coping on the die. Make a new mix of Improved Ceramco3 Margin porcelain and Ceramco3 Improved Margin and Opaque Correction Liquid. Apply the mixture to the gingival margin.

3. Do not allow the restoration to become completely dry before lifting off the model.

4. Dry and fire the restoration according to the recommended temperatures.

5. The correct visual indicator will be shiny yet grainy. **B9** (Shoulder Margin Completed)

**Note:** If additional applications are required, repeat the procedures used for the second margin application.



**B5:**  
First Shoulder  
Lift-Off

**B6:**  
First Shoulder  
Fired

**B7:**  
Second Shoulder  
Application

**B8:**  
Second Shoulder  
Lift-Off

**B9:**  
Shoulder Margin  
Completed

### FINAL MARGIN APPLICATION

The Final Margin is designed to be a final porcelain margin application that can be used to repair small margin imperfections. It is designed to be fired at the same time as the glaze cycle.

1. Be sure the die is clean
2. Reapply the die release and allow to dry
3. Place the coping on the die and apply the Final Margin porcelain
4. Allow to dry several minutes, then lift the coping off the die. **DO NOT ALLOW TO DRY COMPLETELY** before lifting off the die.
5. If using an overglaze, carefully apply the glaze to the restoration.
6. Fire the restoration according to the recommended temperatures.

# Ceramco® 3

## Stains



**D1:**  
Applying the Stain

**D2:**  
Basic Build-Up  
Technique

**D3:**  
Completed Illuminé™  
Shaded Crown

**D4:**  
Completed Crown  
with Internal  
Characterization

## Stains

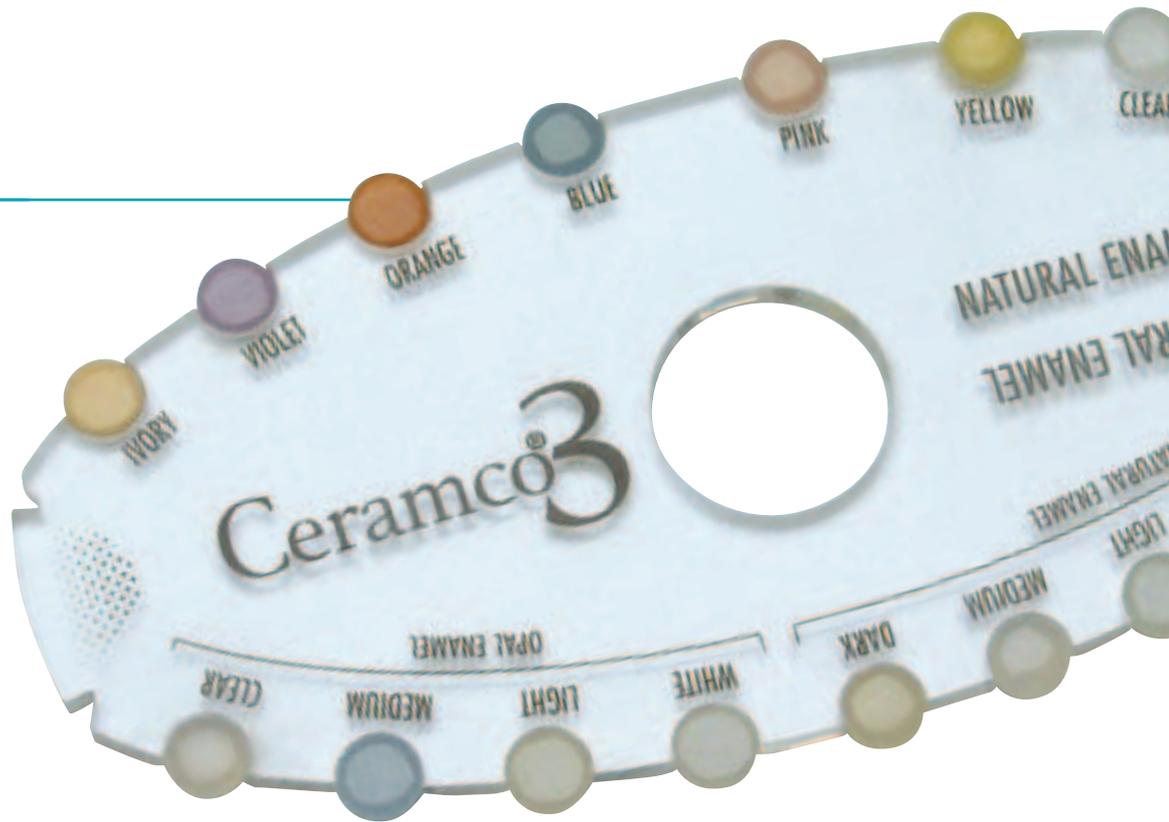
- I1 – Orange Tint stain
- I2 – Yellow Tint stain
- I3 – Orange Tint stain
- I4 – Yellow Tint stain
- I5 – Orange Tint stain
- I6 – Yellow Tint stain
- I7 – Orange Tint stain
- I8 – Yellow Tint stain
  
- A1 – Orange Tint stain
- A2 – Orange Tint stain
- A3 – Orange Tint stain
- A3.5 – Orange Tint stain
- A4 – Orange Tint stain
  
- B1 – Yellow Tint stain
- B2 – Yellow Tint stain
- B3 – Yellow Tint stain
- B4 – Yellow Tint stain
  
- C1 – Brown Tint stain
- C2 – Brown Tint stain
- C3 – Brown Tint stain
- C4 – Brown Tint stain
  
- D2 – Orange Tint stain
- D3 – Yellow Tint stain
- D4 – Orange Tint stain

### General Principles

1. Mix the Ceramco3 Stains and Overglaze with the Ceramco3 Stain and Glaze Liquid.
2. Apply the stain to the desired area.
3. Fire the porcelain on honeycomb sagger trays with metal pins.
4. Fire according to recommended temperatures.

### Tint Stains

The tint stains are designed to closely approximate the average range of tooth colors found in natural dentition and commercially available shade guides. Predetermined, ready to use tint stains are designed to increase chroma one or more shades in a given range, or subtly characterize and intensify neck and interproximal areas.



### Applying Ceramco3 Stains

1. Clean the porcelain surface by lightly blasting with 50-micron aluminum oxide at 1.4 bar, followed by cleaning with a steam cleaner or in a ultrasonic cleaner with distilled water for 5 minutes.
2. Use the tip of the staining brush and spread a thin film of stain liquid and overglaze mixture on the surface to be stained. If you wish to use a natural glaze, use only the glaze medium. This is done to simulate a glaze and enable the ceramist to judge the necessary correction.
3. Mix the stains with the stain medium to a thin consistency and apply the mixture to the porcelain surface. Do not allow the mixture to puddle. Apply the stain until the desired effect is achieved.
  - D1 (Applying the Stain)
4. Fire according to recommended temperatures.
5. If stains are not required, the restoration can either be natural glazed, overglazed or mechanically polished using silicone wheels, porcelain polishing wheels, and flour pumice or aluminum oxide polishing paste. Diamond polishing paste may also be used but is not required.
  - D2 (Basic Build-Up Technique)
  - D3 (Completed Illuminé™ Shaded Crown)
  - D4 (Completed Crown with Internal Characterization)

# Ceramco<sup>®</sup> 3

## Opaque Corrections and Add-On Porcelain

### Opaque Corrections and Add-On Porcelain

#### Opaque Correction

If during the contouring procedures the porcelain surface is removed and the metal surface is exposed, this may be easily repaired by using the opaque correction material. This correction opaque should be used for small minor repairs only.

1. Lightly blast the surface that is to be repaired with aluminum oxide at 1.4 bar. Then steam clean or clean in an ultrasonic cleaner in distilled water for 5 minutes.
2. Place a small amount either the light, medium or dark correction opaque onto a pallet. Mix with a small amount of Ceramco3 Margin/Opaque Correction Liquid to a paste-like consistency.
3. Apply the opaque mixture to the exposed metal and allow to dry for about 5 minutes. The opaque will appear chalky and hard.
4. Apply either Ceramco3 opaceous dentin, dentin or Add-On porcelain and fire according to the recommended firing temperatures.

#### Add-On Porcelain

The Ceramco3 Add-On porcelain is available in a translucent enamel, dentin light, white, medium and dark, and tissue colored pink, red-dish-pink, salmon, and dark. They fire at slightly lower temperatures than the regular dentin porcelain. These porcelains are always fired under vacuum and are used when a low temperature add-on is required.

1. Lightly blast the surface that is to be repaired with aluminum oxide at 1.4 bar. Then steam clean or clean in an ultrasonic cleaner in distilled water for 5 minutes.
2. Mix the porcelains with Ceramco3 Build-up Liquids E or U, or distilled water to a paste-like consistency.
3. Apply the mixture to the desired area.
4. Fire according to the recommended firing temperatures.

## Firing recommendations

### Firing recommendations

#### General Information for Firing

1. You can optionally fire Ceramco3 in connection with conventional alloys (not bio alloys) and non-precious alloys using a higher heating rate of 80 °C/min. When using the higher heating rate, the firing temperature should also be increased by 10 °C.
2. Note the required long-term cooling/tempering process for alloys with a CTE ex 14.5 µm/m·K (25–600 °C).
3. Different ceramic furnaces may perform completely differently. The actual firing temperatures may have to be adjusted accordingly.

## Firing Reference Chart

#### Firing Program in °C

Program Description	Time (min)			Time (min)			Vacuum	Set Temp		Temperature			
	Dry	Pre Heat	Vac Hold	Hi Temp Hold	Hold	Cool	Set Point (in hPa)	Idle	Hi Temp	Vac Start	Vac Stop	Heat Rate °C/min	Night
Paste Opaque	5	3	0	0	0	0	50	500	975	500	975	100	100
Powder Opaque	3	3	0	0	0	0	50	650	970	650	970	70	100
Improved Margin	5	5	0	1.0	0	0	50	650	965	650	965	70	100
Final Margin (with overglaze)	3	3	0	0.5	0	0	0	650	925			70	100
Final Margin (with natural glaze)	3	3	0	0.5	0	0	0	650	920			70	100
Op. Dentin/Dentin/Mod/Enamels	5	5	0	1.0	0	0	50	650	930	650	930	45	100
Natural Glaze	3	3	0	0.5	0	0	0	650	920			45	100
Overglaze	3	3	0	0.5	0	0	0	650	925			55	100
Add-On	5	5	0	0	0	0	50	650	920	650	920	55	100

**Note:** The values listed here are intended for orientation only and should be regarded only as guidelines. Your firing results may differ. All firing results depend on the performance of the furnace used, which in turn depends on the make, model and age of the furnace. Therefore, the guideline values will have to be adapted individually for each firing. We recommend running a test firing cycle to evaluate the performance of the furnace used. We have compiled and checked all values and other data with great care. However, we cannot under any circumstances be liable for your results.

Firing temperatures are recommended figures. If necessary, carry out a firing test, and adjust firing temperature or times.

## Troubleshooting

Problem	Possible causes
<ul style="list-style-type: none"> <li>• Porosities, cavities, fractures of the metal framework</li> </ul>	<ul style="list-style-type: none"> <li>• Sprueing recommendations or recommendations on pre-heating and casting temperatures were disregarded</li> </ul>
<ul style="list-style-type: none"> <li>• Ceramic shades are too bright and too opaque</li> <li>• Ceramic material is porous</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-heating temperature too high</li> <li>• Firing temperature too low</li> <li>• Vacuum pump actuated too late</li> <li>• Attained vacuum too low</li> </ul>
<ul style="list-style-type: none"> <li>• Ceramic surface too rough</li> <li>• Ceramic surface has too little lustre</li> <li>• Ceramic surface has too much lustre</li> <li>• Edges and contours are not clearly defined but rounded</li> </ul>	<ul style="list-style-type: none"> <li>• Firing temperature too low</li> <li>• Holding time too short</li> <li>• Firing temperature too high</li> <li>• Holding time too long</li> </ul>
<ul style="list-style-type: none"> <li>• Cracks caused by compression: horizontal cracks in the incisal region or in bridge pontics</li> </ul>	<ul style="list-style-type: none"> <li>• Extended cooling required but not observed</li> <li>• Cooling temperature too low</li> <li>• Cooling phase too short</li> </ul>
<ul style="list-style-type: none"> <li>• Cracks caused by tension: Craquelé on the ceramic surface</li> </ul>	<ul style="list-style-type: none"> <li>• Incorrect alloy</li> <li>• Ceramics CTE too high due to extended cooling or low heating rates</li> <li>• Framework walls too thin</li> </ul>
<ul style="list-style-type: none"> <li>• Bubbles</li> </ul>	<ul style="list-style-type: none"> <li>• Metal or ceramic impurities caused by improper grinding instruments</li> <li>• Pastes or opaque incorrectly pre-dried</li> <li>• Entrapped air</li> <li>• Too much opaque thinner</li> <li>• Paste applied too thickly</li> </ul>

## Recommended actions

- See points 2, 4, 5 and 6 of the processing recommendations for precious dental alloys
- Decrease pre-heating temperature
- Increase firing temperature
- Decrease pre-heating or vacuum start temperature
- Check vacuum pump/furnace for leaks
- Increase firing temperature
- Extend holding time
- Decrease firing temperature
- Shorten holding time
- Check the CTE of the alloy (if the CTE is  $>14.2 \mu\text{m}/\text{m}\cdot\text{K}$ , use extended cooling or temper for 3 min at  $850^\circ\text{C}$ )
- Increase tempering temperature
- Extend cooling phase
- Check alloy for compatibility
- Respect minimal wall thickness requirement
- Use only tools specifically designed for metal or ceramics
- Use only stagger-toothed tungsten-carbide cutters
- Extend pre-drying phase

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# Ceramco<sup>®</sup>3

simply beautiful



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