

# VITAVM<sup>®</sup>13

## Working Instructions



VITA shade taking

VITA shade communication

VITA shade reproduction

VITA shade control

Date of issue: 07.13

VITA shade, VITA made.

**VITA**

For veneering metal substructures in the conventional CTE range.  
Available in VITA SYSTEM 3D-MASTER and VITA classical A1–D4 shades.



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**Restoring oral harmony.**

The result of the teamwork of the dentist, Dr. Enrico Poli (Padua/Italy) and the dental technician, Maurizio Buzzo (Venice/Italy).

Photo courtesy of: M. Buzzo



Situation after preparation of teeth 11 and 21.



Metal crown copings; cervical reduction for shoulder.



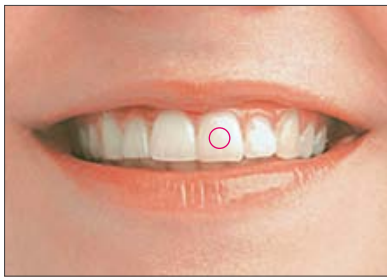
Crown copings prepared with opaque and shoulder material.



Restoration in harmony with the patient's natural dentition.

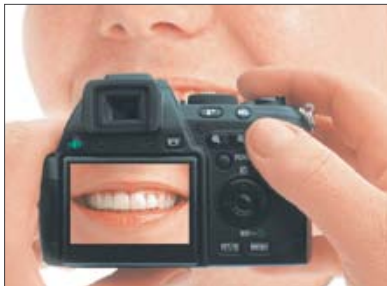
## Competence for more than 80 years

Shade management is more than just shade determination. At VITA, shade management means incorporating the best solutions into a complete process. The key question we have always asked ourselves is: How can we improve shade determination and reproduction? The answer: By establishing standardized process steps to increase the efficiency, we can help dental specialists achieve better results while spending less time and money.



## VITA shade taking

The accurate determination of the basic shade of a tooth is the key prerequisite for patient acceptance. The basic shade is generally found in the dentine center.



## The determination of the effects

Natural teeth are unique and a perfect creation of nature. Therefore, after determining the base shade, details of a tooth (translucent zones or anomalies, for example) need to be recorded to obtain a perfect match. We recommend the use of a digital photo to analyze details or effects.



## VITA shade communication

To ensure perfect reproduction of the determined shade, it is essential to ensure that all parameters are communicated accurately to the dental laboratory. Any misunderstanding leads to expensive and unnecessary extra work. For this reason we recommend using the color communication form to describe the basic shade and a digital photo for the analysis of effects or details. The software of VITA Easyshade Advance 4.0 provides a template to have all data on a single sheet – a laboratory communication form. This information will enable you to create a restoration that matches the remaining teeth perfectly in a quick and reliable manner.



## VITA shade reproduction

The most important step in reproducing a tooth is to ensure that the determined tooth shade is accurately reproduced. Then the shade effects of the tooth can be reproduced to obtain a high-quality restoration.

You can be sure that whichever VITA materials you choose, you will be able to achieve this objective without time-consuming mixing or testing.

## VITA shade control

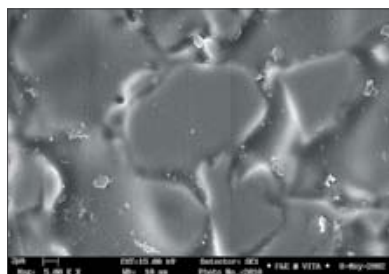
In the final step, qualitative shade evaluation should not be left to the subjective opinion of an individual. Within the VITA process, objective control of the final restoration is the most important prerequisite for ensuring satisfied patients and avoiding additional work.

VITA VM 13 was designed as a feldspar veneering ceramic for metal substructures made of conventional alloys in the CTE range of 13.8 – 15.2. The CTE range and the firing temperature of VITA VM 13 are optimally matched to high gold content, reduced gold content and palladium based or precious metal-free alloys. With these firing temperatures distortion of the alloy can be virtually ruled out.

VITA VM 13 is a ceramic, which in terms of structure features considerably more homogeneous distribution of the crystalline and glass phase than traditional ceramics. This type of structure is described as a "fine structure". In figs. 1 and 2 the fine structure of VITA VM 13 is compared with that of a traditional structure.

**Fig. 1**

The etched surface (etched for 20 seconds with VITA CERAMICS ETCH) of a conventional metal ceramic shows agglomerations of leucite crystals of up to 30 µm in diameter. The differences between the CTE values of the leucite agglomerations and those of the glass phase can lead to stress cracks.



**Fig. 1:** SEM image of the surface of a conventional metal ceramic (magnification 5000 x).

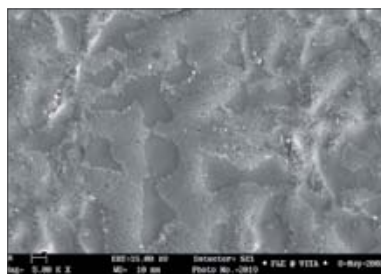
**Fig. 2**

The etched surface of VITA VM 13 (etched for 20 seconds with VITA CERAMICS ETCH) shows an extremely fine distribution of the leucite crystals in the glass matrix.

By means of localized balancing of the differing CTE values of the leucite and the glass phase it is possible to avoid larger stress cracks.

### Good surface structure

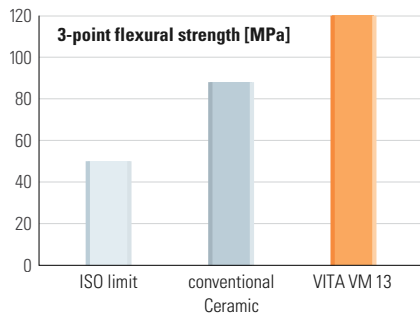
In addition to improved physical properties, the fine structure of VITA VM 13 offers the dental technician and the patient a whole set of advantages. Since VITA VM 13 demonstrates excellent grinding and polishing characteristics after firing, it is possible to achieve very smooth surfaces. This reduces plaque adhesion to the ceramic surface and results in a pleasant sensation of cleanliness for the patient.



**Fig. 2:** SEM image of the surface of VITA VM 13 (magnification 5000 x).

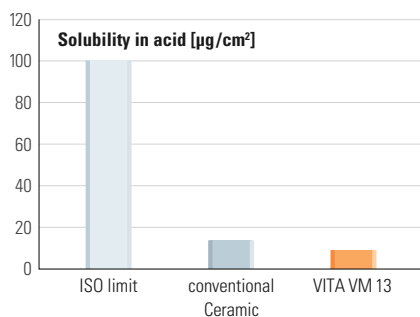
### Improved physical properties

In addition to the lower firing temperature, VITA VM 13 demonstrates an improvement in flexural strength, its adhesive bonding and resistance to thermal cycling while retaining the same, low degree of solubility in acid compared with conventional metal ceramics.



### Flexural strength

Flexural strength of VITA VM 13 compared with that of a conventional metal ceramic and the ISO limit according to ISO 6872.



### Solubility

Solubility in acid of VITA VM 13 compared with that of a conventional ceramic and the ISO limit according to ISO 6872.

VITA VM 13 – Physical properties	Unit of measure	Value
CTE (25-500°C) of OPAQUE	$10^{-6} \cdot K^{-1}$	13.6–14.0
Transformation temperature of OPAQUE	°C	approx. 570/577
CTE (25-500°C) of BASE DENTINE	$10^{-6} \cdot K^{-1}$	13.1–13.6
Softening point of BASE DENTINE	°C	approx. 635
Transformation temperature of BASE DENTINE	°C	approx. 60/565
Solubility of BASE DENTINE	µg/cm <sup>2</sup>	approx. 12
Density of BASE DENTINE	g/cm <sup>3</sup>	approx. 2.5
3-point flexural strength of BASE DENTINE	MPa	approx. 120
Average particle size of BASE DENTINE	µm	approx. 18
Adhesive bond testing (according to ISO 9693) of BASE DENTINE	MPa	approx. 43

### Enamel-like properties

Like all VITA fine-structure ceramics, VITA VM 13 demonstrates behavior very similar to that of natural tooth enamel. This is confirmed by studies carried out with VITA VM 7 by the Dental Clinic of the University of Zurich in Switzerland and Dr. Giordano from the Goldman School of Medicine of the University of Boston.

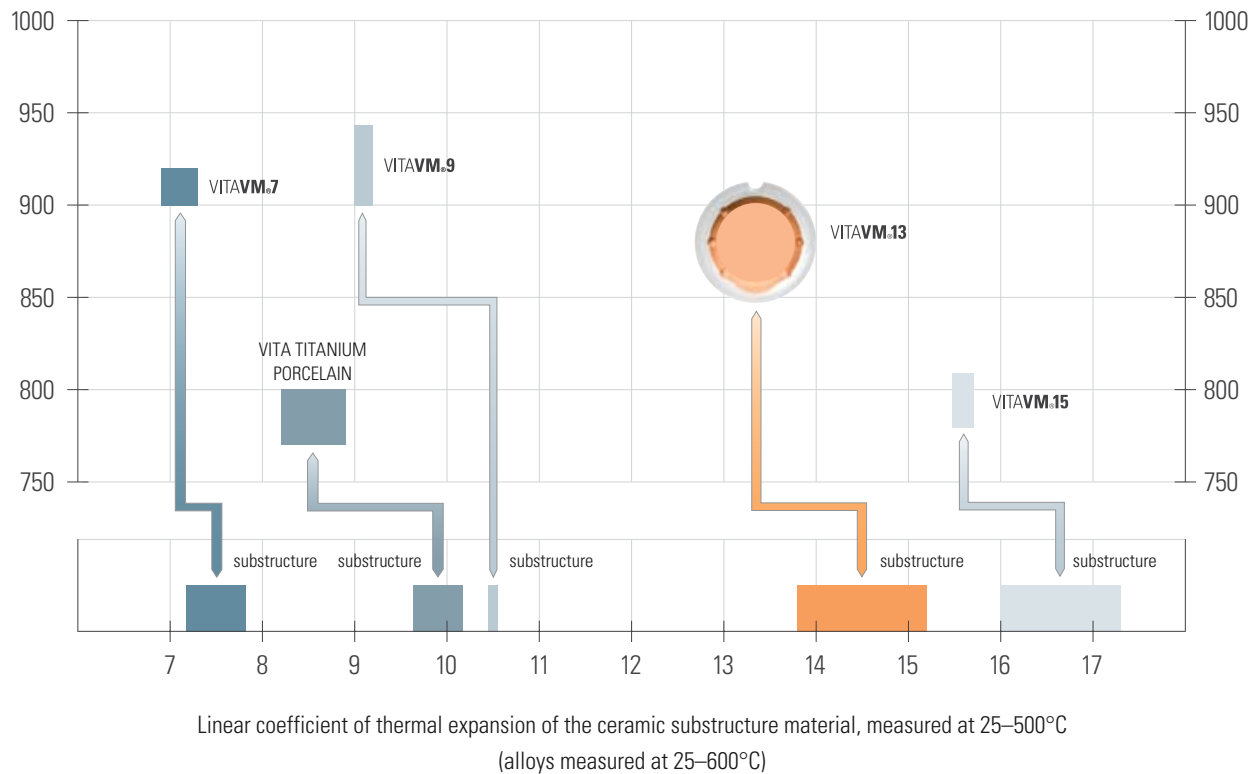
Literature: E. A. McLaren, R. A. Giordano II, R. Pober, B. Abozenada „Zweiphasige Vollglas Verblendkeramik“, (Quintessenz Zahntech 30, 1, 32-45 [2004])

For veneering alloys in the CTE range of  $13.8\text{--}15.2 \cdot 10^{-6} \text{ K}^{-1}$

Firing temperature of  
ceramic [°C]

Linear coefficient of thermal expansion of the ceramic, measured at 25–500°C

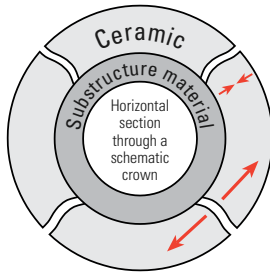
Firing temperature of  
ceramic [°C]



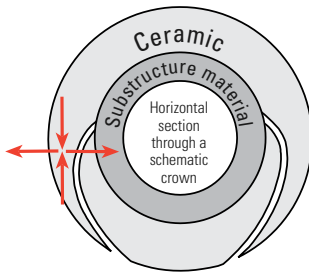
VITA VM 7 CTE (25–500°C) $6.9\text{--}7.3 \cdot 10^{-6} \cdot \text{K}^{-1}$	VITA In-Ceram ALUMINA, CTE (25–500°C) $7.2\text{--}7.6 \cdot 10^{-6} \cdot \text{K}^{-1}$ VITA In-Ceram ZIRCONIA, CTE (25–500°C) $7.6\text{--}7.8 \cdot 10^{-6} \cdot \text{K}^{-1}$
VITA TITANIUM PORCELAIN CTE (25–500°C) $8.2\text{--}8.9 \cdot 10^{-6} \cdot \text{K}^{-1}$	for titanium and titanium alloys Titanium (grade 1) CTE (25–500°C), approx. $9.6 \cdot 10^{-6} \cdot \text{K}^{-1}$ Ti <sub>6</sub> Al <sub>4</sub> V CTE (25–500°C), approx. $10.2 \cdot 10^{-6} \cdot \text{K}^{-1}$
VITA VM 9 CTE (25–500°C) $9.0\text{--}9.2 \cdot 10^{-6} \cdot \text{K}^{-1}$	VITA In-Ceram YZ CTE (25–500°C), approx. $10.5 \cdot 10^{-6} \cdot \text{K}^{-1}$
VITA VM 13 CTE (25–500°C) $13.1\text{--}13.6 \cdot 10^{-6} \cdot \text{K}^{-1}$	High gold content-, reduced precious metal content, palladium based and non-precious alloys CTE (25–600°C) $13.8\text{--}15.2 \cdot 10^{-6} \cdot \text{K}^{-1}$ *
VITA VM 15 CTE (25–500°C) $15.5\text{--}15.7 \cdot 10^{-6} \cdot \text{K}^{-1}$	Multi-indication alloys CTE (25–600°C) $16.0\text{--}17.3 \cdot 10^{-6} \cdot \text{K}^{-1}$ *

\* visit the download section of our website for more information about alloys

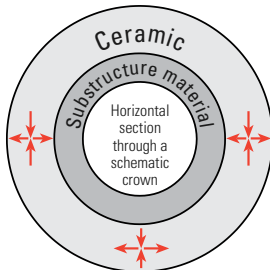




If the CTE of the substructure material is considerably lower than the CTE of the veneering ceramic, tangential tensile stress will increase and form radial cracks that run to the outside. This may result in late cracks.



If the CTE of the substructure material is considerably higher than the CTE of the veneering ceramic, tangential compressive stress will increase and form cracks that run almost parallel to the substructure. This may result in chipping.



The ideal tangential and radial tensile stress is ensured if the CTE of the ceramic has been optimally matched with the CTE of the substructure material.

Optimal preconditions are given if the veneering ceramic features a somewhat lower CTE value than the substructure material. Due to adhesive bonding, the ceramic must follow the thermal behavior of the substructure material. If cooled down, the ceramic is exposed to slight tangential compressive stress.

If a substructure material is veneered with ceramic, the layer thickness of the veneer is a decisive factor in addition to the CTE value. Accordingly, differences in strain (radial tensile stress) are obtained, which will grow in case of increasing layer thickness.

The firing result obtained with dental ceramics depends to a great extent on the individual user's firing procedure and substructure design. The type of furnace, the location of the temperature sensor, the firing tray and the size of the workpiece during the firing cycles are decisive for the result of firing.

Our application-technical recommendations for the firing temperatures (regardless of whether they have been provided orally, in writing or in the form of practical instructions) are based on extensive experience and tests. The user, however, should consider this information only as a reference. Should the surface quality or the degree of transparency or glaze not correspond to the result that is achieved under optimum conditions, the firing procedure must be adjusted correspondingly.

The crucial factors for the firing procedure are not the firing temperature displayed by the furnace but the appearance and the surface condition of the ceramic after the firing process.

⚠ **Note:** Firing trays may also have significant influence on the result. All firing temperatures for VITA VM are based on the use of dark-colored ceramic firing trays. When using light-colored firing trays, the temperature may vary by 10–20°C - in some cases even by up to 40° - from the reference value given depending on the type of furnace that is used and needs to be adjusted correspondingly.



A slight luster of the ceramic surface is an evidence for correct firing. If the ceramic, however, appears to be milky and non-homogeneous, the firing temperature is too low. Approach the correct firing temperature in steps of 5–10°C.

### Substructure design

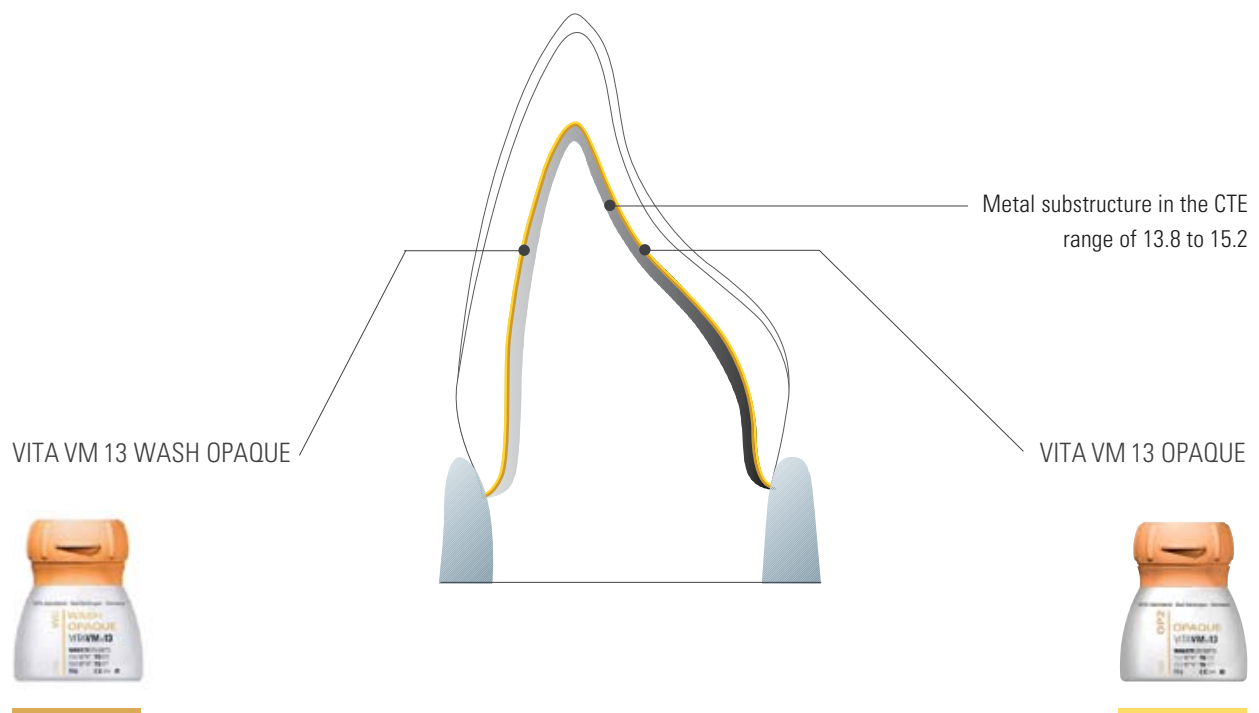
Crowns and bridge units which are to be veneered with ceramic must be modeled in reduced anatomical size. A minimum wall thickness of 0.4 mm is required in order to ensure a minimum wall thickness of 0.3 mm after finishing. Avoid sharp edges, undercuts and deep grooves. The stability can be further increased by means of metal collars or inlay-type supports in the palatal area.

Regarding the substructure, investing, casting, etching, finishing, sandblasting and oxidation please follow the alloy manufacturer's instructions.

⚠ **Note:** Our practical experience in the CTE range of  $13.8\text{--}15.2 \cdot 10^{-6} \cdot \text{K}^{-1}$  has shown that good results can be achieved when the CTE of the alloy (measured at  $25\text{--}600^\circ\text{C}$ ) is within the range of  $14.0\text{--}14.4 \cdot 10^{-6} \cdot \text{K}^{-1}$ . In the case of alloys with a CTE ( $25\text{--}600^\circ\text{C}$ )  $>14.5 \cdot 10^{-6} \cdot \text{K}^{-1}$  slow cooling should be used from the first dentine firing onwards. If the alloy has a higher CTE value, cooling in the  $900^\circ\text{C}\text{--}700^\circ\text{C}$  range should not be completed in less than 3 minutes. For further information see the list of alloys tested in combination with VITA VM 13. This list can be found at [www.vita-zahnfabrik.com](http://www.vita-zahnfabrik.com) under Download/Veneering Materials/Alloy List.

### Layer thicknesses for ceramics

When preparing a ceramic veneer, a uniform layer thickness across the entire surface to be veneered must be ensured. The entire thickness of the ceramic layer, however, should not exceed 2 mm (the optimum layer thickness ranges from 0.7 to 1.2 mm).



To prepare the VITA VM 13 BASIC and BUILD UP layering, first apply WASH OPAQUE and OPAQUE to the substructure.

WASH OPAQUE fulfills the following functions:

1. Formation of the required adhesive oxides
2. Formation of a bond to the alloy surface
3. Enhancing the chroma of the restoration; particularly in the case of precious metal-free alloys

Wash opaque (WO) and the respective opaque material (OP) or SUN OPAQUE (SO) materials are available for the washbake. WO, OP and SO have the same chemical-physical properties and hence are perfectly suitable for the washbake.

For opaque firing, one opaque material is required for reproducing the VITA SYSTEM 3D-MASTER shades (one for each lightness level OP0-OP5) and the VITA classical A1–D4 shades (one for each shade).

**⚠ Note:** To produce a more intense and warmer shade, the respective OPAQUE can be mixed with Wash Opaque (WO golden-orange) or SUN OPAQUE (SO1 yellowish, SO2 orange and SO3 reddish). However, the final result of the restoration may differ significantly from the shade sample.



#### Substructure preparation

The substructure before sandblasting, processed with a fine, cross-cut tungsten carbide bur.

Sandblast the substructures with 125 µm aluminum oxide at a pressure of 2 bar. Use a grit size of 250 µm and a pressure of 3–4 bar for precious metal-free alloys. Please adhere precisely to the manufacturer's instructions for preparation of the substructure.



The substructure oxidized according to the manufacturer's instructions.

⚠ **Important:** Bonding alloys containing zinc (Zn) must be sandblasted, oxidized, and after oxidation firing etched in a clean, warm acidic bath for approx. 5 min. Any etching residue must be removed with steam.



#### Wash opaque firing

##### Powder opaque

Mix the powder opaque with VITA VM OPAQUE FLUID to a thin, watery consistency and apply to the clean, dry substructure with a brush suitable for opaque materials.

#### VITA SPRAY-ON procedure

The wash opaque can also be applied using the VITA SPRAY-ON procedure.

Mix the powder wash opaque with VITA SPRAY-ON LIQUID in the appropriate glass container and spray homogeneously onto the substructure surface. See separate working instructions for VITA SPRAY-ON (No. 492M).

##### Paste opaque

Alternatively, paste wash opaque can be used.





To apply, massage it into the surface of the substructure in a thin layer.

⚠ **Note:** The pastes should be stirred before use with a glass or plastic instrument. Should the OPAQUE PASTE be difficult to stir after longer periods of storage, its original consistency can be regained by adding VITA VM PASTE FLUID.

The paste opaque requires a longer predrying time in order to dry.

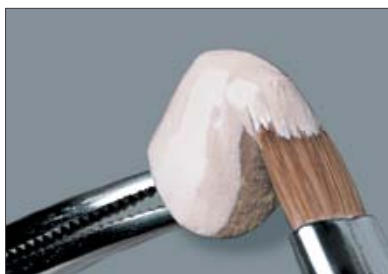
Please observe the recommended firing cycles. The paste opaque must not come into contact with water, since this may result in cracks and bubble formation in the opaque during firing.

**Recommended firing - wash firing:**

	Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
Powder	500	2.00	5.12	75	890	2.00	5.12
Paste	500	4.00	5.12	75	890	2.00	5.12



The fired wash opaque on a ceramic firing tray.



**Opaque firing**





Mix the opaque powder to a creamy consistency with VITA VM OPAQUE FLUID, apply with a brush or glass instrument to mask the surface to be veneered and fire as recommended.

As an alternative the opaque paste can be applied to the dry substructure.

The opaque can also be applied using the VITA SPRAY-ON procedure.

The classification table for the OPAQUE materials can be found on page 26.

**Recommended firing - opaque firing:**

	Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
Powder	500	2.00	5.12	75	890	1.00	5.12
Paste	500	4.00	5.12	75	890	1.00	5.12







The opaque on a ceramic firing tray shows a light surface glaze after firing.

### Guidelines for reliable veneering of precious metal-free alloys





Since substructures made of precious metal-free alloys are poor heat conductors and demonstrate a different behavior to precious metal alloys, the following points must be observed when veneering non-precious metal alloys with VITA VM 13:

- Use only special ceramic crucibles when casting precious metal-free alloys.
- Use only new material for casting.
- Sharp edges must be avoided when finishing the frameworks.
- Sandblast with 250 µm aluminum oxide at a pressure of 3 – 4 bar.  
Please observe the alloy manufacturer's instructions!!!
- To avoid discoloration, all surfaces not to be veneered should be sandblasted or polished with rubber polishers after each firing process. Then the substructure needs to be cleaned thoroughly.
- In order to achieve secure bonding between a non-precious metal alloy and VITA VM 13, the wash opaque firing temperature must be increased by 50 °C and the opaque firing by 30 °C. This allows better coating of the surface and improves bonding.

### Recommended firing – wash opaque firing of precious metal-free alloys:

	Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
Powder	500	2.00	5.52	75	940	2.00	5.52
Paste	500	4.00	5.52	75	940	2.00	5.52

### Recommended firing - opaque firing for precious metal-free alloys:

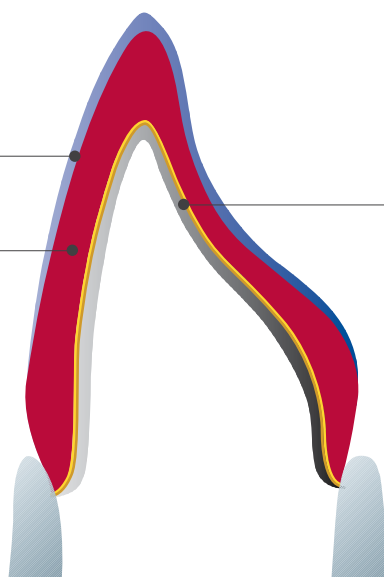
	Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
Powder	500	2.00	5.36	75	920	1.00	5.36
Paste	500	4.00	5.36	75	920	1.00	5.36

**Note:** The fired opaque demonstrates a high degree of surface glaze and a glassy, transparent appearance.

VITA VM 13 ENAMEL



VITA VM 13 BASE DENTINE



OPAQUE-coated metal  
substructure in the CTE  
of 13.8–15.2

After applying WASH OPAQUE and OPAQUE, VITA VM 13 BASIC layering consists of the application of BASE DENTINE and ENAMEL.

The color-bearing BASE DENTINE materials, which provide good coverage, offer the perfect precondition for the preparation of veneers with intensive shades.

With this two-layer alternative VITA offers an ideal solution for the reproduction of optimal shade results in case of thin walls.

Additionally, the intensive shade effect of the BASE DENTINE materials permits generous use of the ENAMEL materials which create the desired translucency.

After applying OPAQUE material, the user is able to prepare a natural restoration with a lifelike appearance with only two layers.

**⚠ Note:** The intensity of the restoration can be varied with different layer thicknesses of BASE DENTINE and ENAMEL. The thicker the BASE DENTINE layer, the more intensive is the shade of the restoration. The thicker the ENAMEL layer, the paler is the shade of the restoration.

The use of CHROMA PLUS materials helps to achieve perfect shade reproduction in the cervical area.

To obtain a brighter or warmer shade, the respective BASE DENTINE can either be mixed with SUN DENTINE or replaced by SUN DENTINE. When using Chroma Plus or Sun Dentine materials, the final result of the restoration may differ significantly from the shade sample.







**Metal substructures coated with OPAQUE**

To allow easy removal of the restoration later on, the model must be previously insulated using the VITA Modisol pen.



**Application of VITAVM®13 BASE DENTINE**

Apply the desired shade of BASE DENTINE starting from the neck to obtain the required complete tooth shape.

The centric, lateral and protrusive occlusion should be checked in the articulator already during this stage.



To obtain adequate space for the enamel, removal of corresponding amount of the BASE DENTINE material according to the layering pattern is required.



**Application of VITAVM®13 ENAMEL**

Apply several small portions of ENAMEL to complete the crown mould beginning from the middle third of the crown. To compensate firing shrinkage, the size of the mould must be prepared somewhat larger.

The classification tables for the VITA VM 13 ENAMEL materials can be found on page 26.







Prior to the first dentine firing, the individual units of bridges must be separated in the interproximal areas down to the substructure.



Restoration after completion of layering, ready for first dentine firing.

#### Recommended firing - first dentine firing

Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
500	6.00	6.55	55	880	1.00	6.55



Restoration after first dentine firing.



#### Corrections of shape/further layering





Insulate the model once more with the VITA Modisol pen.

The interdental spaces and the basal surface of the pontic must be filled with BASE DENTINE.



Apply BASE DENTINE starting from the neck and add ENAMEL in the body area up to the incisal area to perform subsequent corrections of the shape.

#### Recommended firing - second dentine firing

Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
500	6.00	6.44	55	870	1.00	6.44



Bridge and crown after second dentine firing.







### Finishing

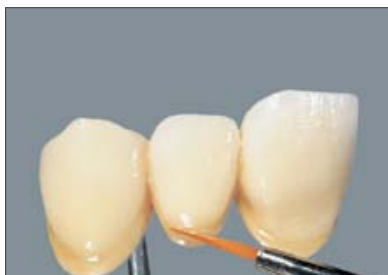
Finish the bridge or crown respectively. For glaze firing, the entire surface must be ground evenly and grinding particles must be removed carefully.

In case of formation of dust, use an extraction system or wear a face mask. Additionally, protective goggles must be worn when grinding the fired ceramic.







### Recommended firing – glaze firing

Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
500	0.00	4.45	80	880	2.00	–



If required, the entire restoration can be coated with VITA AKZENT Plus GLAZE and then individualization can be carried out using the VITA AKZENT Plus stains. (see VITA AKZENT Plus working instructions, No. 1925)

### Recommended firing - glaze firing with VITA AKZENT® Plus

Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
500	4.00	4.45	80	880	1.00	–



Completed restoration on the model.

**⚠ Note:** If the restoration needs to be adjusted (ground) when it is tried in, it must be smoothed again. Polishing or glaze firing have proved to be very suitable.

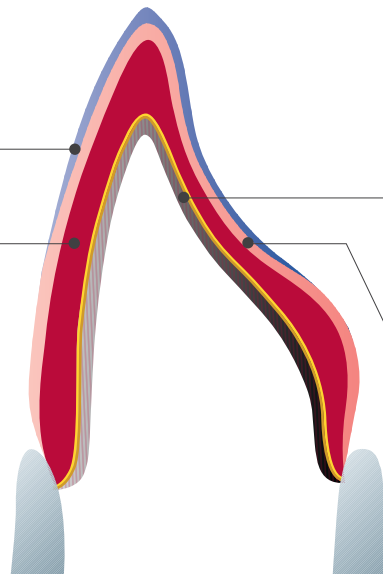
VITA VM 13 ENAMEL



VITA VM 13 BASE DENTINE



VITA VM 13 TRANSPA DENTINE



OPAQUE-coated metal  
substructure in the CTE of  
13.8–15.2

After applying WASH OPAQUE and OPAQUE, VITA VM 13 BUILD UP layering consists of the application of BASE DENTINE, TRANSPA DENTINE and ENAMEL.

The combination of color-bearing BASE DENTINE and translucent TRANSPA DENTINE in the BUILD UP layering creates an enhanced effect of depth in the restoration. The use of the three-layer method permits reduced and more individual application of the ENAMEL materials.

As a result, restorations have a lifelike and natural appearance.

By combining ENAMEL and TRANSPA DENTINE according to the layer thickness of BASE DENTINE, the intensity of the shade can be individualized.

An increased proportion of BASE DENTINE results in an intensified shade whereas larger quantities of TRANSPA DENTINE and ENAMEL will reduce the intensity of the shade.

**Note:** The shade effect of the restoration is mainly influenced by BASE DENTINE. Analogously to natural teeth, the TRANSPA DENTINE materials create a harmonious transition to the enamel.

The use of CHROMA PLUS materials helps to achieve perfect shade reproduction in the cervical area.

To obtain a brighter or warmer shade, the respective BASE DENTINE can either be mixed with SUN DENTINE or replaced by SUN DENTINE. When using Chroma Plus or Sun Dentine materials, the final result of the restoration may differ significantly from the shade sample.





#### **Metal substructures coated with OPAQUE**

To allow easy removal of the restoration later on, the model must be previously insulated using the VITA Modisol pen.



#### **Application of VITAVM®13 BASE DENTINE**

Apply the desired shade of BASE DENTINE starting from the neck to obtain the required complete tooth shape.

The centric, lateral and protrusive occlusion should be checked in the articulator already during this stage.



#### **Application of VITAVM®13 TRANSPA DENTINE**

TRANSPA DENTINE is applied in the required complete tooth shape.



To obtain sufficient space for the enamel, the volume of the TRANSPA DENTINE must be reduced correspondingly.



#### **Application of VITAVM®13 ENAMEL**

To complete the crown, apply several small portions of ENAMEL to the upper third of the crown. To compensate firing shrinkage, the size of the mould must be prepared somewhat larger.

The classification tables for the VITA VM 13 ENAMEL materials can be found on page 26.



Prior to firing, the individual units of bridges must be separated in the interdental areas down to the substructure.



Restoration prior to first dentine firing.

#### Recommended firing - first dentine firing

Predry. °C	$\xrightarrow{\quad}$ min.	$\nearrow$ min.	$\nearrow$ °C/min.	approx. temp. °C	$\xrightarrow{\quad}$ min.	VAC min.
500	6.00	6.55	55	880	1.00	6.55



Restoration after first dentine firing.



#### Corrections of shape/further layering

Insulate the model once more at the pontic with the VITA Modisol pen.  
The interdental spaces and the basal surface of the pontic must be filled with BASE DENTINE.







Subsequent corrections of the shape in the body area are carried out using TRANSPA DENTINE ...



... and ENAMEL in the incisal area.

### Recommended firing - second dentine firing

Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
500	6.00	6.44	55	870	1.00	6.44



Bridge and crown after second dentine firing.







### Finishing

Finish the bridge or crown respectively. For glaze firing, the entire surface must be ground evenly and grinding particles must be removed carefully.

In case of formation of dust, use an extraction system or wear a face mask. Additionally, protective goggles must be worn when grinding the fired ceramic.







### Recommended firing – glaze firing

Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
500	0.00	4.45	80	880	2.00	–



If required, the entire restoration can be coated with VITA AKZENT Plus Glaze and then individualization can be carried out using the VITA AKZENT Plus stains. (see VITA AKZENT Plus working instructions, No. 1925)

### Recommended firing - glaze firing with VITA AKZENT<sup>®</sup> Plus





Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
500	4.00	4.45	80	880	1.00	–



Completed restoration on the model.

⚠ **Note:** If the restoration needs to be adjusted (ground) when it is tried in, it must be smoothed again. Polishing or glaze firing have proved to be very suitable.



	Predry. °C	 min.	 min.	 °C/min.	approx. temp. °C	 min.	VAC min.
Oxidation firing	Please observe alloy manufacturer's instructions !!!						
WASH OPAQUE firing	500	2.00	5.12	75	890	2.00	5.12
WASH OPAQUE PASTE firing	500	4.00	5.12	75	890	2.00	5.12
OPAQUE firing	500	2.00	5.12	75	890	1.00	5.12
OPAQUE PASTE firing	500	4.00	5.12	75	890	1.00	5.12
WASH OPAQUE firing for precious metal-free alloys**	500	2.00	5.52	75	940	2.00	5.52
WASH OPAQUE PASTE firing for precious metal-free alloys**	500	4.00	5.52	75	940	2.00	5.52
OPAQUE firing for precious metal-free alloys**	500	2.00	5.36	75	920	1.00	5.36
OPAQUE PASTE firing for precious metal-free alloys**	500	4.00	5.36	75	920	1.00	5.36
MARGIN* firing	500	6.00	7.05	55	890	2.00	7.05
EFFECT LINER* firing	500	6.00	7.05	55	890	1.00	7.05
First dentine firing	500	6.00	6.55	55	880	1.00	6.55
Second dentine firing	500	6.00	6.44	55	870	1.00	6.44
Glaze firing	500	0.00	4.45	80	880	2.00	—
Glaze firing VITA AKZENT Plus	500	4.00	4.45	80	880	1.00	—
Corrective firing with CORRECTIVE*	500	4.00	6.00	50	800	1.00	6.00

\*Indication range, see pages 28/29

\*\*Note: For further information on the procedure with substructures made of precious metal-free alloys see page 15.

#### Please note:

The firing result obtained with dental ceramics depends to a great extent on the individual user's firing procedure and substructure design. The type of furnace, the location of the temperature sensor, the firing tray and the size of the workpiece during the firing cycles are decisive for the result of firing.

Our application-technical recommendations for the firing temperatures (regardless of whether they have been provided orally, in writing or in the form of practical instructions) are based on extensive experience and tests. The user, however, should consider this information only as a reference.

Should the surface quality or the degree of transparency or glaze not correspond to the firing result that is achieved under optimum conditions, the firing procedure must be adjusted correspondingly. The crucial factors for the firing procedure are not the firing temperature indicated on the furnace display, but the appearance and the surface quality of the firing object after firing.

#### Explanation of the firing parameters

Predry. °C

Start temperature



Predrying time in minutes, closing time



Heating time in minutes



Temperature rise rate in degrees Celsius per minute

Temp. approx. °C

End temperature



Holding time for end temperature

VAC min.

Vacuum holding time in minutes

## VITAVM.13 Classification tables for VITA SYSTEM 3D-MASTER® and VITA classical A1–D4 shades

The classifications given below are only intended to provide reference values!

VITA SYSTEM 3D-MASTER shades	OPAQUE	MARGIN**	EFFECT LINER**	CHROMA PLUS**	ENAMEL
0M1	OP0	M1	EL1	—	ENL
0M2	OP0	M1	EL1	—	ENL
0M3	OP0	M1	EL1/EL2*	—	ENL
1M1	OP1	M1/M7*	EL1/EL2*	CP1	ENL
1M2	OP1	M1/M7*	EL2	CP1/CP2*	ENL
2L1.5	OP2	M1/M7*	EL1/EL2*	CP1/CP2*	ENL
2L2.5	OP2	M1/M4*	EL1/EL3*	CP2/CP3*	ENL
2M1	OP2	M1/M4*	EL1/EL6*	CP1/CP5*	ENL
2M2	OP2	M1/M4*	EL1/EL3*	CP1/CP3*	ENL
2M3	OP2	M4	EL2/EL4*	CP3	ENL
2R1.5	OP2	M1/M7*	EL1/EL6*	CP1/CP5*	ENL
2R2.5	OP2	M1/M4*	EL2/EL4*	CP1/CP3*	ENL
3L1.5	OP3	M4/M7*	EL2/EL6*	CP2/CP5*	ENL
3L2.5	OP3	M4/M7*	EL4/EL6*	CP2/CP5*	ENL
3M1	OP3	M7	EL1/EL6*	CP1/CP5*	ENL
3M2	OP3	M4/M7*	EL2/EL6*	CP3/CP5*	ENL
3M3	OP3	M4/M9*	EL4/EL6*	CP4/CP4*	ENL
3R1.5	OP3	M7	EL2/EL3*	CP1/CP5*	ENL
3R2.5	OP3	M4/M7*	EL5/EL6*	CP4/CP5*	ENL
4L1.5	OP4	M7	EL6	CP5	END
4L2.5	OP4	M4/M9*	EL3/EL4*	CP4/CP5*	END
4M1	OP4	M7	EL6	CP5	END
4M2	OP4	M4/M9*	EL2/EL3*	CP3/CP5*	END
4M3	OP4	M9	EL5/EL6*	CP4/CP5*	END
4R1.5	OP4	M7/M8*	EL2/EL3*	CP5	END
4R2.5	OP4	M7/M9*	EL3/EL4*	CP4/CP5*	END
5M1	OP5	M7/M8*	EL3/EL6*	—	END
5M2	OP5	M7/M9*	EL5/EL6*	—	END
5M3	OP5	M5/M9*	EL3/EL4*	—	END

VITA classical A1–D4 shades	OPAQUE	MARGIN**	EFFECT LINER**	CHROMA PLUS**	ENAMEL
A1	A1	M1/M7*	EL2	CP1	ENL
A2	A2	M4/M7*	EL1/EL3*	CP2	ENL
A3	A3	M4	EL4/EL6*	CP2/CP3*	ENL
A3,5	A3,5	M4/M9*	EL5/EL6*	CP2/CP3*	END
A4	A4	M4/M9*	EL1/EL3*	CP2/CP4*	END
B1	B1	M1/M4*	EL1/EL2*	CP1	END
B2	B2	M1/M4*	EL1/EL4*	CP1	END
B3	B3	M4	EL2/EL4*	CP2/CP3*	END
B4	B4	M4/M9*	EL4/EL6*	CP3	END
C1	C1	M1/M4*	EL1/EL6*	CP1	END
C2	C2	M4/M7*	EL2/EL6*	CP1/CP5*	END
C3	C3	M4/M7*	EL6	CP1/CP5*	ENL
C4	C4	M4/M7*	EL3/EL6*	CP5	ENL
D2	D2	M1/M9*	EL2/EL6*	CP1/CP5*	END
D3	D3	M4/M7*	EL2/EL3*	CP2/CP5*	END
D4	D4	M1/M4*	EL2/EL6*	CP2/CP5*	END

\* Mixing ratio 1:1

\*\* Indication range, see pages 28/29



#### **VITA VM MODELLING LIQUID**

For mixing BASE DENTINE, TRANSPA DENTINE, ENAMEL and additional materials. VITA VM MODELLING LIQUID provides excellent stability characteristics during layering and allows faster evaporation of the liquid.

Perfectly suitable for the fabrication of small restorations or for processing without the permanent use of an extraction unit.



#### **VITA VM OPAQUE FLUID**

Especially for mixing the VITA VM powder opaque materials.

⚠ **Note:** Cannot be used for mixing the dentine materials!

#### **VITA VM PASTE FLUID**

Liquid for mixing the VITA VM paste opaque materials



#### **VITA MODELLING FLUID** (not included in the assortment)

For mixing all dentine, incisal and additional materials.

VITA MODELLING FLUID avoids rapid drying of the ceramic material.

Moreover increased plasticity during layering is achieved.



#### **VITA MODELLING FLUID RS** (not included in the assortment)





































Red special liquid for mixing all dentine, incisal and additional materials.



































The smooth consistency of VITA MODELLING FLUID RS allows extended and wet processing while ensuring good stability. The fluid is therefore particularly suited for large-sized restorations and multi-unit bridges.















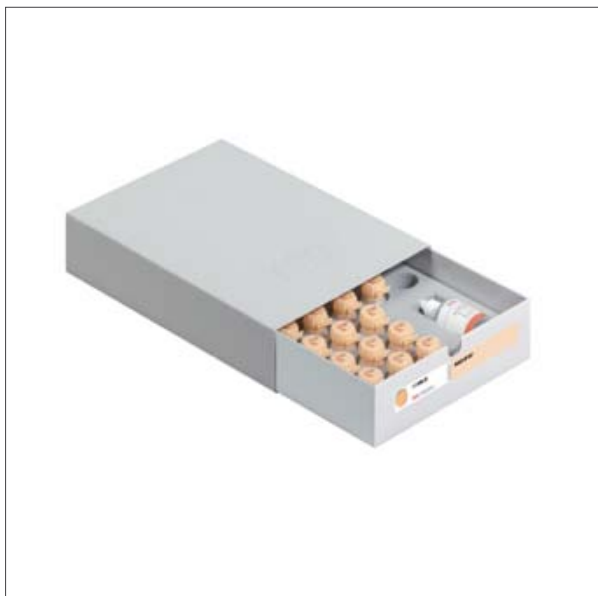
#### **VITA HIGH SILVER MODELLING LIQUID** (not included in the assortment)

Special anti-greening liquid for high silver content alloys (silver content > 30 %).

<b>VITA VM 13 EFFECT LINER</b> – to control the fluorescence from the depth of the restoration – universally suitable to support and intensify the base shade – applied in the gingival area, they enhance the distribution of light		EL1	snow	white	
		EL2	cream	beige	
		EL3	tabac	brown	
		EL4	golden fleece	yellow	
		EL5	papaya	orange	
		EL6	sesame	green-yellow	
<b>VITA VM 13 MARGIN</b> – to create an esthetic transition in the case of a labially shortened metal coping – after the application, the plastified MARGIN material must be hardened through the supply of heat; it is recommended to use a hairdryer or radiated heat from the furnace to stabilize the shoulder		M1	icy beige	white	
		M4	wheat	yellow	
		M5	amber	amber	
		M7	seashell	light beige	
		M8	tan	pastel-brown	
		M9	beach	light orange	
<b>VITA VM 13 EFFECT CHROMA</b> – color-intensive modifier porcelains – to accentuate certain color areas of the tooth – to vary the lightness value in the neck, dentine and enamel areas		EC1	ghost	white	
		EC2	linen	sand-beige	
		EC3	pale banana	light yellow	
		EC4	lemon drop	tender lemon yellow	
		EC5	golden rod	light orange	
		EC6	sunflower	orange	
		EC7	light salmon	pink	
		EC8	toffee	beige-brown	
		EC9	doe	brown	
		EC10	larch	green-brown	
		EC11	gravel	green-grey	
<b>VITA VM 13 MAMELON</b> – highly fluorescent material which is mainly used in the incisal area – for shade characterization between incisal edge and dentine		MM1	ecru	beige	
		MM2	mellow buff	warm yellow-brown	
		MM3	peach puff	tender orange	
<b>VITA VM 13 CHROMA PLUS</b> – Chroma Plus materials can be used to achieve more intensive shade reproduction in the cervical region (especially with VITA classical A1–D4 shades) – in case of thin walls, they enhance the shade in an efficient manner		CP1	ivory	ivory	
		CP2	almond	beige	
		CP3	moccasin	light orange-brown	
		CP4	caramel	orange	
		CP5	burlywood	green-brown	

<b>VITA VM 13 CORRECTIVE</b> – with reduced firing temperature (830°C) for corrections after glaze firing – in three nuances for neck, dentine and enamel areas		COR1	neutral	neutral	
		COR2	sand	beige	
		COR3	ochre	brown	
<b>VITA VM 13 SUN OPAQUE</b> – for mixing the respective opaque shades – in three different nuances		S01	yellowish	yellowish	
		S02	medium	orange	
		S03	reddish	reddish	
<b>VITA VM 13 SUN DENTINE</b> – for a "sunnier" and warmer shade result – to be used in the dentine and body area		SD1	sun light	light yellow	
		SD2	sun rise	light orange	
		SD3	sun set	orange-red	
<b>VITA VM 13 EFFECT ENAMEL</b> – can be used for all enamel areas of the natural tooth – universally suitable translucent enamel effect material – to achieve a natural effect of depth		EE1	mint cream	whitish-translucent	
		EE2	pastel	pastel	
		EE3	misty rose	pink-translucent	
		EE4	vanilla	yellowish	
		EE5	sun light	yellowish-translucent	
		EE6	navajo	reddish-translucent	
		EE7	golden glow	orange-translucent	
		EE8	coral	red-translucent	
		EE9	water drop	bluish translucent	
		EE10	silver lake blue	blue	
		EE11	drizzle	greyish-translucent	
<b>VITA VM 13 EFFECT PEARL</b> – only suitable for effects on the surface, not for layering in – perfectly suitable for bleached restorations – to obtain nuances of yellow and red		EP1	pearl	shade in pastel-yellow	
		EP2	pearl blush	shade in pastel-orange	
		EP3	pearl rose	shade in pastel-rosé	
<b>VITA VM 13 EFFECT OPAL</b> – to create the opal effect in restorations of young and highly translucent teeth		EO1	opal	neutral, universally suitable	
		EO2	opal whitish	whitish	
		EO3	opal bluish	bluish	
		EO4	opal blue	blue	
		EO5	opal dark violet	dark violet	

<b>VITA VM 13 GINGIVA</b> – to restore the original gingival situation – are applied and fired during the first and / or second dentine firing – color nuances range from orange-red and reddish to brown-red		G1	rose	dusky pink	
		G2	nectarine	orange-pink	
		G3	pink grapefruit	pink	
		G4	rosewood	brown-red	
		G5	cherry brown	dark red	
		GOL	light flesh	light pink	
		GOD	dark flesh	dark pink	
<b>VITA VM 13 COLOR OPAQUE</b> – shade-intensive opaque materials for the characterization of enamel and cervical areas		C01	gold	orange	
		C02	brown	brown	
		C03	lilac	lilac	


**VITA VM 13 BASIC KIT\*\*/\*\*/\*\*\*\***

BASIC assortment for BASIC layering

Quantity	Content	Material
1	12 g	WASH OPAQUE W0
5	12 g	OPAQUE° OP1 – OP5
3	12 g	SUN OPAQUE S01– S03
5	12 g	CHROMA PLUS CP1– CP5
26	12 g	BASE DENTINE° 1M1– 5M3
3	12 g	SUN DENTINE SD1–SD3
2	12 g	ENAMEL° ENL, END
1	12 g	NEUTRAL° NT
1	12 g	WINDOW° WIN
3	12 g	CORRECTIVE COR1– COR3
1	50 ml	VITA VM MODELLING LIQUID
1	50 ml	VITA VM OPAQUE FLUID
1	–	Shade indicator
1	–	VITA Toothguide 3D-MASTER
1		Working Instructions

...\*also available as BASIC KIT SMALL with reduced range of materials.

\*\* also available as BASIC KIT classical in the VITA classical A1–D4 shades and as BASIC KIT SMALL classical in the following six shades: A1, A2, A3, A3.5, B3, D3

\*\*\* each assortment also available with PASTE OPAQUE

° also available in 50 g

**VITA VM 13 BUILD UP KIT\***

Add-on assortment for BUILD UP layering

Quantity	Content	Material
26	12 g	TRANSPA DENTINE° 1M1– 5M3
1	50 ml	VITA VM MODELLING LIQUID

\* also available as BUILD UP KIT SMALL in the following fifteen shades: 1M1, 1M2, 2M1, 2M2, 2M3, 3L1.5, 3L2.5, 3M1, 3M2, 3M3, 3R1.5, 3R2.5, 4M1, 4M2, 4M3

\*\* also available as BUILD UP KIT classical in the VITA classical A1–D4 shades and as BUILD UP KIT SMALL classical with 6 shades

° also available in 50 g

**VITA VM 13 CLASSICAL COLOR KIT\*\*/\*\***

Add-on assortment for 3D-MASTER users

Quantity	Content	Material
16	12 g	OPAQUE A1–D4
16	12 g	BASE DENTINE° A1–D4
16	12 g	TRANSPA DENTINE° A1–D4
1	50 ml	VITA VM MODELLING LIQUID
1	50 ml	VITA VM OPAQUE FLUID
1	–	Shade indicator
1	–	VITA classical A1–D4 shade guide
1	–	Working Instructions

\* also available with OPAQUE PASTE

\*\* Assortment for 3D-MASTER customers who wish to add VITA classical shades to their assortment

° also available in 50 g


**VITA VM 13 PROFESSIONAL KIT\***

For incorporating natural effects and characteristics

Quantity	Content	Material
11	12 g	EFFECT CHROMA EC1–EC11
3	12 g	MAMELON MM1–MM3
3	12 g	EFFECT PEARL EP1–EP3
5	12 g	EFFECT OPAL EO1–EO5
11	12 g	EFFECT ENAMEL EE1–EE11
6	12 g	EFFECT LINER EL1–EL6
4	–	Shade guides

\* also available as PROFESSIONAL KIT SMALL in the following shades:

EC1, EC4, EC6, EC8, EC9, MM2, EP1, EO2, EE1, EE3, EE7, EE8, EE9, EE10, EE11


**VITA VM 13 BLEACHED COLOR KIT**

Ultra-bright shades for the reproduction of bleached teeth

Quantity	Content	Material
1	12 g	OPAQUE OPO
3	12 g	BASE DENTINE OM1–OM3
3	12 g	TRANSPA DENTINE OM1– OM3
1	12 g	ENAMEL ENL
1	12 g	NEUTRAL NT
1	12 g	WINDOW WIN
1	50 ml	VITA VM MODELLING LIQUID
1	50 ml	VITA VM OPAQUE FLUID
1	–	BLEACHED SHADE GUIDE SHADE GROUP OM
1	–	Workin Instructions

\* also available with OPAQUE PASTE


**VITA VM 13 GINGIVA KIT\***

Gingiva materials with natural effects

Quantity	Content	Material
5	12 g	GINGIVA G1– G5
2	12 g	GINGIVA OPAQUE GOL, GOD
1	–	GINGIVA shade guide

\* also available with OPAQUE PASTE








**VITA VM 13 MARGIN KIT**

For ceramic shoulder design





Quantity	Content	Material
6	12 g	MARGIN M1, M4, M5, M7, M8, M9
1	–	MARGIN shade guide

**IMPORTANT INFORMATION:**

Information on troubleshooting can be found under **FAQs - metal ceramics** - on our website.

The following products require hazard identification:		
<b>VITA VM OPAQUE FLUID</b>	<p>Causes severe skin burns and damage to eyes. May be corrosive to metals.</p> <p>Causes severe eye irritation.</p> <p>When working with the product, do not eat and drink. In case of contact with eyes: rinse carefully with water for some minutes. In case of contact with skin: rinse thoroughly with water. Do not empty into drains. This product and its container must be disposed of as hazardous waste.</p>	 
<b>VITA SPRAY-ON INDICATOR LIQUID and VITA SPRAY-ON LIQUID</b>	<p>Highly flammable liquid and vapor.</p> <p>Keep container tightly closed. Keep away from ignition sources. - No smoking. Use only in well-ventilated areas. Store container tightly closed at an adequately ventilated place. Do not empty into drains. This product and its container must be disposed of as hazardous waste.</p>	

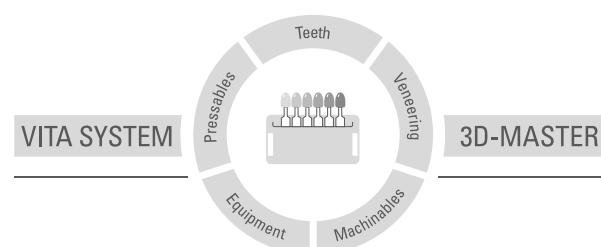
Please refer to the safety data sheet for detailed information!

<b>Safety at work and health protection</b>	<p>When working with the product, wear suitable safety goggles/face protection, gloves and safety clothing. In case of formation of dust, use an extraction system or wear a face mask.</p>	   
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VITA VM 13 veneering material is available in VITA SYSTEM 3D-MASTER and VITA classical A1–D4 shades. Shade compatibility with all VITA SYSTEM 3D-MASTER and VITA classical A1–D4 materials is guaranteed.

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: 07.13

After the publication of these working instructions any previous versions become obsolete. The current version can be found at [www.vita-zahnfabrik.com](http://www.vita-zahnfabrik.com)

VITA Zahnfabrik has been certified in accordance to the Medical Device Directive and the following products bear the mark  0124 :

VITA**VM**13 · VITA AKZENT® **Plus**

US 5498157 A · AU 659964 B2 · EP 0591958 B1

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