VITA ENAMIC® for CEREC®/ inLab®

Working Instructions

Date of issue: 11.12

VITA shade taking    VITA shade communication    VITA shade reproduction    VITA shade control

VITA shade, VITA made.
### Table of contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The material and its advantages</td>
<td>3</td>
</tr>
<tr>
<td>Technical data</td>
<td>4</td>
</tr>
<tr>
<td>Indication und contraindication</td>
<td>5</td>
</tr>
<tr>
<td>Processing requirements</td>
<td>5</td>
</tr>
<tr>
<td>The shade concept</td>
<td>6</td>
</tr>
<tr>
<td>Layer thicknesses and preparation guidelines</td>
<td>7</td>
</tr>
<tr>
<td>Design</td>
<td>9</td>
</tr>
<tr>
<td>Reworking</td>
<td>10</td>
</tr>
<tr>
<td>Characterization of the shade</td>
<td>12</td>
</tr>
<tr>
<td>Adhesive bonding</td>
<td>14</td>
</tr>
<tr>
<td>Finishing and polishing</td>
<td>17</td>
</tr>
<tr>
<td>Assortments</td>
<td>19</td>
</tr>
<tr>
<td>Literature</td>
<td>19</td>
</tr>
<tr>
<td>Accessories</td>
<td>20</td>
</tr>
<tr>
<td>Safety information</td>
<td>21</td>
</tr>
</tbody>
</table>

Information about VITA ENAMIC hybrid ceramic is available at www.vita-enamic.de

Information about the CEREC and inLab systems is available from:

**Sirona Dental Systems GmbH**

Fabrikstraße 31  D-64625 Bensheim

email: contact@sirona.de

www.sirona.com
VITA ENAMIC® for CEREC®/inLab® A new class of ceramic materials

VITA ENAMIC is the first hybrid dental ceramic in the world with a dual network structure.

The dominant fine structure ceramic network (86 % by wt.) is reinforced by an acrylate polymer network in this material to ensure that both networks penetrate one another.

Accordingly, VITA ENAMIC is a dental hybrid material that combines the positive characteristics of a ceramic and a composite.

This innovative hybrid material ensures unique balance between strength and elasticity and provides high absorption of masticatory forces.

Product characteristics and advantages

• Significantly lower brittleness than pure ceramic and better abrasion behavior than composite.

• Compared to silicate ceramic, it is possible to mill restorations with thinner walls. Particularly suitable for minimally invasive restorations.

• Enamel-like abrasion properties and antagonist protection achieved by the fine-structure ceramic network.

• Clearly higher elasticity than traditional dental ceramics since the acrylate polymer network provides flexibility.

• Very high reliability: thanks to its dual network structure, VITA ENAMIC features a crack-stop function.

• Very accurate and precise milling results for restorations thanks to exceptional marginal stability of the material.

• Can be perfectly milled with diamond instruments.

• Compared to silicate ceramic, life of milling tools increased by about 4–5-fold in the normal milling mode.

• Compared to silicate ceramic, milling times reduced up to 45% in the fast milling mode (for molar crowns).

• Simple bonding with self-adhesive composites is enabled.
Chemical composition of the fine-structure feldspar ceramic networks*

<table>
<thead>
<tr>
<th>Oxides</th>
<th>% by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>SiO₂</td>
<td>58–63</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>20–23</td>
</tr>
<tr>
<td>Na₂O</td>
<td>6–11</td>
</tr>
<tr>
<td>K₂O</td>
<td>4–6</td>
</tr>
<tr>
<td>B₂O₃</td>
<td>0.5–2</td>
</tr>
<tr>
<td>CaO</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>TiO₂</td>
<td>&lt; 1</td>
</tr>
</tbody>
</table>

* The values of the chemical composition listed above are dependent on the lot. Chemical elements (oxides) which are contained in very low concentrations and are required, e.g. for coloring, are not listed.

Chemical composition of the polymer network

The polymer network consists of a surface-modified PMMA free from MMA.

Material ratio - ceramic - polymer

<table>
<thead>
<tr>
<th>Component</th>
<th>% by weight</th>
<th>% by volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine-structure feldspar ceramic</td>
<td>86</td>
<td>75</td>
</tr>
<tr>
<td>Polymer</td>
<td>14</td>
<td>25</td>
</tr>
</tbody>
</table>

Physical data*

<table>
<thead>
<tr>
<th>Property</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexural strength</td>
<td>MPa</td>
<td>150–160</td>
</tr>
<tr>
<td>Fracture toughness</td>
<td>MPa√m</td>
<td>1.5</td>
</tr>
<tr>
<td>Modulus of elasticity</td>
<td>GPa</td>
<td>30</td>
</tr>
<tr>
<td>Weibull modulus</td>
<td>–</td>
<td>20</td>
</tr>
<tr>
<td>Hardness</td>
<td>GPa</td>
<td>2.5</td>
</tr>
</tbody>
</table>

* The technical/physical values are typical measuring results and refer to internal samples and measurement equipment available on site. If samples are prepared using different methods and measurement equipment, other measuring results may be obtained.
**Indication**

VITA ENAMIC for CEREC/inLab is indicated for the fabrication of fully anatomical, esthetic single tooth restorations if

- the preconditions for the adhesive or self-adhesive bonding technique are present.

<table>
<thead>
<tr>
<th>Indication</th>
<th>VITA ENAMIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowns</td>
<td><img src="image" alt="Crown" /></td>
</tr>
<tr>
<td>Onlays/Inlays</td>
<td><img src="image" alt="Onlay/Inlay" /></td>
</tr>
<tr>
<td>Veneers</td>
<td><img src="image" alt="Veneer" /></td>
</tr>
</tbody>
</table>

- recommended

**Contraindication**

- Bridge restorations
- Parafunction (for example bruxism)

**Processing requirements for VITA ENAMIC**

**Hardware requirements**

- VITA ENAMIC can be processed with the CEREC und inLab milling systems of Sirona.

**Software requirements**

- Software CEREC 3D >V4.0x or inLab 3D >V4.0x.

- To enable milling the material also in the small CEREC or inLab milling systems with (previous) software versions < 4.0, please select VITABLOCS Mark II, II4.

**Important!**

Under no circumstances should restorations made from VITA ENAMIC be fired during processing. A polymerization process is used for characterizing and individualizing the shade.
The shade concept

The shades of VITA ENAMIC have been matched with those of VITA SYSTEM 3D-MASTER, which is the only tooth shade system available on the market that takes all 3 color dimensions into account and integrates them into a systematic classification principle for shade determination and shade reproduction:

Value - Chroma - Hue

Overview of blocks

- Shades:

<table>
<thead>
<tr>
<th>high translucent</th>
<th>0M1-HT</th>
<th>1M1-HT</th>
<th>1M2-HT</th>
<th>2M2-HT</th>
<th>3M2-HT</th>
</tr>
</thead>
<tbody>
<tr>
<td>translucent</td>
<td>0M1-T</td>
<td>1M1-T</td>
<td>1M2-T</td>
<td>2M2-T</td>
<td>3M2-T</td>
</tr>
</tbody>
</table>

- Size: 12 x 14 x 18 mm
- Designation: EM-14 (ENAMIC, size 14)
Layer thicknesses and preparation guidelines

To ensure clinical success of restorations made from VITA ENAMIC, the following minimum layer thicknesses must be adhered to:

**Anterior crowns**

- Incisal: at least 1.5 mm
- Circumferential: at least 0.8 mm

**Posterior crowns**

- At the bottom of the fissure: at least 1.0 mm
- In the area of the cusps: at least 1.5 mm
- Circumferential: 0.8–1.5 mm

**Inlays**

- At the bottom of the fissure: at least 1.0 mm
- In the area of the isthmus: at least 1.5 mm
**Onlays**

At the bottom of the fissure: **at least 1.0 mm**
In the area of the cusps: **at least 1.5 mm**

**Veneers**

Labial: **on average at least 0.3 mm**
Incisal third: **at least 0.3 mm**
Central third: **at least 0.3 mm**
Cervical third: **at least 0.2 mm**

**Application of the VITA Powder Scan Spray**

- Matting the tooth substance with VITA Powder Scan Spray before taking the optical impression.
Designing the restoration with the CEREC or inLab 3D ≥ V4.0x software.

- Selecting VITA ENAMIC in the material menu.
- Drawing the preparation margin
- Defining the insertion axis
- Editing the restoration
Reworking (extraoral)

Restorations made from VITA ENAMIC must not be reworked with tungsten carbide instruments since such instruments may damage the material. Use only diamond-coated milling tools or special polishing tools. When reworking, use water and exert only slight pressure.

Special 2-stage polishing assortments were developed for intraoral and extraoral polishing of VITA ENAMIC. The use of these assortments allows successful high-gloss polishing:

- VITA ENAMIC Polishing Set technical
- VITA ENAMIC Polishing Set clinical

- Use diamond tool to remove the sprue.

- Fit in and check proximal and occlusal contacts.
• Use the instruments of the VITA ENAMIC Polishing Set technical or clinical for contouring and pre- and high-gloss polishing.

**Tip:** If Sof-Lex polishing discs are used for prepolishing, it must be ensured to use only the medium grain (M) and very fine grain (SF) types.

**Important note:**
Since dust is formed when grinding sintered dental ceramic products, always wear a face mask or grind when wet. Use an extraction unit in the laboratory.
Optional: characterization of the shade (staining technique)

The shade of VITA ENAMIC restorations can be easily characterized (staining technique) with the special VITA ENAMIC STAINS (polymerization). Then the surface is sealed with a special varnish. For this purpose, the special VITA ENAMIC STAINS KIT, including 6 shades and accessories, is available.

Please observe the detailed working instructions, No. 1931.

Conditioning the surface

The surface of the ENAMIC restoration to be characterized needs to be rough and free from grease to optimize wetting and the retentive bond of the stain.

Do not use on polished surfaces!

The surface should be conditioned in the following way:

Sandblast with Al₂O₃, max. 50 µm and a pressure of max. 1 bar or etch with 5% hydrofluoric acid gel, such as VITA CERAMICS ETCH, for 60 seconds. Residues must be carefully removed.

Then silanize the roughened surface, for example with VITASIL.

The surface must not be touched any longer!

Mixing the stain

Mix stain powder with VITA ENAMIC STAINS LIQUID on the porcelain mixing plate. The mixing ratio can be varied depending on the desired intensity of the shade: from aqueous-transparent to opaque.

Application of the stain

Apply the shade and polymerize in steps. Then use VITA ENAMIC GLAZE to seal the applied stain.
Final polymerization

VITA ENAMIC GLAZE can be polymerized with all standard dental light-curing units with a spectral range of 350 - 500 nm. All coated surfaces must be completely polymerized.

Optional: Individualization of the shade (layering technique)

For direct and indirect individualization, e.g. subsequent application of contact points and for minor adjustments of the shape, etc., light-curing methacrylate based composites, in particular low-viscous restorative composites are suitable since these materials can be easily applied and adapted to the restoration. Additionally, indirect veneering composites, such as VITA VM LC are also suitable for extraoral use. It is recommended to condition the surface of the ENAMIC restoration with a suitable bonding agent prior to individualization.

Please read the corresponding product information, which can be downloaded at www.vita-enamic.com.
Adhesive bonding

- Adhesive bonding using light- or dual-curing fine hybrid composites is required for restorations made from VITA ENAMIC.

- The self-adhesive composite RelyX Unicem (3M ESPE) is exclusively suitable also for cementing crowns (dentin adhesion). When using this composite, the restoration is etched with VITA CERAMICS ETCH for 60 sec and silanized subsequently.

- Crowns should preferably be cemented with a highly flowable, dual-curing composite (depending on the layer thickness).

- The ultrasonic insertion method or preheated composite can be used for stronger composite materials.

- Dual-curing composites should not be used for thin veneers since these composites may cause a slight change in color (yellow shade) after curing. Therefore a light-curing composite should be preferred. A microbrush glued to the veneer or a stick (adhesive) can be used as a retention tool. Fixing the veneer with a finger allows more uniform distribution of pressure during the adhesive cementation.

<table>
<thead>
<tr>
<th>Adhesive technique</th>
<th>Adhesive composite</th>
<th>Crown</th>
<th>Onlay/Inlay</th>
<th>Veneer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional with adhesive system</td>
<td>Fine hybrid composite with adhesive system for example, VITA DUO CEMENT with VITA A.R.T. BOND or PANAVIA F 2.0 with ED Primer II</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-adhesive</td>
<td>Self-adhesive composite: RelyX Unicem</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) luted to dentine
Procedure for conventional adhesive technique with adhesive system

Conditioning the tooth substance

• If present, etch enamel with VITA ETCHANT GEL (phosphoric acid gel, 35%) for 30 sec. Spray clean for 30 sec and dry for 20 sec. Control: etched surface must be white opaque.

• Agitate dentin primer (for example VITA A.R.T. BOND Primer A+B) for 30 sec using a disposable brush or Microbrush, dry with air for 15 sec. Agitate primer coat of adhesive (for example VITA A.R.T. BOND, Bonder) for 20 sec., clean carefully for 5 s (using air). Any excess should be soaked up with endo paper points. Light curing: 60 sec.

Conditioning the restoration

• Use alcohol to degrease the restoration before it is seated. Apply VITA CERAMICS ETCH (hydrofluoric acid gel, 5%) to the inner surfaces. Etching time: 60 sec. Cover any polished outer surface in order to avoid accidental etching.
• Completely remove any remaining acid by using waterspray (60 sec) or clean in the ultrasonic bath. Then dry for 20 sec. Do not brush off to avoid the risk of contamination! After drying, the etched surfaces exhibit a whitish opaque appearance. Apply silane (for example VITASIL) to the etched surfaces. Allow to evaporate completely.

• Apply primer coat of adhesive (for example VITA A.R.T. BOND Bonder), blow off. Do not light cure! The restoration must be protected against light before it is inserted.

• Insertion of the restorations

• Light curing of the composite.
Finishing and polishing (intraoral)

Pay attention to margins and contact points when finishing and polishing the restoration. Generation of heat must be avoided!

- Check if excess material has been applied, finish with Sof-Lex discs or files in an oscillating dental handpiece.

Fine morphological adjustments

The occlusion must be completely free of interferences. Remove unwanted occlusal contacts with diamond abrasives (40 µm).

- A two-stage procedure is recommended to achieve natural surface gloss:
  - Prepolishing with the pink polishers of the VITA ENAMIC Polishing set (7,000 – 10,000 rpm) while cooling with water.
  - High gloss polishing with the grey diamond-coated polishers of the VITA ENAMIC Polishing Set (5,000 – 8,000 rpm). Exert slight pressure only!

Tip: High-gloss polishing at lowest speed and without water cooling. If Sof-Lex polishing discs are used for finishing and prepolishing, it must be ensured to use only the medium grain (M) and very fine grain (SF) types.
Situation prior to treatment.

Situation after treatment. The restorations were fabricated using VITA ENAMIC blocks of shade 1M2 HT.
VITA ENAMIC® for CEREC®/inLab® Assortments

Assortments: VITA ENAMIC for CEREC/inLab

<table>
<thead>
<tr>
<th>Shade</th>
<th>Designation of block</th>
<th>Size in mm</th>
<th>Content of pack</th>
<th>Prod. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0M1-T</td>
<td>EM-14</td>
<td>12 x 14 x 18</td>
<td>5 pieces</td>
<td>EC40M1TEM14</td>
</tr>
<tr>
<td>1M1-T</td>
<td>EM-14</td>
<td>12 x 14 x 18</td>
<td>5 pieces</td>
<td>EC41M1TEM14</td>
</tr>
<tr>
<td>1M2-T</td>
<td>EM-14</td>
<td>12 x 14 x 18</td>
<td>5 pieces</td>
<td>EC41M2TEM14</td>
</tr>
<tr>
<td>2M2-T</td>
<td>EM-14</td>
<td>12 x 14 x 18</td>
<td>5 pieces</td>
<td>EC42M2TEM14</td>
</tr>
<tr>
<td>3M2-T</td>
<td>EM-14</td>
<td>12 x 14 x 18</td>
<td>5 pieces</td>
<td>EC43M2TEM14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shade</th>
<th>Designation of block</th>
<th>Size in mm</th>
<th>Content of pack</th>
<th>Prod. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0M1-HT</td>
<td>EM-14</td>
<td>12 x 14 x 18</td>
<td>5 pieces</td>
<td>EC40M1HTEM14</td>
</tr>
<tr>
<td>1M1-HT</td>
<td>EM-14</td>
<td>12 x 14 x 18</td>
<td>5 pieces</td>
<td>EC41M1HTEM14</td>
</tr>
<tr>
<td>1M2-HT</td>
<td>EM-14</td>
<td>12 x 14 x 18</td>
<td>5 pieces</td>
<td>EC41M2HTEM14</td>
</tr>
<tr>
<td>2M2-HT</td>
<td>EM-14</td>
<td>12 x 14 x 18</td>
<td>5 pieces</td>
<td>EC42M2HTEM14</td>
</tr>
<tr>
<td>3M2-HT</td>
<td>EM-14</td>
<td>12 x 14 x 18</td>
<td>5 pieces</td>
<td>EC43M2HTEM14</td>
</tr>
</tbody>
</table>

Literature

Al-Harbi, A; Ardu, S; Bortolotto, T.; Krejci, I.: Stain intensity of CAD/CAM Materials versus Direct composites. IADR 2012 Poster Abstract, Iguazu Falls, Brazil


VITA printed materials

VITA ENAMIC Working Instructions, Prod. No. 1767E
VITA ENAMIC Technical and scientific documentation, Prod. No. 1914
VITA ENAMIC Concept Brochure, Prod. No. 1781
VITA ENAMIC Product Sheet, Prod. No. 1912E
VITA ENAMIC Product Brochure, Prod. No. 1780E
VITA ENAMIC Magazine, Prod. No. 1911E
VITA ENAMIC Testimonials, Prod. No. 1938E
VITA ENAMIC STAINS KIT, Working Instructions, Prod. No. 1931E
VITA ENAMIC STAINS KIT, Product Sheet, Prod. No. 1923E
VITA ENAMIC Polishing Set, Product Sheet, Prod. No. 1924E
Accessories

VITA ENAMIC Polishing Sets

Specially developed set for time-saving and efficient polishing of VITA ENAMIC restorations. Includes all instruments for two-stage, well-coordinated polishing.

2 polishing sets with 8 polishers each are available:

- VITA ENAMIC Polishing Set technical
  with instruments for the handpiece.
  
  **Prod. No. EENPSETT**

- VITA ENAMIC Polishing Set clinical
  with instruments for the contra-angle
  
  **Prod. No. EENPSETC**

  **Note:** Each polishing instrument of the VITA ENAMIC Polishing Set is available in refill packs containing 6 instruments each. See Product Sheet, VITA ENAMIC Polishing Set, Prod. No. 1924.

VITA ENAMIC STAINS KIT

Specially developed assortment for characterizing (staining technique) the shade of restorations made from VITA ENAMIC. Contains 6 light curing stains, sealing varnish and accessories.

**Prod. No. EENSTKIT**
<table>
<thead>
<tr>
<th>Product Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VITA CERAMICS ETCH</strong></td>
<td><strong>Caustic/Toxic</strong></td>
</tr>
<tr>
<td>(hydrofluoric acid ceramic</td>
<td>Toxic on inhalation, in contact with skin and if swallowed. Causes severe burns. Store container well sealed at an adequately ventilated place. In case of contact with eyes, rinse thoroughly with water and consult a doctor. In case of contact with skin, rinse immediately with copious amount of water. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Keep away from living quarters. This material and its container must be disposed of as hazardous waste.</td>
</tr>
<tr>
<td>etching gel</td>
<td></td>
</tr>
<tr>
<td><strong>VITA ETCHANT GEL</strong></td>
<td><strong>Caustic</strong></td>
</tr>
<tr>
<td>(Phosphoric acid etching gel)</td>
<td>When working with the product, do not eat and drink. Do not inhale gas/fume/vapor/aerosol. In case of contact with eyes, rinse thoroughly with water and consult a doctor. When working with the product, wear suitable protective clothing, gloves and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its containers must be disposed of as hazardous waste.</td>
</tr>
<tr>
<td><strong>Safety clothing</strong></td>
<td>When working with the product, wear suitable safety goggles/face protection, gloves and safety clothing.</td>
</tr>
</tbody>
</table>

The respective safety data sheets can be downloaded at www.vita-zahnfabrik.com or requested by fax at (+49) 7761-562-233.
With the unique VITA SYSTEM 3D-MASTER, all natural tooth shades can be systematically determined and perfectly reproduced.

Please note: Our products must be used in accordance with the instructions for use. We accept no liability for any damage resulting from incorrect handling or usage. The user is furthermore obliged to check the product before use with regard to its suitability for the intended area of application. We cannot accept any liability if the product is used in conjunction with materials and equipment from other manufacturers that are not compatible or not authorized for use with our product. Furthermore, our liability for the accuracy of this information is independent of the legal basis and, in as far as legally permissible, shall always be limited to the value as invoiced of the goods supplied, excluding value-added tax. In particular, as far as legally permissible, we do not assume any liability for loss of earnings, indirect damages, ensuing damages or for third-party claims against the purchaser. Claims for damages based on fault liability (culpa in contrahendo, breach of contract, unlawful acts, etc.) can only be made in the case of intent or gross negligence. The VITA Modulbox is not necessarily a component of the product.

Date of issue of this information: 11.12

VITA Zahnfabrik has been certified in accordance to the Medical Device Directive and the following products bear the CE mark:

- VITA ENAMIC®

CEREC® and iLab® are registered trademarks of Sirona Dental Systems GmbH, Bensheim, Germany.

3M, ESPE, Sof-Lex and RelyX® Unicem are registered trademarks of 3M Company or 3M Deutschland GmbH

US 5498157 A   AU 659964 B2   EP 0591958 B1

We would like to express our gratitude to Dr. Alessandro Devigus, Bülach, Switzerland, for providing clinical photos and screenshots.