3M™ Lava™ Esthetic Fluorescent Full-Contour Zirconia

1 disc per pack
Disc height
14 mm
Disc height
18 mm
Disc height
22 mm
Shade Item No. Item No. Item No.
Bleach 69319 69327 69335
A1 69320 69328 69336
A2 69321 69329 69337
A3 69322 69330 69338
A3.5 69323 69331 69339
A4 69352 69361 69370
B1 69624 69332 69340
B2 69353 69362 69371
B3 69354 69363 69372
B4 69355 69364 69373
C1 69325 69333 69341
C2 69356 69365 69374
C3 69357 69366 69375
C4 69358 69367 69376
D2 69326 69334 69342
D3 69359 69368 69377
D4 69360 69369 69378
3 steps to excellent esthetics

This guide focuses on the three key steps for labs to achieve excellent esthetic results with 3M™ Lava™ Esthetic Fluorescent Full-Contour Zirconia. Like with every new material it is important to know the little details that make a big difference. This guide supports you to get to excellent results fast.

Before you start

This guide focuses on the three key steps for labs to achieve excellent esthetic results with 3M™ Lava™ Esthetic Fluorescent Full-Contour Zirconia. Like with every new material it is important to know the little details that make a big difference. This guide supports you to get to excellent results fast.

What you need to process 3M™ Lava™ Esthetic Zirconia

1. CAD/CAM system
   - Dry mill for 98 mm discs with step format
   - CAM module that allows scale factor input

2. Sintering furnace
   - Programmable zirconia sintering furnace to run dedicated Lava Esthetic Zirconia sintering cycle

3. Glaze material
   - Low fusing stain/glaze material for zirconia
   - Firing temperature below 900 °C

FAQ: Can I use dyeing liquids to improve shade match/characterize Lava Esthetic Zirconia restorations?
A: No, dyeing liquids must not be used. Dyeing liquids can reduce the strength of the material and compromise fluorescence and shade match. If you experience poor shade match, this is most probably related to the sintering process (see step 2). For characterization, use porcelain stains after sintering (see step 3).

General best practice recommendations for working with zirconia

In the pre-sintered state, zirconia materials are sensitive to contaminants. This is how you can prevent contamination:

- Separate zirconia working areas from areas where you work with metal, glass ceramics, porcelains, resins, silicones (e.g. putty materials), sandblasting sands, etc.
- Touch only with clean hands or with gloves
- Use a separate set of tools only for working on pre-sintered zirconia to avoid cross-contamination
- Use only oil-free pressurized air to remove dust
- Do not store pre-sintered zirconia restorations in contact with foams or plastic materials that might de-gas

Before using the products described in this guide, please refer to the instructions for use provided with the product packages.
Lava Esthetic Zirconia discs are available in all 16 VITA classical shades plus one Bleach shade. Select the disc shade according to the VITA classical target shade. All discs are pre-shaded with a shade gradient set vertically in the blank. The printed side of the blank marks the incisal zone. The incisal and transition zones are always 3 mm thick, only the thickness of the body zone varies with the disc height.

Please note:
Lava Esthetic Zirconia is designed for excellent shade match to VITA classical shades after glazing (see step 3). As with all zirconia materials the shades of Lava Esthetic Zirconia restorations appear darker when polished only.

Z-position and tilting recommendations.

Default z-position recommendation is at the top of the disc to capture the full incisal zone.

Screenshot of CAM Software, z-positioning in 18 mm disc

Tilt restorations such that from labial/palatinal (or buccal/lingual) view the tooth axis is perpendicular to the zones. From mesial/distal view tilt such that the milling path is ideal.
Program your sintering furnace with the 3M™ Lava™ Esthetic Zirconia sintering profile.

The only way to achieve high translucency and matching shades with Lava Esthetic Zirconia is by using the sintering profile shown here.

<table>
<thead>
<tr>
<th>Segment</th>
<th>Start Temp.</th>
<th>End Temp.</th>
<th>Heating Rate</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Heating ramp</td>
<td>25°C</td>
<td>800°C</td>
<td>20°C / min (300°C / hour)</td>
<td>39 min</td>
</tr>
<tr>
<td>2. Heating ramp</td>
<td>800°C</td>
<td>1500°C</td>
<td>10°C / min (600°C / hour)</td>
<td>70 min</td>
</tr>
<tr>
<td>3. Holding time</td>
<td>1500°C</td>
<td>1500°C</td>
<td>–</td>
<td>120 min</td>
</tr>
<tr>
<td>4. Cooling ramp</td>
<td>1500°C</td>
<td>800°C</td>
<td>15°C / min (900°C / hour)</td>
<td>47 min</td>
</tr>
<tr>
<td>5. Cooling ramp</td>
<td>800°C</td>
<td>250°C</td>
<td>20°C / min (1200°C / hour)</td>
<td>27 min</td>
</tr>
<tr>
<td>Total time</td>
<td></td>
<td></td>
<td></td>
<td>303 min (5h 03 min)</td>
</tr>
</tbody>
</table>

In general, zirconia materials are optimized for a certain sintering program. The same is true for Lava Esthetic Zirconia. Both under- and over-sintering will lead to a decrease in translucency and incorrect shades.

FAQ: We sinter all zirconia restorations together with a sinter program different from this recommendation. Can we sinter Lava Esthetic Zirconia with "our" program?
A: No. If it is not possible to sinter according to Lava Esthetic Zirconia sintering profile, then please refrain from using Lava Esthetic Zirconia in your lab.

FAQ: My furnace has a temperature gradient, how should I program it?
A: Set the temperature such that the maximum temperature of 1500°C is achieved in the hottest zone of the furnace.

What happens if 3M™ Lava™ Esthetic Zirconia sintering profile is not used?

Translucency
Sinter energy

Under-sintering (sintering shorter and/or at lower temperature)
Over-sintering (sintering longer and/or at higher temperature)

Control: Correctly sintered and glazed 3M™ Lava™ Esthetic Zirconia crown, A3.5, with decreased translucency and visible lines.
Over-sintered 3M™ Lava™ Esthetic Zirconia crown, A3.5, with decreased translucency, bleached shade and visible lines.
Still not getting good results? Check your furnace calibration!

Influence of MoSi₂ heating elements.

Even with a correctly programmed sintering cycle, over- or under-sintering might occur due to a defective heating element or thermo couple. Check the calibration of your sintering furnace in regular intervals according to the furnace manufacturer’s service and maintenance instructions. 3M offers temperature control rings to check if your furnace actually runs at the correct temperature levels during the Lava Esthetic Zirconia sintering cycle.

Two types of heating elements are used for zirconia sintering furnaces: Silicium carbide (SiC) and Molybdenumdisilicide (MoSi₂).

In general, with MoSi₂ heating elements there is a potential of contamination of the furnace atmosphere with Molybdenum. This leads to greenish/yellowish discoloration of zirconia restorations. Contamination may also be observed on the sintering trays and beads.

MoSi₂ heating elements are covered by a SiO₂ passivation layer that prevents Mo emission. Passivation layer damage can occur spontaneous or accelerated by exhaust from dyeing liquid shaded restorations. Cleaning cycles (empty firing at elevated temperature) restore the passivation layer.

What you can do to prevent Molybdenum contamination:
- Use only best quality MoSi₂ heating elements
- Use a separate MoSi₂ furnace only for pre-shaded materials to prevent passivation layer damage from liquid exhausts
- Regularly perform cleaning cycle firings to restore passivation layers
- Consider switching to a furnace with SiC heating elements

MoSi₂ heating element
SiO₂ passivation layer

Temperature control ring. Sinter the ring with the 3M™ Lava™ Esthetic Zirconia sintering cycle. Ring can be sintered together with restorations.

Compare ring diameter after sintering with diameter range provided by 3M for this ring lot. If the ring diameter is outside of the range, then furnace maintenance is recommended.

Ask your 3M representative for control rings and target diameter.
Which sintering trays and beads to use.

- Use only high-quality sintering trays such as high-purity alumina sintering trays. A lid helps to prevent contaminations.
- Trays must have openings for ventilation. Air circulation around the fired pieces during the sintering process is important to obtain the correct shade.
- Use only high-quality sintering beads (diameter approx. 1 mm) such as 3M™ Lava™ Sintering Beads to avoid contamination, sticking and misfit.
- Dedicate one tray with beads just for pre-shaded materials to prevent contamination of beads with liquids.
- With new beads and trays always perform a empty firing before using them with restorations.

How to position the restorations for sintering.

- Fill the tray with an ~3 mm thick layer of sintering beads.
- Position posterior restorations with occlusal facing down.
- Position anterior restorations labial facing up.
- Do not put the restorations deep into the beads, just lay them on top of the bead layer.

FAQ: If I load the furnace with many restorations – do I need to sinter longer or increase the sintering temperature?
A: No, this is not necessary for sintering furnaces. They provide enough energy to sinter a full load. Use only the recommended sintering cycle to prevent over-sintering.
How to glaze 3M™ Lava™ Esthetic Zirconia.

Glazing is recommended for finishing 3M™ Lava™ Esthetic Zirconia. Lava Esthetic Zirconia is designed for excellent shade match to VITA classical shades after glazing. Shades appear darker when polished only.

Carefully clean the restoration before glazing e. g. with a steam cleaner to ensure good wetting of the glaze.

Apply glaze (spray or brush). Low-temperature (< 900 °C) firing glazes and stains suitable for use with zirconia must be used. Examples of compatible glazes:
- Creation ZI / ZI-F Glaze
- InSync Stain & Glaze
- IPS e.max® Ceram Glaze
- VITA AKZENT® Plus LT Glaze
- Amann Girrbach Ceramill® Glaze

Fire glaze. Vacuum during holding time is not recommended. Firing cycle example for IPS e.max® Ceram Glaze: Heating rate 60°C/min to 770°C with vacuum on, holding time 2 min with no vacuum. Program code for Dekema Austromat 3000: C450 T180 T180.L9 V9 T060.C770 V0 T120 C0 L7 T180 L0 T2 C450

FAQ: Are multiple firings OK?
A: Yes. For multiple firings it is recommended to use glazes with lowest possible glaze temperatures to avoid bleaching of the shade.

What happens if 3M™ Lava™ Esthetic Zirconia is glazed at too high temperature (> 900°C)?

Zirconia is an oxygen conductor at elevated temperatures. Shading elements within the zirconia may change color depending on temperature and furnace atmosphere.

FAQ: Are multiple firings OK?
A: Yes. For multiple firings it is recommended to use glazes with lowest possible glaze temperatures to avoid bleaching of the shade.
Indication range
∙ Crowns
∙ Bridges with a maximum of one pontic that must be supported on each side by a crown (prosthesis not to exceed three units)
∙ Inlays/onlays
∙ Veneers

Minimum bridge connector cross-sections
∙ ≥ 12 mm² anterior
∙ ≥ 14 mm² posterior

Cementation
∙ Sandblast bonding surface with alumina grain size 30 to 50 µm at 2 bars
∙ Recommended cement: 3M™ RelyX™ Unicem 2 Self-Adhesive Resin Cement

3M™ Lava™ Esthetic Zirconia
Indications and design guidelines

Minimum wall thickness
- 0.8 mm

High strength of 800 MPa*
First zirconia with built-in fluorescence
Designed for excellent match to VITA classical shades
High translucency optimized for esthetic full-contour restorations

*3-point bending strength according to ISO 6872:2015; qualified for Type II, class 4; indications: crowns, bridges with a maximum of one pontic that must be supported on each side by a crown (prosthesis not to exceed three units), inlays, onlays and veneers.