

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



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3M Science.
Applied to Life.™

3M™ Lava™ Esthetic
Esthetic Fluorescent Full-Contour Zirconia

3 steps
to excellent
esthetics



Screen-optimized,
72 dpi only!

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.



1
Disc selection &
restoration positioning

2
Sintering

3
Glazing



Before using the products described in this guide, please refer to the instructions for use provided with the product packages.

Before you start

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

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

FAQ: Can I use dyeing liquids to improve shade match/characterize Lava Esthetic Zirconia restorations?

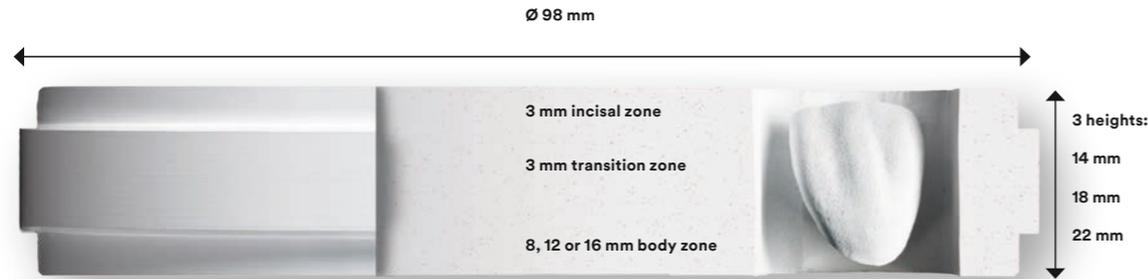
A: No, dyeing liquids must not be used. Dyeing liquids can reduce the strength of the material and compromise fluorescence and shade match. If you experience poor shade match, this is most probably related to the sintering process (see step 2). For characterization, use porcelain stains after sintering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



Selecting the right 3M™ Lava™ Esthetic Zirconia disc.

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:

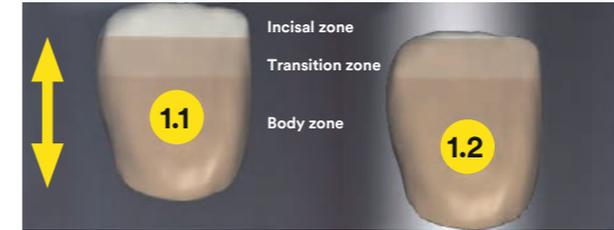
Lava Esthetic Zirconia is designed for excellent shade match to VITA classical shades **after glazing** (see step 3).

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

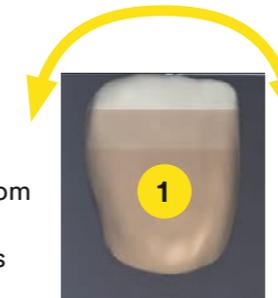
**Mill,
sinter,
glaze**



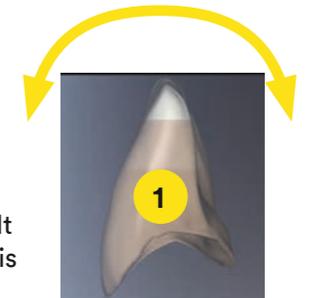
Z-position at top
▶ pronounced incisal shade



Z-position at bottom
▶ no incisal shade



Tilt restorations such that from labial/palatinal (or buccal/lingual) view the tooth axis is perpendicular to the zones.

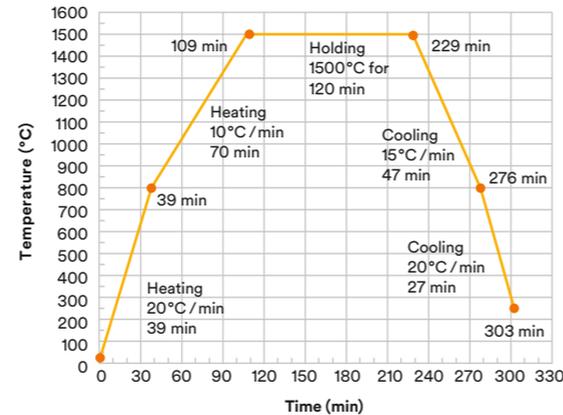


From mesial/distal view tilt such that the milling path is ideal.

Program your sintering furnace with the 3M™ Lava™ Esthetic Zirconia sintering profile.

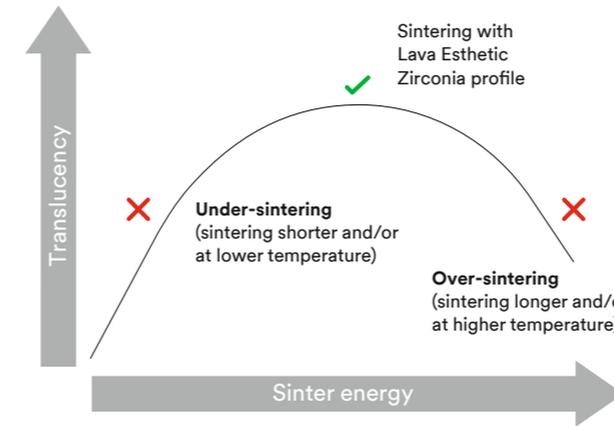
The only way to achieve high translucency and matching shades with Lava Esthetic Zirconia is by using the sintering profile shown here.

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



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

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.



Control: Correctly sintered and glazed 3M™ Lava™ Esthetic Zirconia crown, A3.5



Over-sintered 3M™ Lava™ Esthetic Zirconia crown, A3.5, with decreased translucency, bleached shade and visible lines.

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?

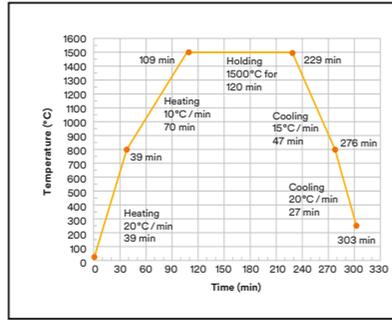
A: Set the temperature such that the maximum temperature of 1500°C is achieved in the hottest zone of the furnace.

Still not getting good results? Check your furnace calibration!

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.



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.

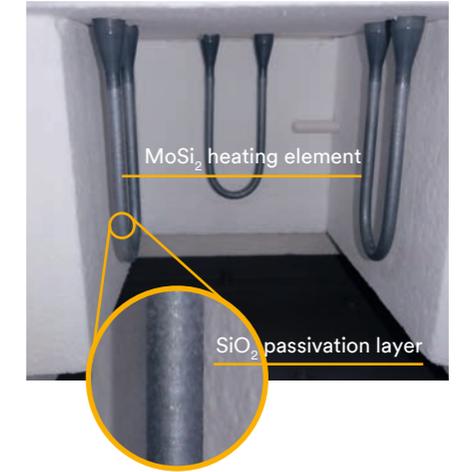
Ask your 3M representative for control rings and target diameter.

Influence of MoSi₂ heating elements.

Two types of heating elements are used for zirconia sintering furnaces: Silicon 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

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.

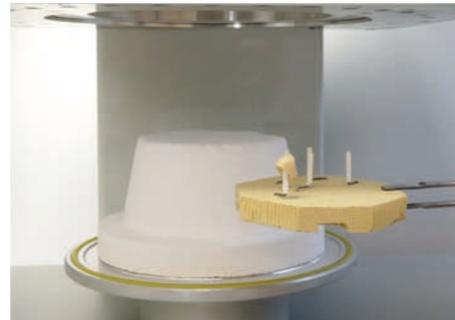


Carefully clean the restoration before glazing e.g. with a steam cleaner to ensure good wetting of the glaze.



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 Girschbach 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 3001:
C450 T180 T180.L9 V9 T060.C770 V0 T120 C0
L7 T180 L0 T2 C450

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.



Control: 3M™ Lava™ Esthetic Zirconia crown, A3.5, glazed with e.max® Ceram Glaze Spray, firing temperature 770°C ▶ correct shade



3M™ Lava™ Esthetic Zirconia crown, A3.5, glazed with Vita Akzent Glaze, firing temperature 950°C ▶ shade is too light

A lack of oxygen in the furnace atmosphere during the holding time (because of a vacuum being applied or because of organic contaminants) can lead to discoloration.



Control: glazed 3M™ Lava™ Esthetic Zirconia crown, A3 ▶ correct shade



VITA classical A3 shade tab



3M™ Lava™ Esthetic Zirconia crown, A3, glaze firing with lack of oxygen in the furnace ▶ yellow discoloration

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.

3M™ Lava™ Esthetic Zirconia

Indications and design guidelines

Minimum wall thickness

- 0.8 mm

Minimum bridge connector cross-sections

- $\geq 12 \text{ mm}^2$ anterior
- $\geq 14 \text{ mm}^2$ 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

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



- 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.

