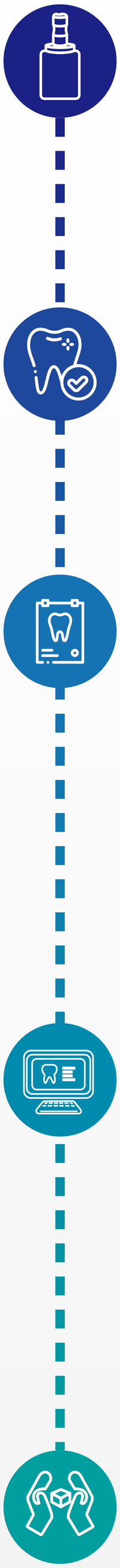
Instruction Manual

for Glazic Glass Ceramic Blocks

Workflow Overview



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Section 1: Product Overview

1.1 Main Composition

Glazic glass ceramic blocks are composed primarily of silicon dioxide (SiO2), aluminum oxide (Al2O3), lithium oxide (Li2O), potassium oxide (K2O), zirconium (hafnium) dioxide (Zr(Hf)O2), phosphorus pentoxide (P2O5), and other trace oxides. Designed for CAD/CAM production workflows, this material exhibits uniform pressing properties, excellent flexural strength (>400 MPa), and suitable pre-crystallization hardness and toughness that enable precise cutting, excellent marginal adaptation, long-term stability, and a highly natural opalescent translucency for superior esthetic results.

1.2 Product Advantages

- **Minimal Shrinkage**
  Crystallization shrinkage as low as 0.2%–0.3%.
- **Optimized Hardness**
  Enables high milling accuracy and extends bur life.
- **High Translucency**
  Mimics natural enamel for enhanced esthetics.
- **Enhanced Machinability**
  >400 MPa strength—20% higher than industry averages—supports diverse restorations and minimizes edge chipping.
- **Ultra-Thin Margins**
  Pre-crystallization strength allows margins as thin as 0.3 mm without chipping.

1.3 Physical & Chemical Properties

Property	Value
Density	≥2.2 g/cm³
Flexural Strength	≥400 MPa
Chemical Solubility	<100 μg/cm²
Radioactivity	≤10 Bq/g (U-238 activity concentration)
Glass Transition Temperature	530 ± 20°C
Coefficient of Thermal Expansion (CTE)	$(9.7 \pm 0.5) \times 10^{-6}\ K^{-1}$

Biocompatibility

Test Item	Result
Intradermal Test	Difference in mean score < 10
Delayed Hypersensitivity	None observed
Cytotoxicity	Slight (Grade 1)
Genotoxicity	Negative (Ames test, chromosomal aberration, TK gene mutation)
Acute Systemic Toxicity	Not observed
Subchronic Systemic Toxicity	Not observed

Physical and Chemical Properties

Property	Value
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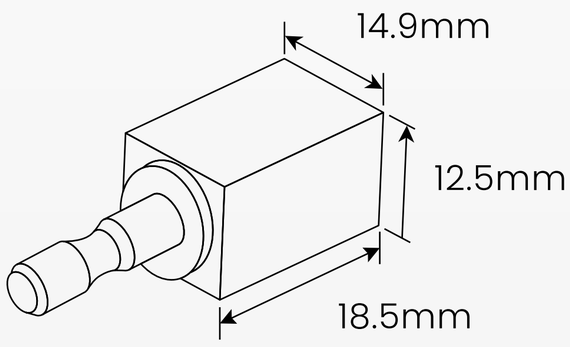
1.4 Sizes and Shades

Glazic glass ceramics are available in:

Shades

Size



Translucency

- **HT (High Translucency):** Ideal for small restorations (inlays, onlays, etc.) or restorations on naturally colored abutments.
- **LT (Low Translucency):** Provides masking ability for slightly discolored abutments and is suitable for cut-back restorations.

Section 2: Indications & Contraindications

Glazic Glass Ceramic is suitable for the production of single crowns, inlays/onlays, veneers, and three-unit anterior bridges.

2.1 Indications

Block Type	Restoration Type									Processing Technique	
	Inlay	Onlay	Veneer	Cut-back Crown	Anterior Full Crown	Posterior Single Crown	Partial Crown	Anterior 3-Unit Bridge	Implant-Supported Crown	Staining Technique	Cut-back Technique
											
HT	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
LT			✓	✓	✓	✓		✓	✓	✓	✓

2.2 Contraindications

Contraindicated for patients with allergies to any component of glass ceramics.

Also not recommended for:

- Full-coverage veneers on molars
- Deep subgingival preparations
- Severely atrophied dentition
- Patients with severe bruxism or high occlusal forces

Section 3: Clinical Guidelines

3.1 Shade Selection – Tooth Shade or Prepared Tooth Shade

Patients seek restorations that are esthetically natural and functionally reliable. To achieve this, both dentists and dental technicians must follow the principles below:

The esthetic outcome of an all-ceramic restoration is affected by the following factors:

- Shade of the prepared tooth (natural tooth or post-core preparation)
- Shade of the restoration (crown, veneer, personalized effect)
- Shade of the bonding material

Shade matching should be performed:

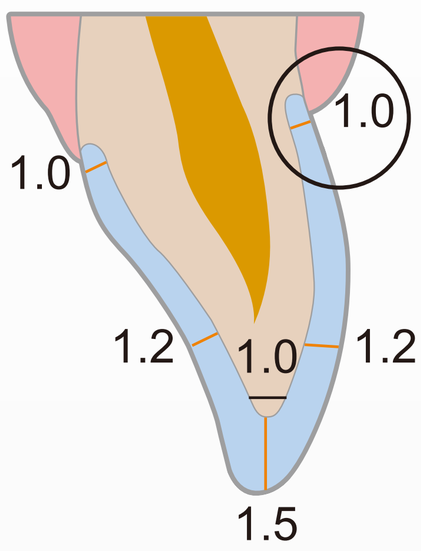
- Before preparation and after cleaning
- Under natural daylight or light with color temperature between 5500K–6500K
- Without strong contrast (avoid bright clothes or lipstick)

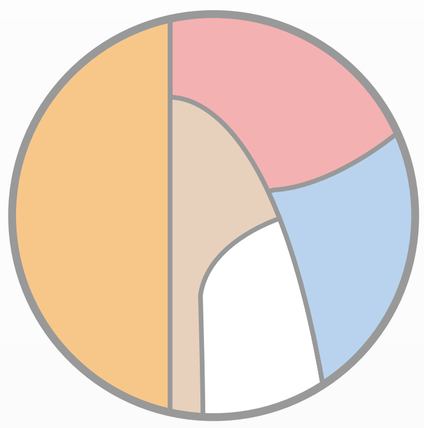
3.2 Tooth Preparation

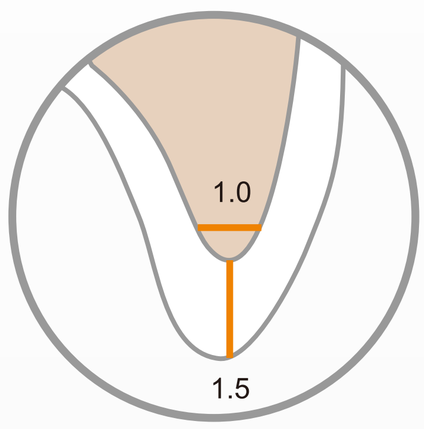
- Avoid sharp edges and corners
- Create a rounded shoulder or deep chamfer finish line
- Ensure minimum required thickness for each indication
- Anterior incisal edge: ≥1.0 mm

3.3 Anterior Crowns

- Full contour must meet minimum thickness requirements
- Rounded shoulder or deep chamfer: ≥1.0 mm
- Incisal edge: ≥1.5 mm
- Labial/lingual walls: ~1.2 mm
- Adequate retention required for conventional or self-adhesive cementation

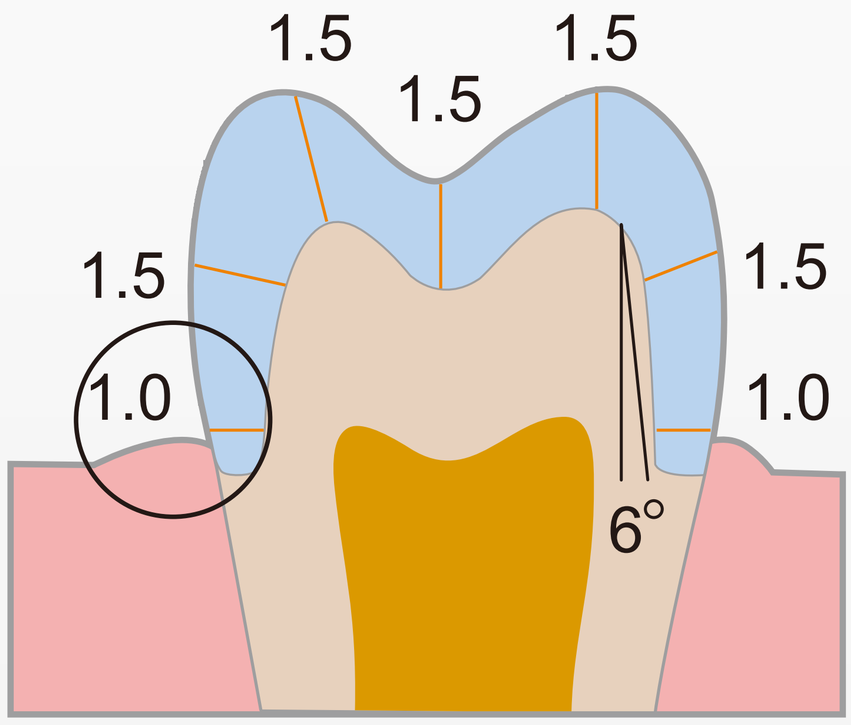






3.4 Posterior Crowns

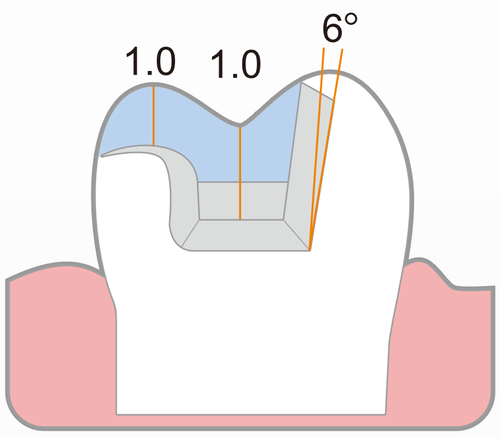
- Rounded shoulder width: ≥1.0 mm
- Occlusal thickness: ≥1.5 mm
- Buccal/lingual wall thickness: ≥1.5 mm

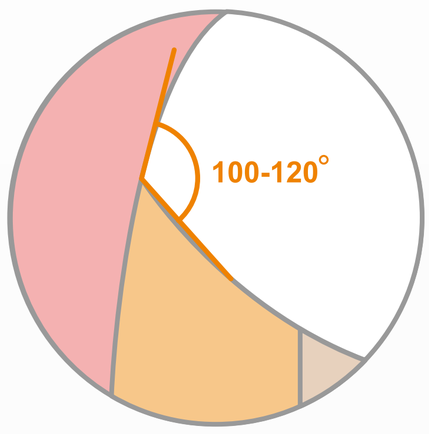


3.5 Inlays / Onlays / Partial Crowns / Veneers

Inlays

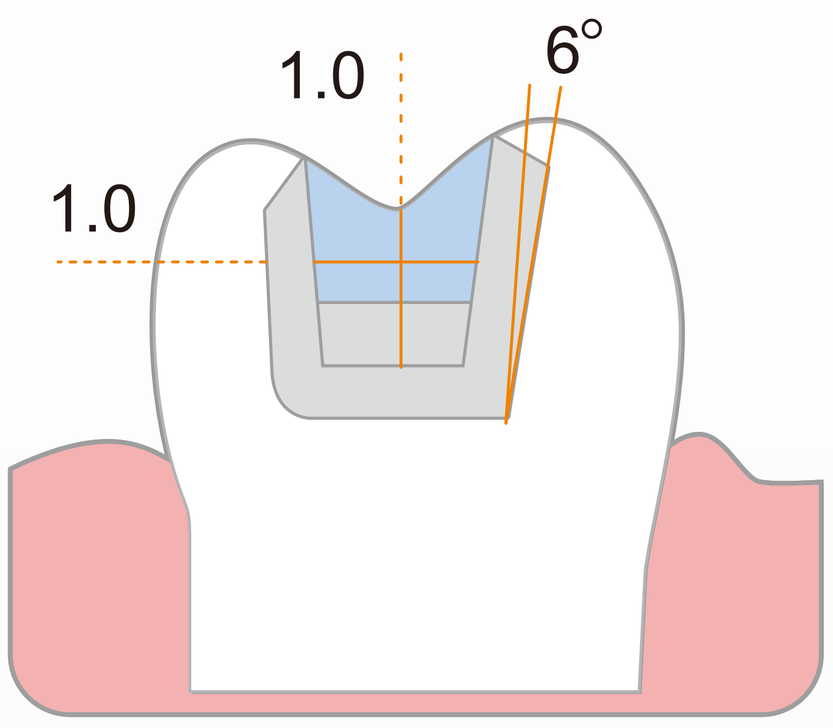
- Avoid placing margins on stress concentration points
- Minimum prep depth: ≥1.0 mm
- Marginal ridge width: ≥1.0 mm
- Proximal walls: rounded internal angles, 100–120°
- Avoid convex preparations without defined margins or shoulder
- Emphasize internal bulk to prevent stress concentration
- Avoid thin or feathered edges





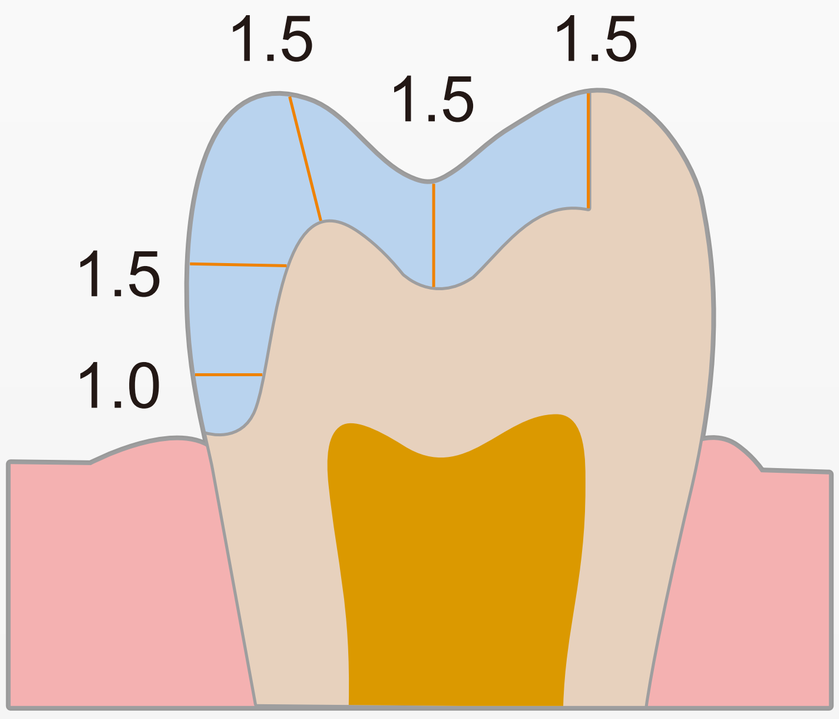
Onlays

- Same as inlay prep principles
- Cusp tip thickness: ≥1.0 mm
- Avoid thin or feathered edges
- Avoid convex preps lacking support
- Maintain rounded internal angles, 100–120°



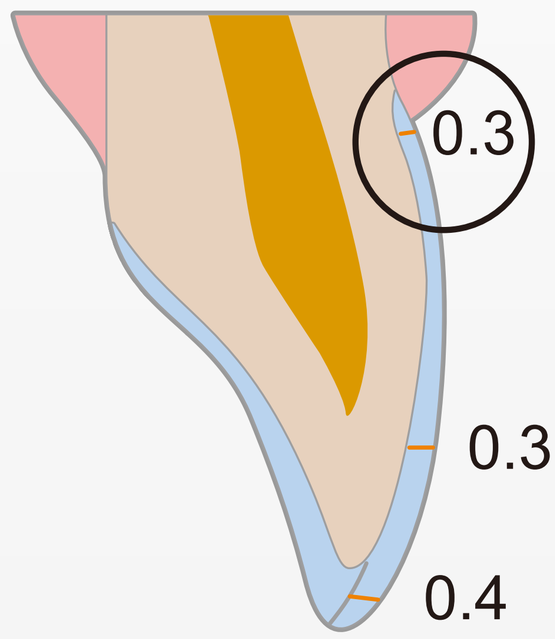
Partial Crowns

- Avoid placing margins on stress points
- Cusp tip thickness: ≥1.5 mm
- Rounded shoulder or deep chamfer: ≥1.0 mm



Veneers

- Preferably limited to enamel layer
- Margin thickness: ≥0.6 mm (cervical), ≥0.7 mm
- (incisal)
- Avoid incisal stress points



Section 4: CAD/CAM Workflow Guidelines

4.1 Scanning

Use intraoral or lab scanners to acquire data, Calibrate equipment regularly to ensure scanning accuracy

4.2 Design

- Follow recommended minimum thickness (see section 3 for preparation guidelines)
- Avoid designing sharp incisal edges on prepared anterior teeth. If unavoidable, activate drill compensation/anticipate milling in the CAD software to create adequate space for milling and ensure an accurate fit over the prepared tooth.
- Consider thickness of the bonding coating based on abutment condition and milling system precision.
- Avoid undercuts when defining the insertion path.

4.3 Nesting

- Adjust connector diameter according to the size of the restoration (typically 1.2–3.0 mm).
- Ensure proper orientation of the restoration without undercuts.
- Position the connector on a convex surface, away from the margin line and proximal contact areas.

4.4 Milling

- Perform routine maintenance on the milling unit, including calibration, cleaning, and lubrication, to ensure stable operation without vibration or abnormal noise.
- Replace any worn or damaged components promptly.
- Track the number of uses for each milling bur; only use burs within their recommended lifespan.
- Always verify correct bur installation order.
- Ensure milling fluid meets required concentration and fill level, and that coolant spray fully covers the bur tip.
- Confirm the glass ceramic block is securely seated in the holder; improper insertion may lead to dimensional inaccuracies.
- Verify sufficient air pressure to support consistent milling performance.

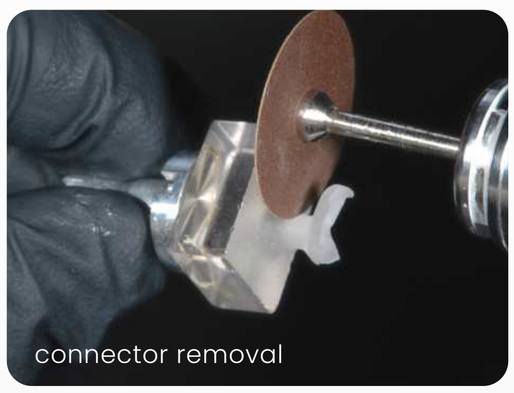
4.5 Finishing & Polishing

- Always use polishing tools specifically designed for glass ceramics.
- Proper tool selection is essential to avoid edge damage or heat-induced microcracks.
- Ensure continuous water cooling during grinding, and use a low-vibration handpiece.
- Place a clean soft towel or sponge pad on the work surface to prevent accidental drops that may cause chipping or fractures.

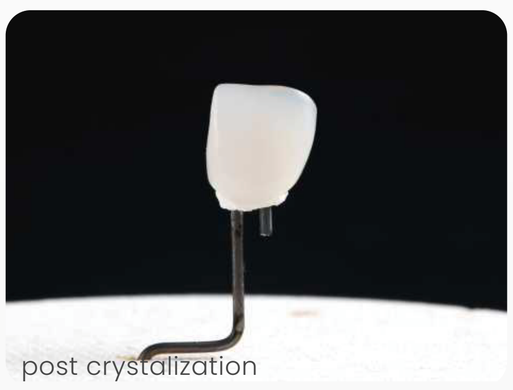
Operating steps:

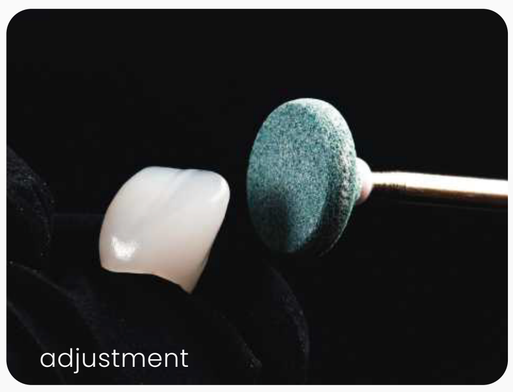
- **Separation:** Use a diamond disc to separate the restoration. Position the disc near the metal sprue holder and avoid contact with the restoration margin to prevent damage.
- **Connector Removal:** Before grinding, apply a small amount of water to the area to prevent overheating during adjustment.
- **Direct Crystallization:** If the restoration is milled accurately with a smooth, glossy surface and requires no contour adjustments, remove and smooth the sprue, then proceed directly to crystallization.
- **Adjustment (if needed):** For cases requiring contour adjustments, follow the recommended polishing protocol:
- **Coarse Adjustment**
- **Pre-Polishing**
- **High-Gloss Polishing**
- **Try-In**


post-milling


connector removal


before crystalization


post crystalization


adjustment

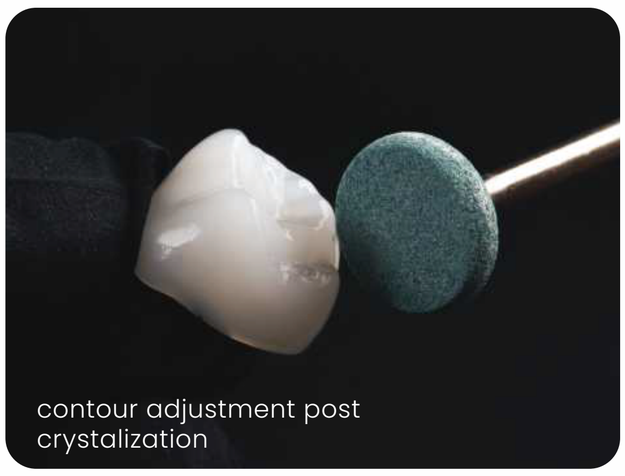

staining & glazing when necessary

Finishing & Polishing Guidelines

- Use one-directional motion, low speed, and light pressure to avoid edge chipping or overheating.
- If adjustment is necessary, it is recommended to perform it on the restoration prior to sintering.
- Avoid thermal damage: cool with water during grinding to prevent microcracks.
- Try-in the restoration on the model and adjust contact points carefully.
- Check proximal and occlusal contacts.
- After CAD/CAM processing, use fine-grit polishers to refine occlusal contacts and smooth the surface.
- After any minor adjustments, confirm that minimum material thickness is still within the safe range.
- Define surface texture as needed.
- Before crystallization, clean thoroughly using an ultrasonic cleaner and dry completely.
- Remove all residue (especially polishing debris) from the surface to avoid interference with bonding or discoloration.
- Do not polish with aluminum oxide or glass polishing powder.

separate the restoration with
a diamond disc

use low-speed handpiece to
grind the attachment point



contour adjustment post
crystalization

4.6 Crystallization & Glazing

Option A: One-Step Crystallization & Glazing (Combined Cycle – 840°C)

Applied for full anatomy restorations only with no additional ceramic build-up needed:

Crystallization and glazing are performed in a single cycle.

Recommended firing curve:

Before crystallization

Staining & glazing

Post crystallization

Recommended firing curve

Start Temperature	Heating Rate	Holding Temperature	Holding Time	Cooling Rate	Final Temperature
550°C	60°C/min	840°C	10 min	50°C/min	700°C

Option B: Two-Step Crystallization

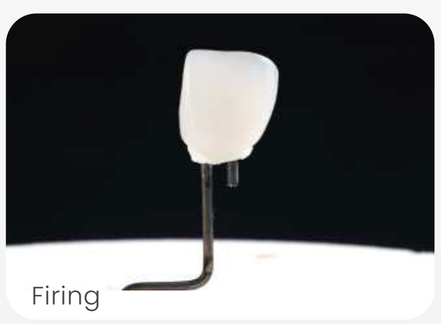
First crystallize the restoration, then apply external stain and glaze.

*Recommended: use Artamic Stain or low-temperature stain materials.

Before crystallization

Post crystallization

Staining & glazing



Firing

Crystallization Firing Parameters

Start Temperature	Heating Rate	Holding Temperature	Holding Time	Cooling Rate	Final Temperature
550°C	60°C/min	840°C	10 min	50°C/min	700°C

Artamic Stain Firing Parameters

Drying		Heating	Sintering		Furnace Opening
Temperature	Time	Rate	Firing Temperature	Holding Time	Temperature
450°C	6 min	45°C/min	740–820°C	3 min	600°C

Section 5: Additional Notes

If the restoration appears overly translucent after crystallization, a second crystallization cycle may be performed to reduce translucency. The recommended second crystallization temperature is 870°C. (Note: Not applicable for combined crystallization and glazing cycles.)

Cleaning: Thoroughly clean the restoration using steam or an ultrasonic cleaner before firing.

Drying: Ensure the restoration is completely dry prior to crystallization.

It is recommended to use firing paste to secure the restoration onto the firing pin.

Firing paste must fully cover sharp areas of the restoration, but must avoid contact with the surface. Contact with the restoration surface may cause a chemical reaction that leads to excessive bubbling in the glaze layer.

The restoration must not be in direct contact with the firing pin. Due to the higher specific heat of metal compared to air and ceramic, localized overheating may occur during temperature changes, resulting in microcracks.

After firing, allow the restoration to cool naturally. Avoid exposure to direct air-conditioning or drafts to prevent thermal shock and cracking. Do not remove the restoration until it has cooled completely. Do not use metal tweezers to handle hot restorations or quench them in water.

Do not use CAD/CAM systems that are incompatible with Glazic glass ceramic blocks.

Firing should be conducted under vacuum in a compatible porcelain furnace. After firing, remove the restoration only once the cycle is fully complete.

Place the restoration in a stable, force-free environment at room temperature after firing.

About Besmile

Besmile is a global digital solutions provider for restorative and implant dentistry.

We offer integrated systems—premium CAD/CAM materials, advanced equipment, and precision implant systems—designed to streamline workflows and ensure reliable results.

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Technology creates the best smile.

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