A Technical Guide

for Achieving Restorative Excellence

DENTSPLY | CERAMCO® PFZ
Porcelain For Zirconia

Ceramco® PFZ

Ceramco® PFZ Porcelain Fused to Zirconia is ideal for metal-free frameworks and can be used with Cercon® Zirconia and other 100% dense zirconia frameworks. It has been engineered to provide exceptional handling, thermal stability, and esthetic properties.

The entire system, from the liners through the dentins, natural enamels, opal enamels, and surface stains, impart the fluorescence of natural dentition. With Ceramco PFZ, clinicians can expect excellent esthetics in their zirconia all-ceramic restorations.

- Exceptional esthetics
- Handling of traditional Ceramco porcelains
- Cutting-edge synthetic porcelain
- Leucite-free for better wear
- Natural fluorescence
- Exceptional thermal stability for increased productivity

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Porcelain For Zirconia

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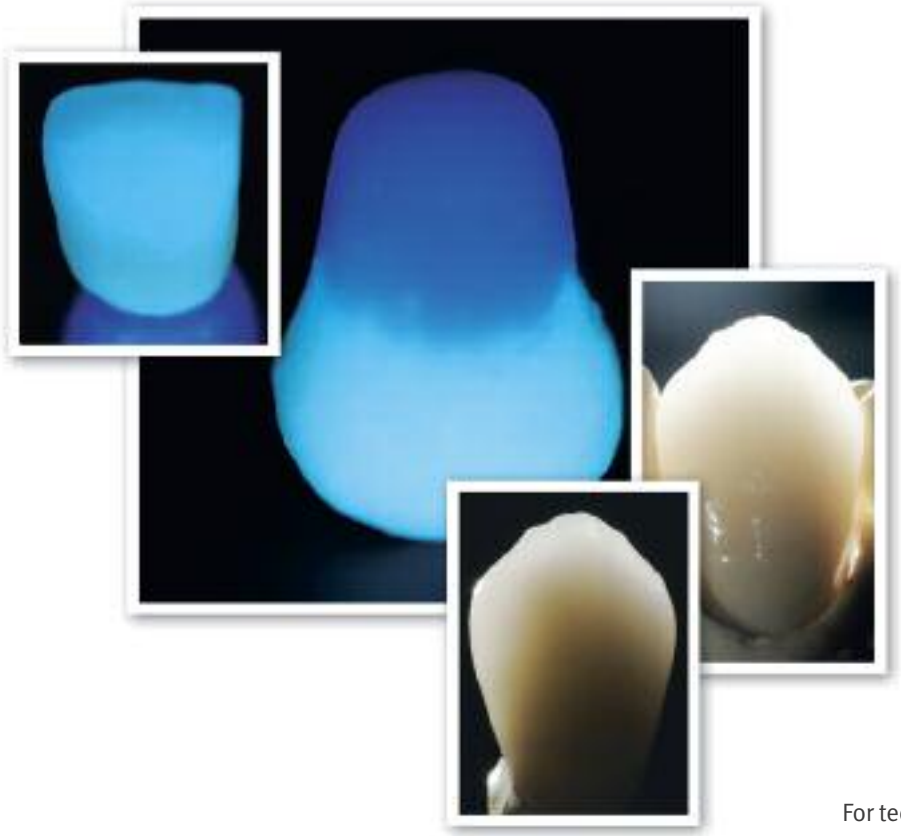
Light Properties



To achieve a natural appearance upon seating and cementation, it is critical to instill opalescence, fluorescence, and translucency in ceramic restorations.

Human teeth are inherently fluorescent, emitting visible light when exposed to ultraviolet light. Ceramco PFZ porcelains contain agents that allow restorations to replicate this effect.

Opalescence is the ability of the Ceramco PFZ porcelain (or other translucent materials) to appear blue in reflected light and red-orange in transmitted light. The opalescent effect is based on the behavior of translucency of natural teeth.

The degree to which light is transmitted through the Ceramco PFZ porcelain, rather than being absorbed or reflected, is its translucency.

Ceramco PFZ allows the ceramist to avoid excessive translucency in the restoration, which can result in a crown or fixed partial denture that appears too gray and dark.

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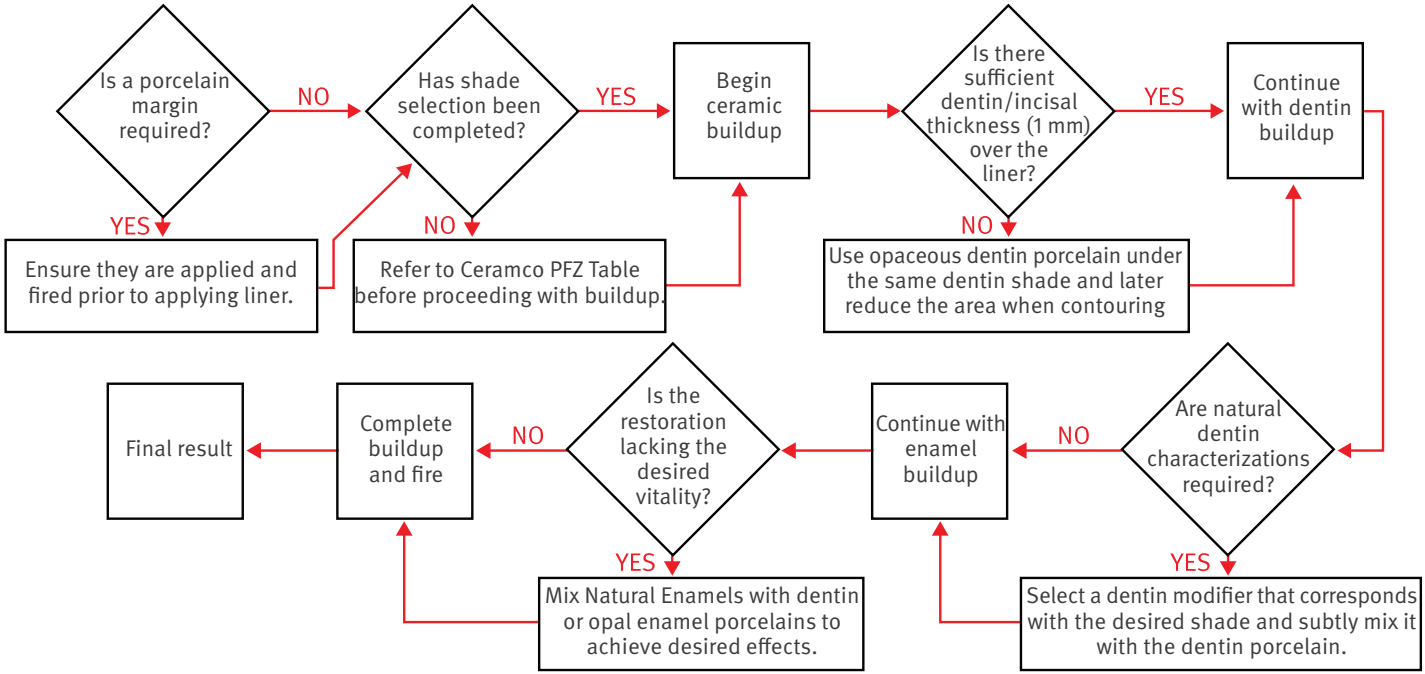
Decision Making



Ceramco® PFZ Restorations

Ceramco® PFZ is a complete porcelain system that has been designed to support a variety of clinical indications. In order to determine the appropriate course of action for a given restoration, the following "decision tree" has been formulated to guide your buildup protocols.

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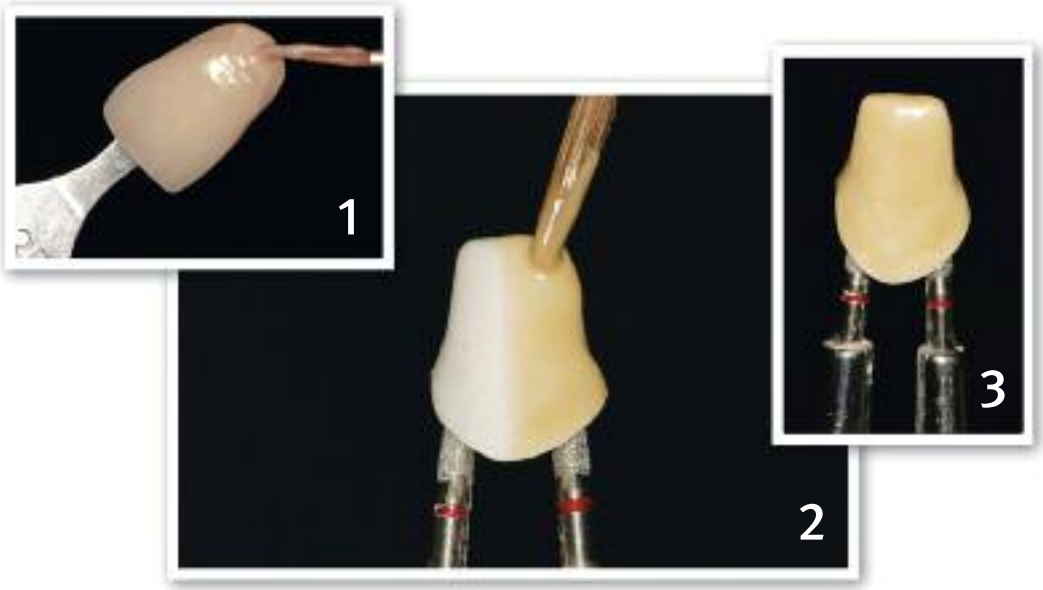
Shading the Zirconia Core



PFZ stains can be used as alternatives to liners in order to alter the shade of the zirconia core.

1. Blend stains and porcelain to achieve the desired shade according to the chart below.
2. Paint the surface of the core to obtain semi-translucent base color.
3. Fire according to the second dentin firing cycle.

When used instead of a liner, this technique will permit greater light transmission through the core and thus create a more vital shade for the final restoration.

Shade	Stains/Porcelain Mix
A Range:	PFZ Stain Ochre – 80%, PFZ Opal Clear – 20%
B Range:	PFZ Stain Corn Yellow – 40%, PFZ Stain Ochre – 40%, PFZ Opal Clear – 20%
C Range:	PFZ Stain Olive – 70%, PFZ Stain Gray – 10%, PFZ Opal Clear – 20%
D Range:	PFZ Stain Olive – 80%, PFZ Opal Clear – 20%
Neutral:	PFZ Opal Clear

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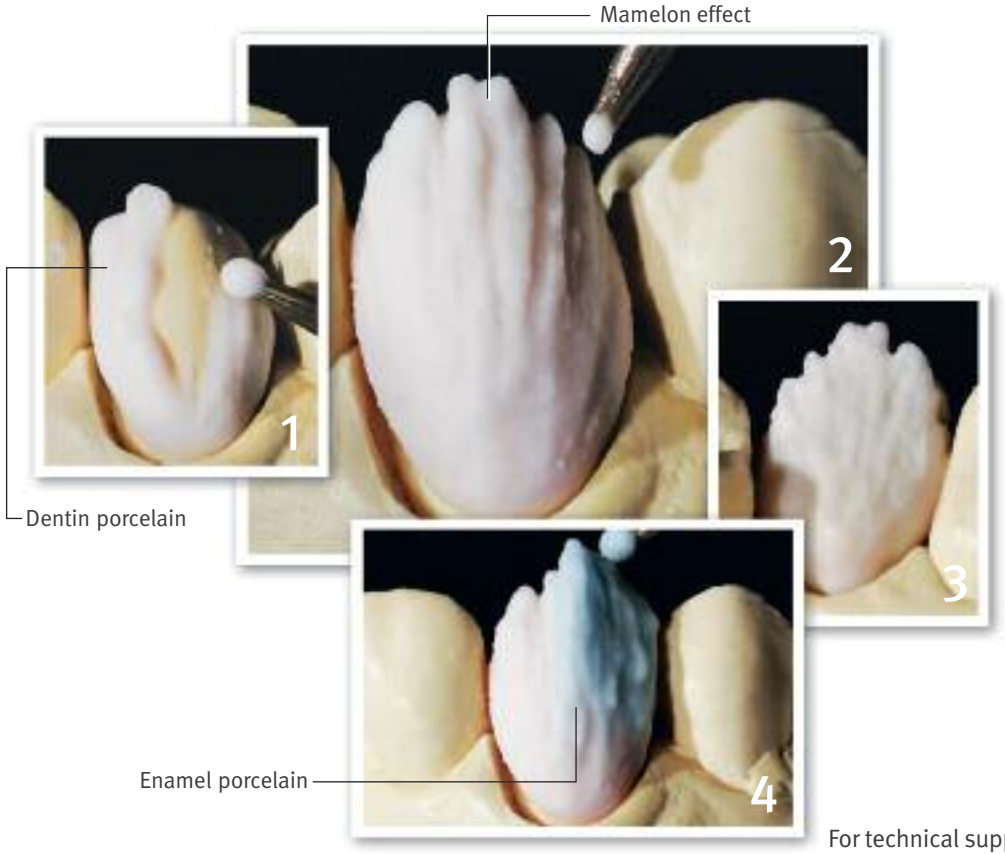
Changing Shade of the Zirconia Core

Standard Porcelain Buildup



1. Apply opaceous dentin and dentin to frame mesial and distal lobes. Use dentin porcelain to build to full contour.
2. Replicate mamelon effect and cut back the incisal third.
3. Create lingual ridges and build to contour.
4. Apply Natural Enamel Porcelain to the mesial and distal lobes.

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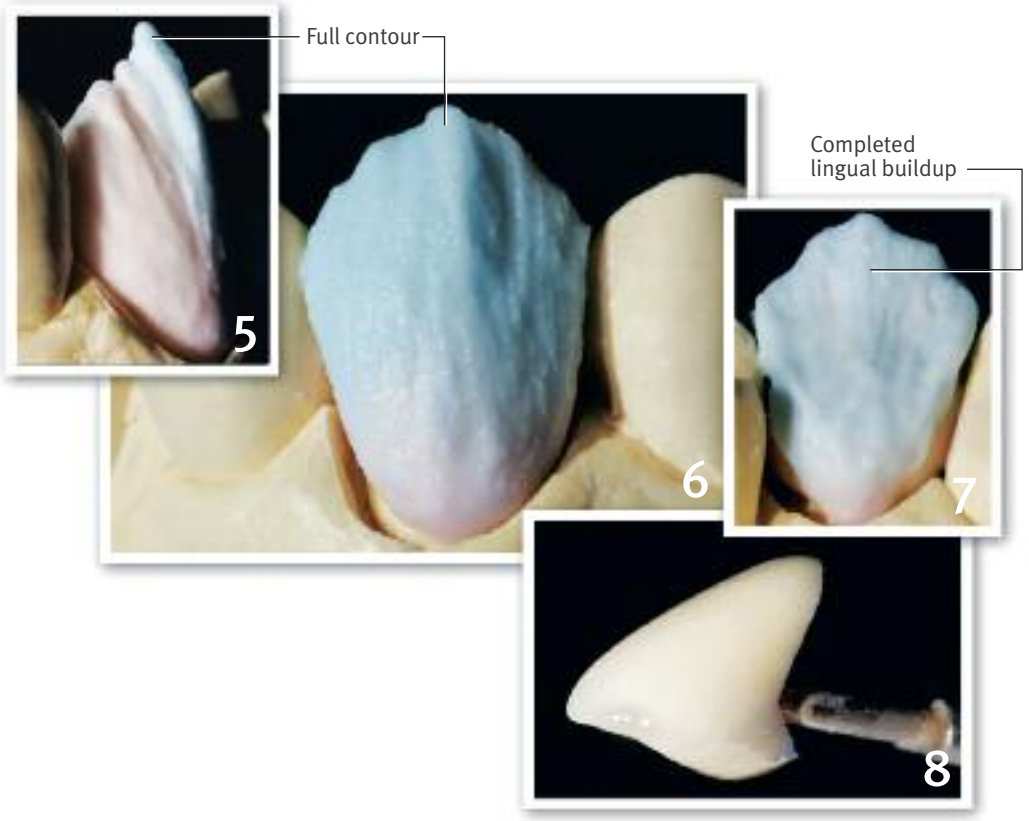
Standard Buildup (Anterior)

Standard Porcelain Buildup



5. Continue application to the incisal one third of the restoration.
6. Complete the buildup of the facial aspect.
7. Build up the lingual surfaces to proper contour.
8. Add enamel porcelain to mesial and distal corners and dentin to any opaqued surface before firing.

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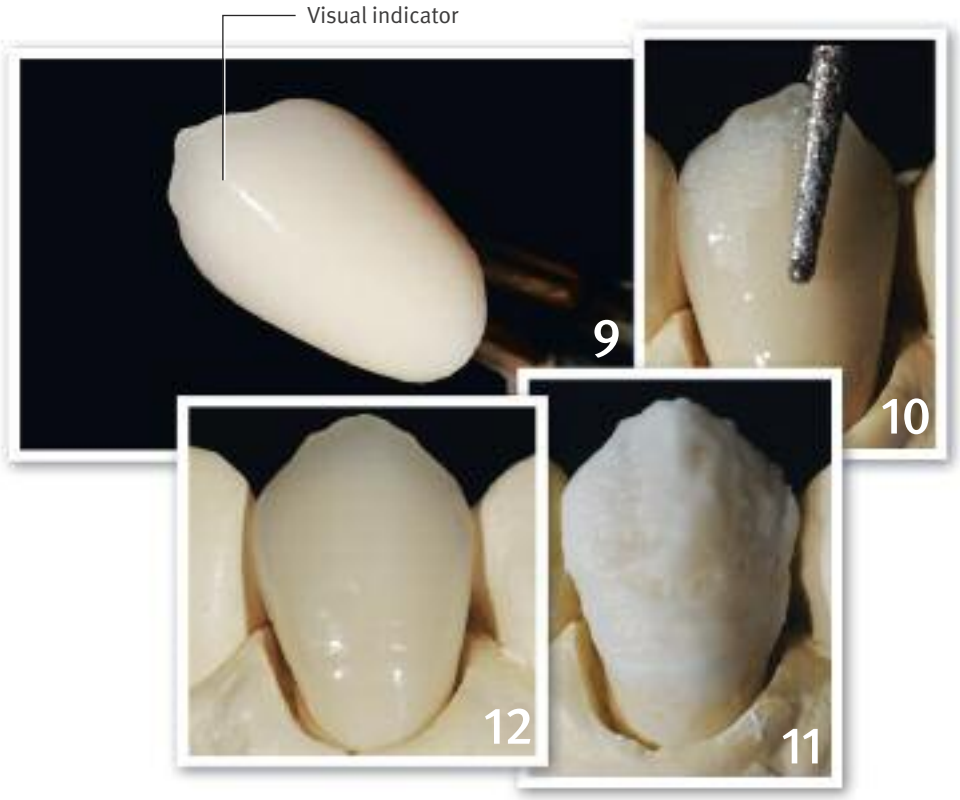
Standard Buildup (Anterior)

Standard Porcelain Buildup



9. Fire the buildup. A properly fired crown will exhibit a shiny surface with a small amount of texture.
10. Use a diamond bur to perform any necessary finishing.
11. Repeat process as necessary for a second porcelain application.
12. The finished restoration with esthetic, natural appearance.

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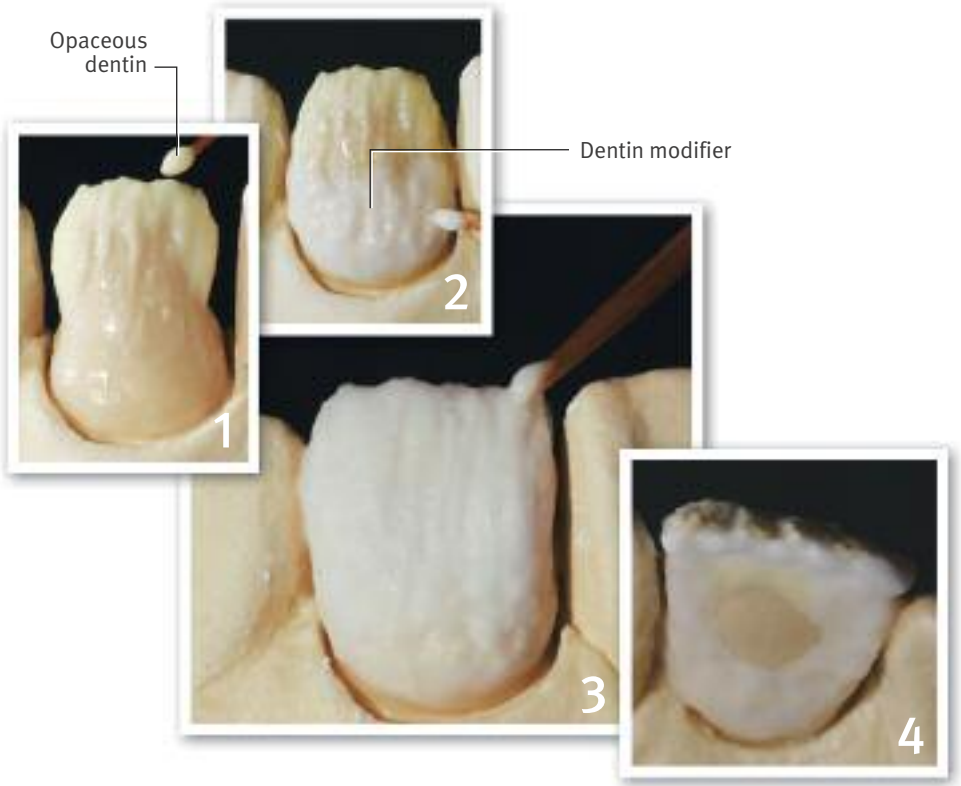
Standard Buildup (Anterior)

Advanced Porcelain Buildup



1. Apply opaceous dentin porcelain. For a FPD, apply to saddle area of pontic and seat framework.
2. Use dentin modifier as necessary to address deep dentin zones.
3. Frame mesial and distal lobes and build to contour.
4. Cut back dentin for the enamel porcelains and related effects.

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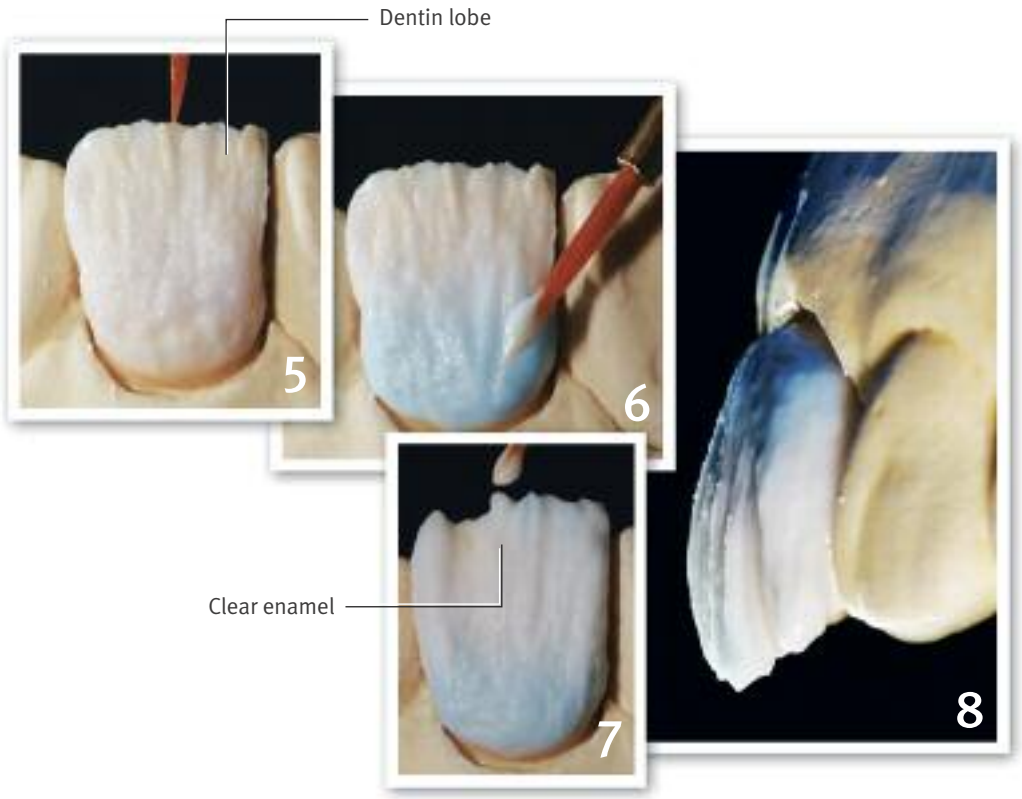
Advanced Buildup (Anterior)

Advanced Porcelain Buildup



5. Place mamelon porcelain on the dentin lobes to achieve mamelon effect.
6. Apply Natural Enamel Porcelain to the incisal or occlusal one third.
7. Use clear enamel porcelain arranged in parallel columns to create contrast.
8. Note contour of buildup and take care not to overbuild when compensating for porcelain shrinkage.

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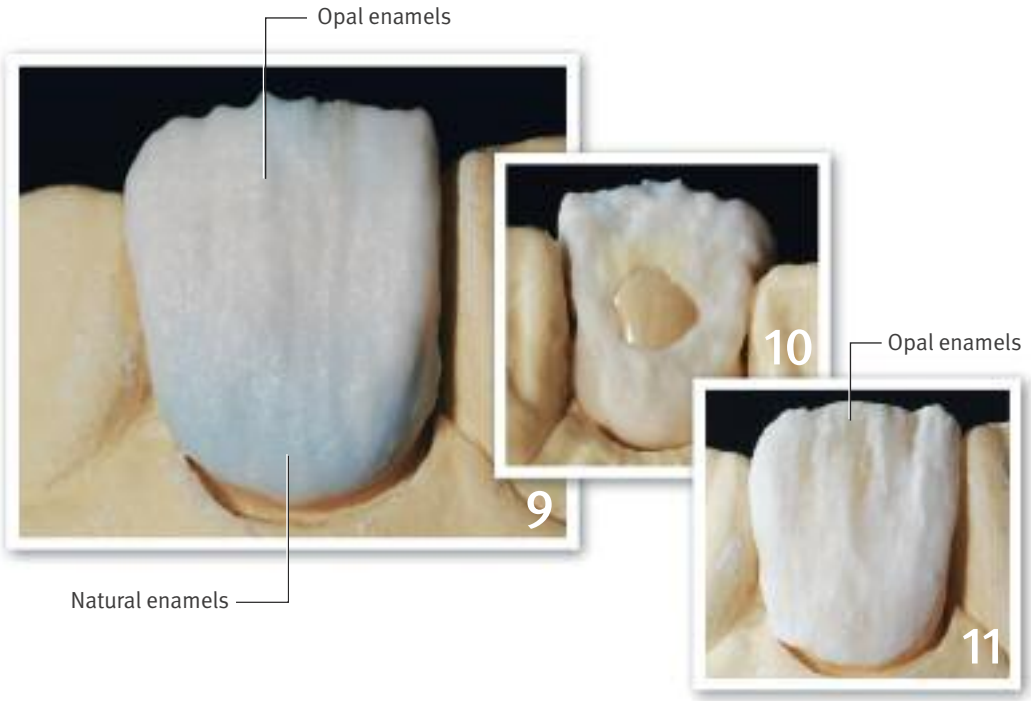
Advanced Buildup (Anterior)

Advanced Porcelain Buildup



9. Continue application of Clear, Opal, and Natural Enamels to full contour.
10. Verify proper application of enamel porcelains on lingual aspect.
11. Apply Opal Enamel Porcelain that matches the dentin; layer Opal Enamel Porcelain on the lingual aspect as well.

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Advanced Buildup (Anterior)

Advanced Porcelain Buildup

12. Dry the buildup and fire to specifications. A proper visual indicator is shiny with a very small amount of surface texture.
13. Use diamond burs under irrigation to refine anatomy.
14. Apply second layer of corresponding dentin and enamel porcelains and fire accordingly.
15. Completed restoration demonstrates natural light transmission and esthetics.

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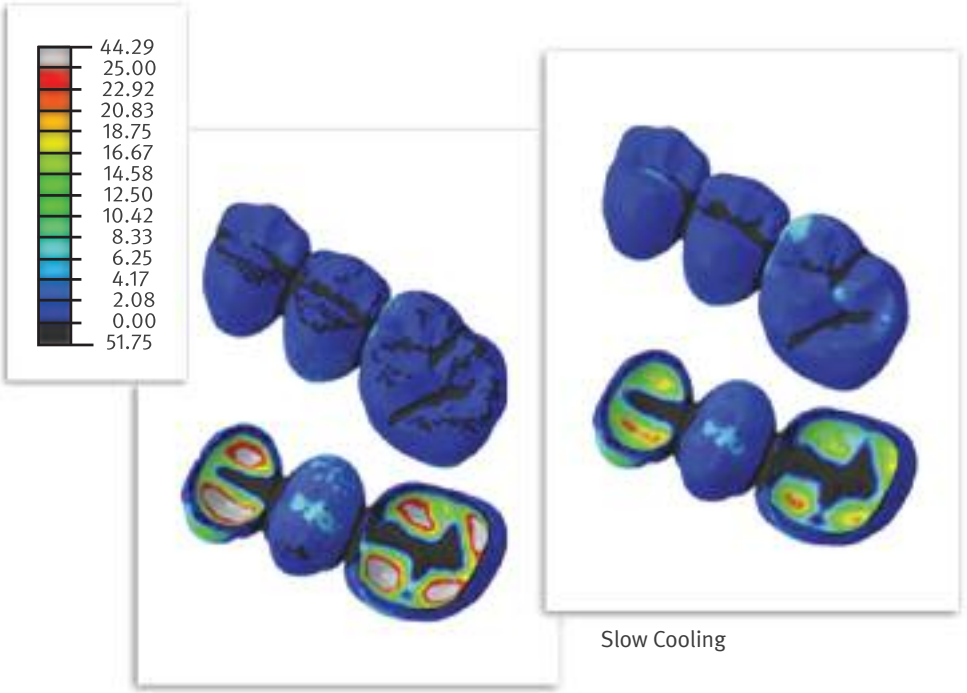
New Cooling Process

IMPROVES RELIABILITY OF CERAMCO® PFZ



Slow Cooling

Standard Cooling

Research[1] has shown that all-ceramic systems can incorporate higher residual tensile stresses, with conventional firing cycles.

However ceramists can minimize tensile stresses, and the incidence of chipping by using the newly developed firing schedule for Ceramco PFZ. This incorporates a 6 minute cooling cycle. Chipping incidents then become comparable to or better than very low PFM rates, in a test lasting over a million stress cycles.

[1] Ref: Rues S, et al. Effect of firing protocols on cohesive failure of all-ceramic crowns. Journal of Dentistry (2010)

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Slow Cool Process

New Cooling Process

IMPROVES RELIABILITY OF CERAMCO® PFZ

Steps the lab can take to maximize success with Cercon®/Ceramco® PFZ

- Always design frameworks with balanced porcelain support and smooth, rounded line angles
- Comply with crown wall thickness and pontic cross section recommendations
- Use the new firing cycle, and adjust only with a high speed water cooled handpiece.

Steps the dentist can take to maximize success

- Stay within system indications in prescriptions
- Use chamfered or rounded shoulder preparation with appropriate reduction
- Polish any adjustments with fine diamonds, and water cooling.

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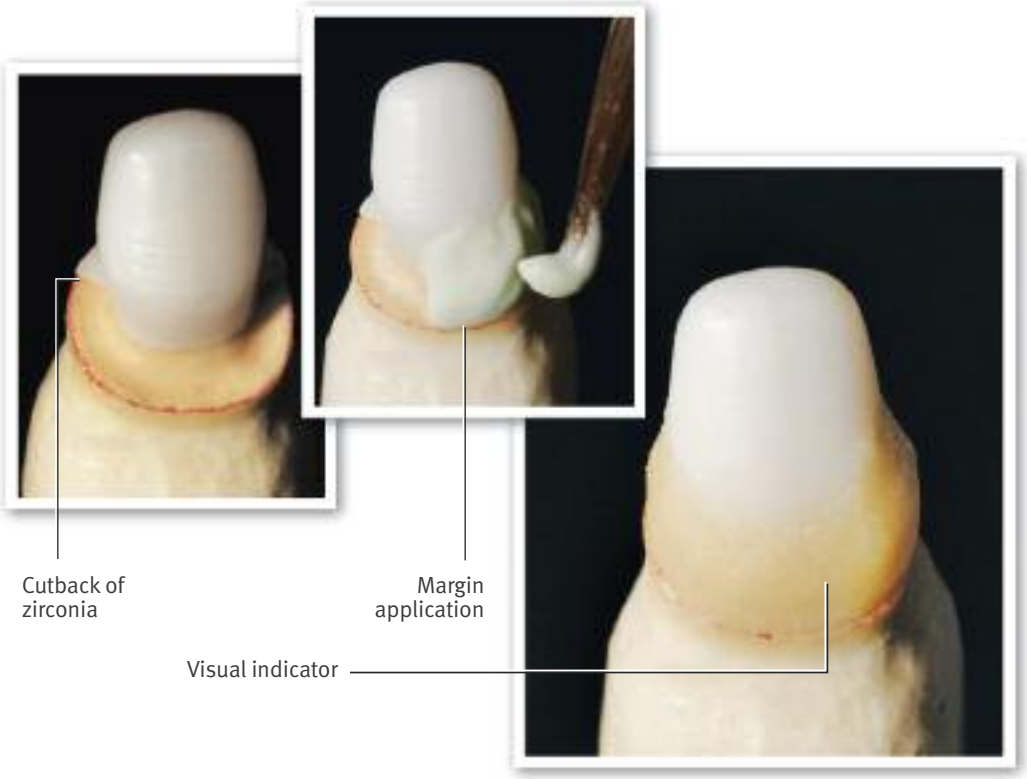
Slow Cool Process

FIRST MARGIN APPLICATION

Esthetic Gingival Margins



- Ensure the coping is properly reduced. Place shaded margin porcelain on palette and mix with Ceramco PFZ Margin Liquid.
- Apply porcelain to the gingival area, extending down to but not over the margin. Allow margin porcelain to dry to a chalky, hard appearance. The correct visual indicator will be shiny yet grainy.
- Complete the 3-minute dry and 3-minute preheat cycles to remove organic material and avoid discoloration.

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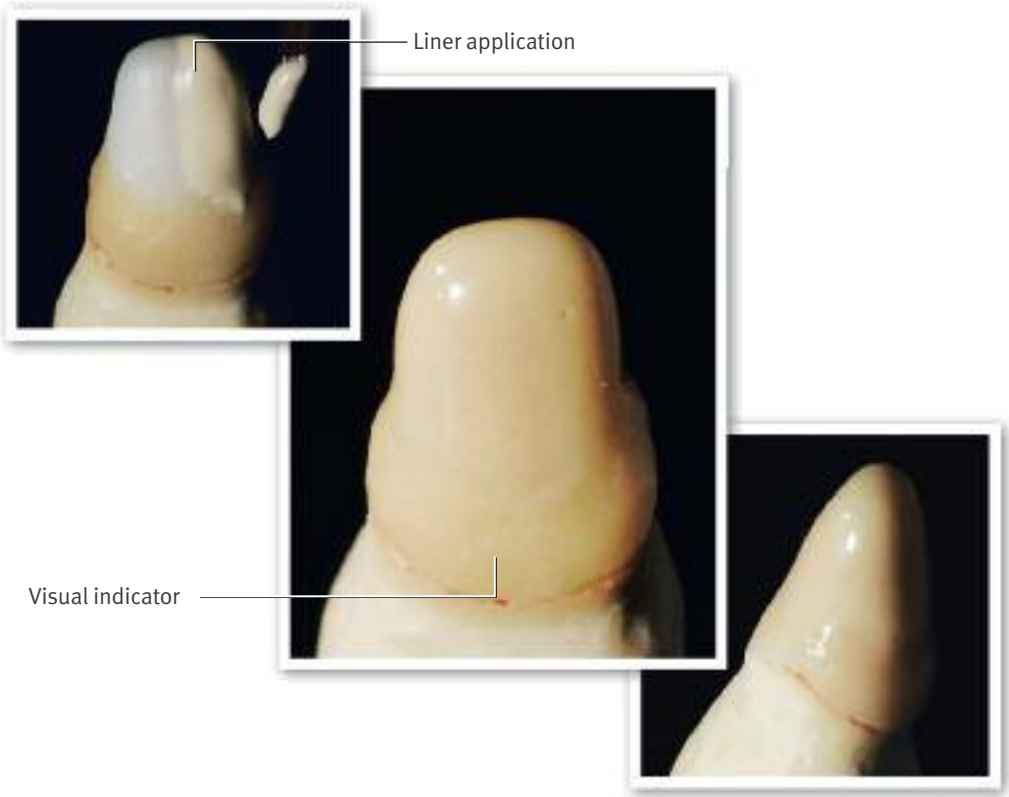
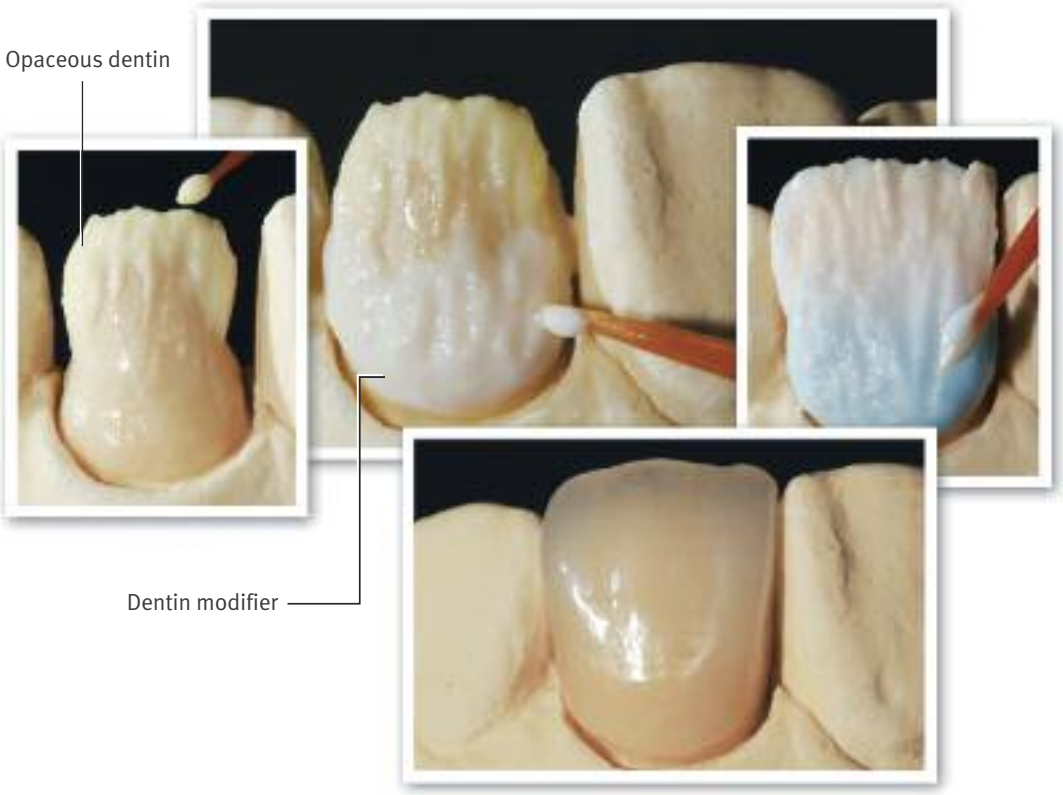
SECOND MARGIN APPLICATION

Esthetic Gingival Margins



- Make a new mix of margin porcelain and Ceramco PFZ Margin Liquid and apply the mixture to the gingival margin.
- Dry and fire the restoration according to the recommended temperatures. The visual indicator is shiny yet grainy.
- Apply and fire the liner according to the recommended procedures.
- Tight adaptation should be evident upon completion.

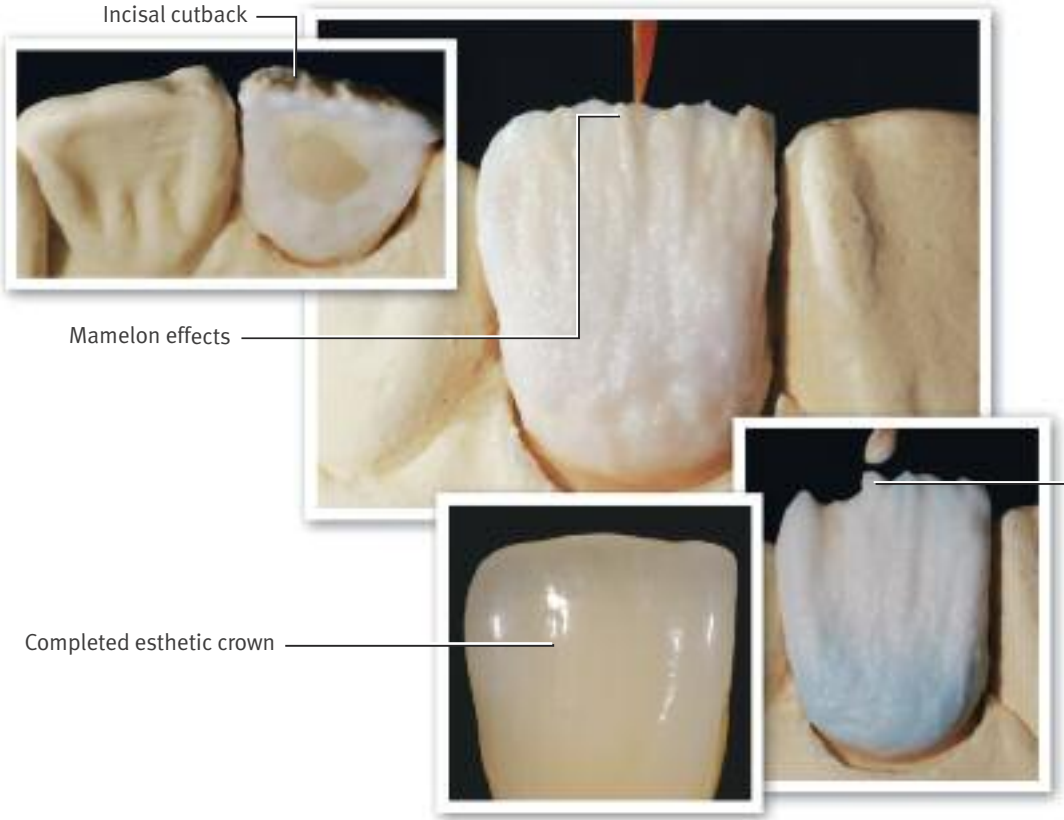
Deep Dentin Zones



When deep dentin zones are encountered, it is possible to mask these areas using dentin modifiers.

- Apply a layer of opaceous dentin porcelain to achieve natural light transmission incisally.
- Layer in dentin modifier along the gingival third and contour.
- Complete the dentin, enamel, and effect buildups and fire the restoration in the normal manner.

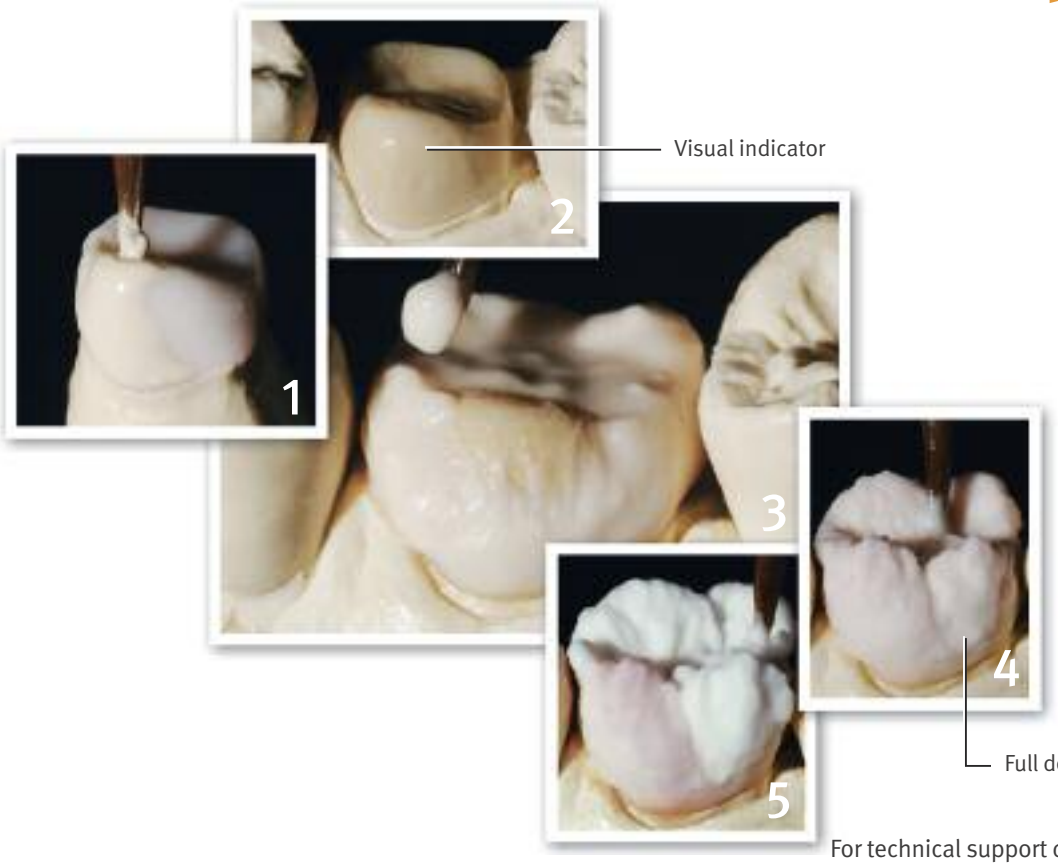
Translucency in the crown



To replicate natural light transmission, it is necessary to create translucency in ceramic restorations.

- Cut back the completed dentin layer before layering in enamel and effect porcelains.
- Layer in mamelons and characterize incisal edges with Natural Enamel Porcelains.
- Complete enamel buildup and fire to achieve desired translucency.

Standard Porcelain Buildup



1. Apply thin coat of liner in an even layer over the coping.
2. Dry and fire the coping according to recommended temperatures. The correct visual indicator is a shiny surface.
3. Select correct shade and apply modified dentin to cervical third.
4. Apply dentin porcelain to full contour and cut back for enamel porcelains.
5. Add Natural Enamel Porcelain occlusally and extend to mesial and distal aspects.

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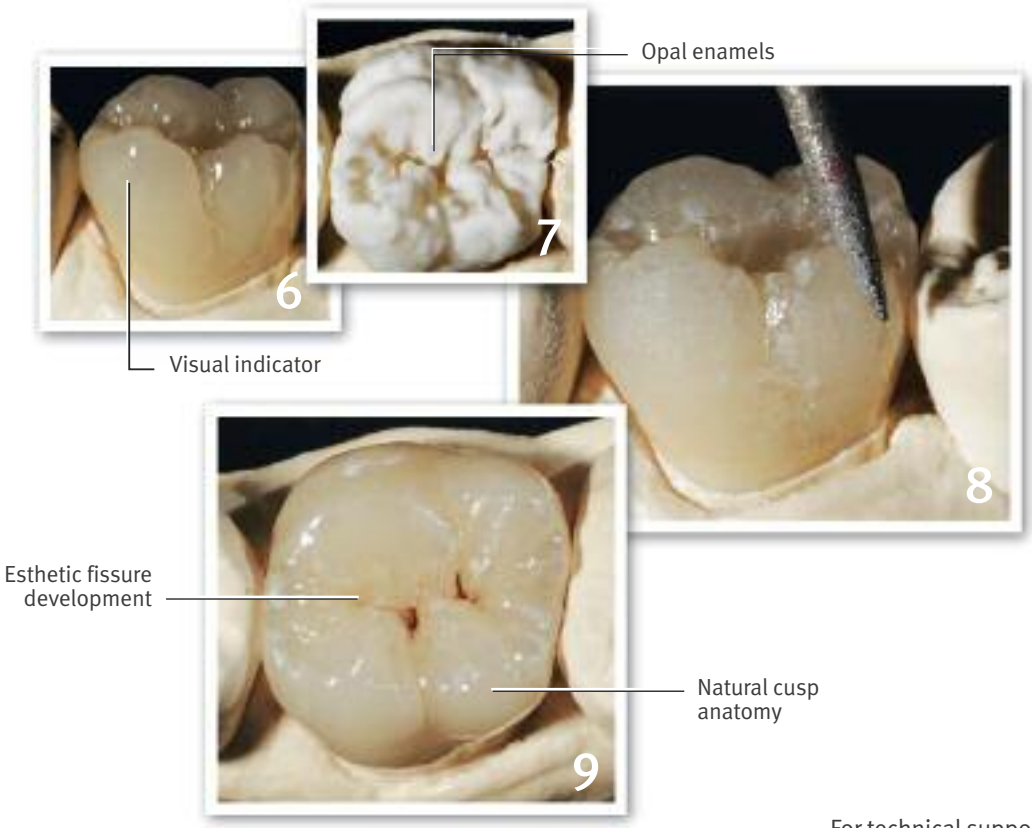
Standard Buildup (Posterior)

Standard Porcelain Buildup



6. Fire at recommended temperatures. A correct visual indicator is shiny with a very small amount of surface texture.
7. Continue with second application of Opal Enamel Porcelains as required.
8. Refine anatomy using diamond burs, using water irrigation as necessary.
9. Fire the completed porcelain buildup. A properly fired crown will exhibit a shiny surface with a small amount of texture.

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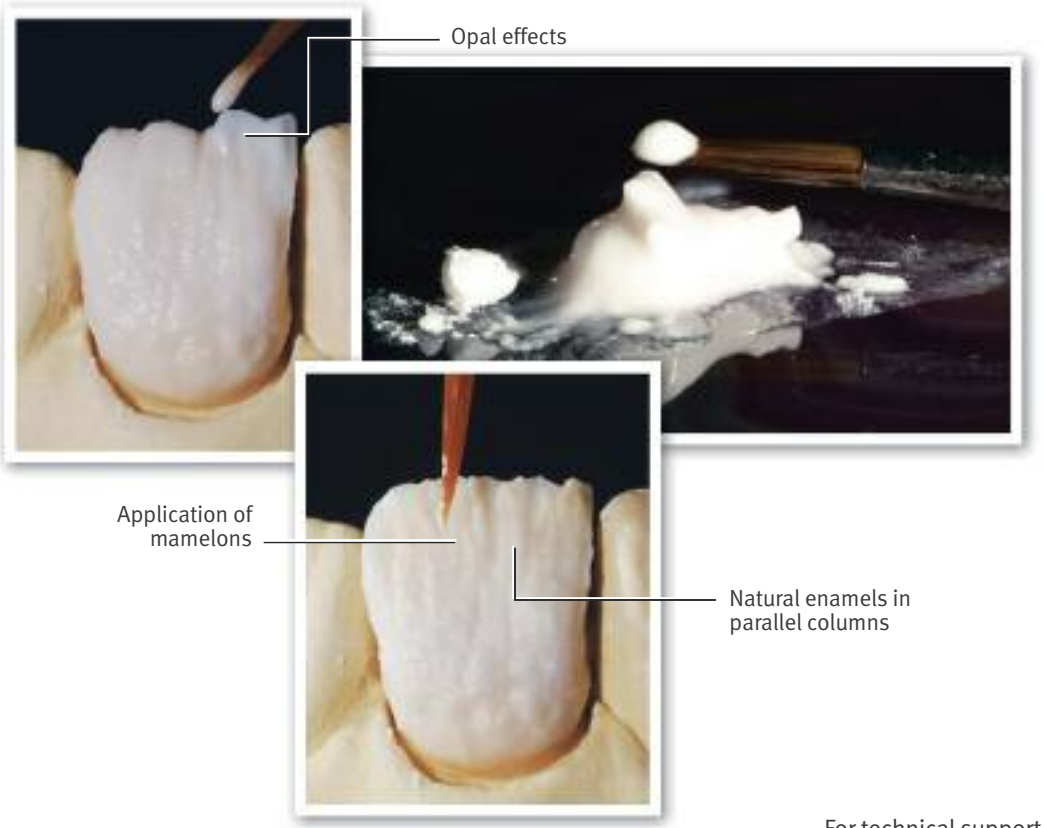
Standard Buildup (Posterior)

Mamelon & Opal Effects



Ceramco PFZ Natural Enamels can be layered over the dentin to duplicate the vitality of natural teeth.

- Mix the Natural Enamels with the dentin or Opal Enamel Porcelains for a variety of characterizations.
- Mix the Ceramco PFZ Opal Enamels with the Natural Enamels or use them as effect powders.
- Place mamelon porcelains on the dentin porcelain lobes prior to applying enamel porcelains.

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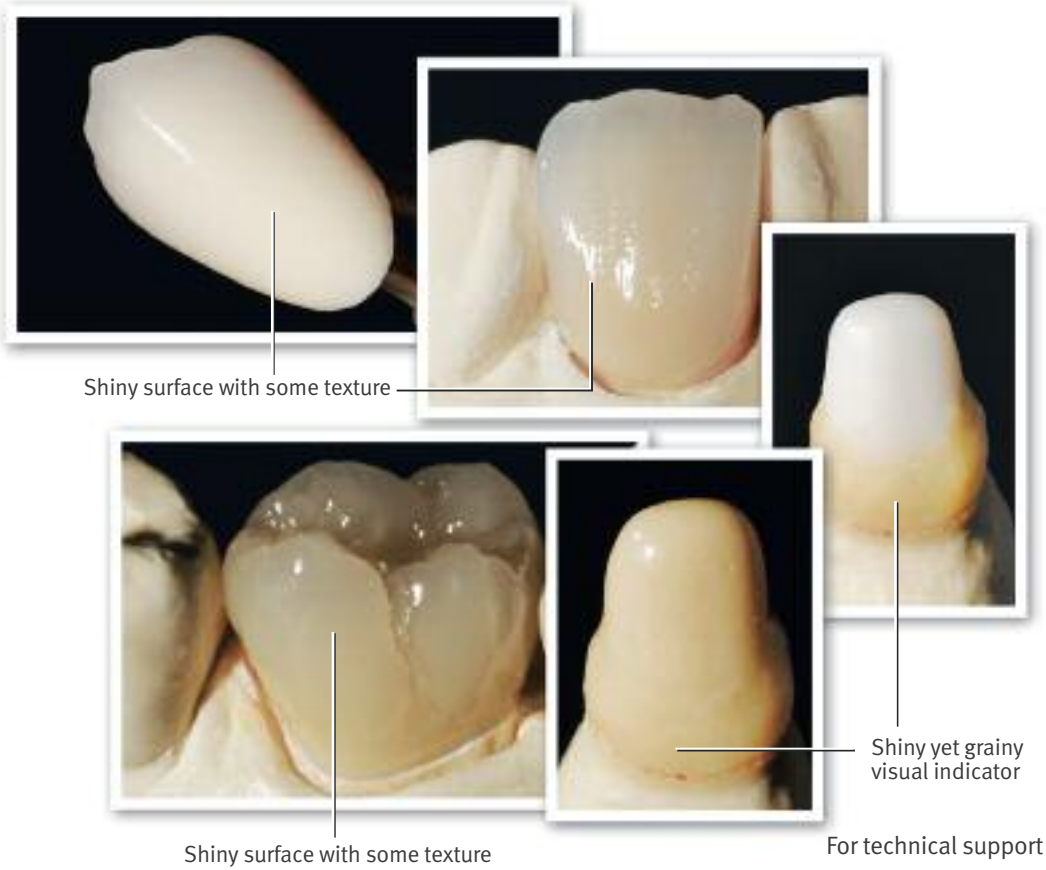
Visual Indicators



Through the ceramic buildup, it is important to follow visual cues depicting the successful completion of a given step. Following here are several images that accurately demonstrate the intended result.

Completed Crown Buildup

A properly fired crown will exhibit a shiny surface with a small amount of texture.

Completed Margin Porcelain

The correct visual indicator will be shiny yet grainy.

Zirconia Shade Table

Shade	Natural Enamel	Opal Effect Enamel	Margin Porcelain	Mamelon	Dentin Modifier	Shade
A1	Extra Light	Opal Light	A1	Yellow-Orange	A1	A1
A2	Light	Opal Light	A1	Yellow-Orange	A1	A2
A3	Light	Opal Light	A3	Red-Orange	A1	A3
A3.5	Light	Opal Medium	A3	Red-Orange	A3.5	A3.5
A4	Medium	Opal Medium	A4	Red-Orange	A3.5	A4
B1	Extra Light	Opal White	B2	Yellow-Orange	B1	B1
B2	Light	Opal Light	B2	Yellow-Orange	B1	B2
B3	Medium	Opal Light	A3	Red-Orange	B3	B3
B4	Medium	Opal Light	A4	Red-Orange	B3	B4
C1	Light	Opal Light	C1	Yellow-Orange	C1	C1
C2	Medium	Opal Light	C1	Yellow-Orange	C1	C2
C3	Medium	Opal Medium	C3	Red-Orange	C3	C3
C4	Medium	Opal Medium	C3	Red-Orange	C3	C4
D2	Extra Light	Opal Light	C1	Yellow-Orange	A1	D2
D3	Medium	Opal Light	A3	Yellow-Orange	B1	D3
D4	Medium	Opal Light	A3	Red-Orange	C3	D4

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Shade Table

CERAMCO® PFZ PZ SHADE SERIES SHADES

Build-up Technique

PFZ PZ Shade Series Shade	Keyed to Vita 3D-Master®[1] Shade Series	Liner/ Opaceous Dentin/Dentin	Enamel	Margin	Dentin Modifier	Opal Effect Enamel	Mamelon
101	1M1	101	PFZ Light	A1	A1	Light	Y-O
102	1M2	102	PFZ Light	B2	A1	Light	Y-O
203	2L1.5	203	PFZ Light	B2	A1	Light	Y-O
204	2L2.5	203	PFZ Light	B2	A1	Light	Y-O
205	2M1	205	PFZ Light	B2	B1	Light	Y-O
206	2M2	206	PFZ Light	B2	B1	Light	Y-O
207	2M3	207	PFZ Light	B2	A1	Light	Y-O
208	2R1.5	208	PFZ Light	B2	B1	Light	Y-O
209	2R2.5	209	PFZ Light	A3	B1	Light	Y-O
310	3L1.5	310	PFZ Light	C1	B1	Light	Y-O
311	3L2.5	311	PFZ Light	A3	B3	Light	Y-O
312	3M1	312	PFZ Light	C1	B1	Light	Y-O
313	3M2	313	PFZ Light	C3	B1	Light	Y-O
314	3M3	314	PFZ Light	A3	B3	Light	Y-O
315	3R1.5	315	PFZ Light	C3	A1	Light	Y-O
316	3R2.5	316	PFZ Light	A3	B3	Light	Y-O

[1]Vita® and 3D-Master® are registered trademarks of Vita Zahnfabrik H. Rauter GmbH & Co.

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Conversion Table

CERAMCO® PFZ PZ SHADE SERIES SHADES

Build-up Technique

PFZ PZ Shade Series Shade	Keyed to Vita 3D-Master®[1] Shade Series	Liner/ Opaceous Dentin/Dentin	Enamel	Margin	Dentin Modifier	Opal Effect Enamel	Mamelon
417	4L1.5	417	PFZ Medium	C3	B1	Light	Y-O
418	4L2.5	418	PFZ Medium	A4	A3.5	Medium	R-O
419	4M1	419	PFZ Medium	C3	C1	Light	Y-O
420	4M2	420	PFZ Medium	C3	A3.5	Medium	R-O
421	4M3	421	PFZ Medium	A4	A3.5	Medium	R-O
422	4R1.5	422	PFZ Medium	C3	C3	Medium	R-O
423	4R2.5	423	PFZ Medium	A4	A3.5	Medium	R-O
524	5M1	524	PFZ Medium	C3	C3	Medium	R-O
525	5M2	525	PFZ Medium	A4	A3.5	Medium	R-O
526	5M3	526	PFZ Medium	A4	A3.5	Medium	R-O

[1]Vita® and 3D-Master® are registered trademarks of Vita Zahnfabrik H. Rauter GmbH & Co.

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Conversion Table

Firing Temperatures

Firing Programs in °C

Program description	Time (min) Dry	Pre Heat	Vac Hold	Time (min) Hi Temp Hold	Cool	Vacuum Set Point (in Hg)	Set Temp Idle	Hi Temp	Temperature Vac Start	Vac Stop	Heat Rate °C/min	Night	Long Term Cooling (min)
Margin/Margin Modifier	5	5	0	15 sec	0	29	450	970	450	970	60	100	0
Liner, 1st bake	5	5	0	1 min	0	29	450	930	450	900	60	100	0
Liner, 2nd bake	5	5	0	0	0	29	450	920	450	900	60	100	0
Op Dentin/Dentin/Mod/Enamels, 1st bake	5	5	0	15 sec	0	29	450	900	450	900	60	100	0
Op Dentin/Dentin/Mod/Enamels, 2nd bake	5	5	0	0	0	29	450	890	450	890	60	100	0
Natural glaze/stains	5	5	0	30 sec	0	0	450	870			60	100	6
Overglaze/stains	5	5	0	30 sec	0	0	450	850			60	100	6
Add-On	5	5	0	0	0	29	450	860	450	860	60	100	6

Firing Programs in °F

Program description	Time (min) Dry	Pre Heat	Vac Hold	Time (min) Hi Temp Hold	Cool	Vacuum Set Point (in Hg)	Set Temp Idle	Hi Temp	Temperature Vac Start	Vac Stop	Heat Rate °F/min	Night	Long Term Cooling (min)
Margin/Margin Modifier	5	5	0	15 sec	0	29	842	1778	842	1778	108	212	0
Liner, 1st bake	5	5	0	1 min	0	29	842	1706	842	1652	108	212	0
Liner, 2nd bake	5	5	0	0	0	29	842	1688	842	1652	108	212	0
Op Dentin/Dentin/Mod/Enamels, 1st bake	5	5	0	15 sec	0	29	842	1652	842	1652	108	212	0
Op Dentin/Dentin/Mod/Enamels, 2nd bake	5	5	0	0	0	29	842	1634	842	1634	108	212	0
Natural glaze/stains	5	5	0	30 sec	0	0	842	1598			108	212	6
Overglaze/stains	5	5	0	30 sec	0	0	842	1562			108	212	6
Add-On	5	5	0	0	0	29	842	1580	842	1580	108	212	6

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Inspiration

"Today's ceramic materials afford unprecedented options in the dental laboratory. It's imperative for the technician to invest him or herself into a system, to understand its nuances and harmonies, when we're pursuing the ultimate goal—the patient's satisfaction."

–Adam J. Mieleszko, CDT, New York, NY

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Creating Art can be Challenging...

Building Restorations shouldn't be!

Ceramco PFZ porcelain utilizes the latest in advanced manufacturing processes to provide exceptional esthetics and the ease of use. This leucite-free porcelain is a cutting edge material that has incomparable thermal stability for increased productivity, while maintaining remarkable shade vitality and fluorescence of natural dentition.

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Porcelain For Zirconia

DENTSPLY | CERAMCO® PFZ
Porcelain For Zirconia

FOLD

FOLD

FOLD

FOLD

FOLD

FOLD

Rx only

RED = Die Cut