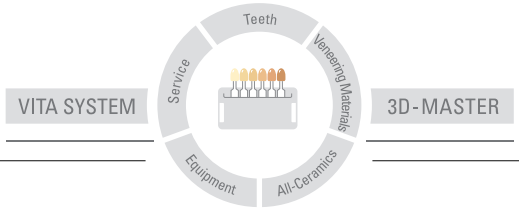
VITA**VM**®**13**

Working Instructions

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

Date of Issue: 04.11



VITA

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

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

Photograph courtesy of: M. Buzzo

Situation after preparation of teeth 11 and 21.

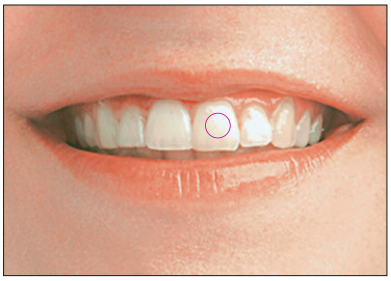
Metal crown copings; cervical reduction for shoulder.

Crown copings prepared with opaque and shoulder porcelain.

Restoration in harmony with the patient's natural dentition.

Over 80 years of expertise

Shade competence is more than purely shade determination. For us, shade competence means taking on responsibility for better solutions within the context of an overall process. That is VITA's key objective: How can we achieve improvements in shade determination and reproduction? By means of standardized process steps for increasing efficiency. The demands on dental professionals today can be summed up as follows: Better results with less time, effort and expenditure. We are united by this common goal.



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.

Determining the effects

Natural teeth are unique and a true miracle of nature. That is why, after determining the basic shade of a tooth, it is important to recognize also the finer details of a tooth, for instance, translucent zones or anomalies, in order to get as close as possible to nature. We recommend a digital photograph for the effect or detail analysis.

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 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 cleverly 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 last step, qualitative shade evaluation is no longer to 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 satified 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 and the firing temperature of VITA VM 13 are optimally matched to high gold content, reduced gold content and palladium based or non-precious 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 a 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 tension cracks.

Fig. 2
The etched surface of the 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 tension 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.

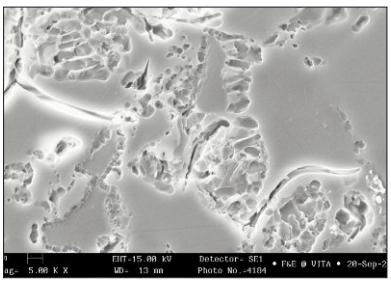


Fig. 1: Scanning electron micrograph (SEM) of the surface of a conventional metal ceramic (magnification 5000 x).

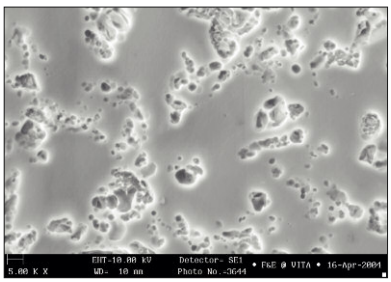
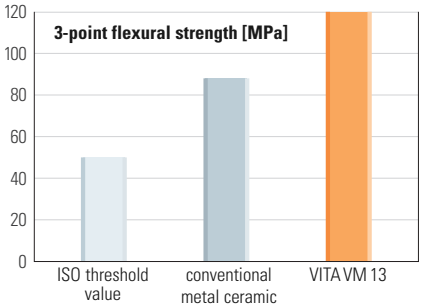


Fig. 2: Scanning electron micrograph (SEM) of the surface of VITA VM 13 (magnification 5000 x).

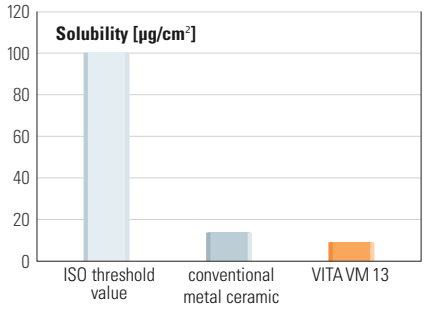
Improved physical properties

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 threshold value according to ISO 6872.



Solubility

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

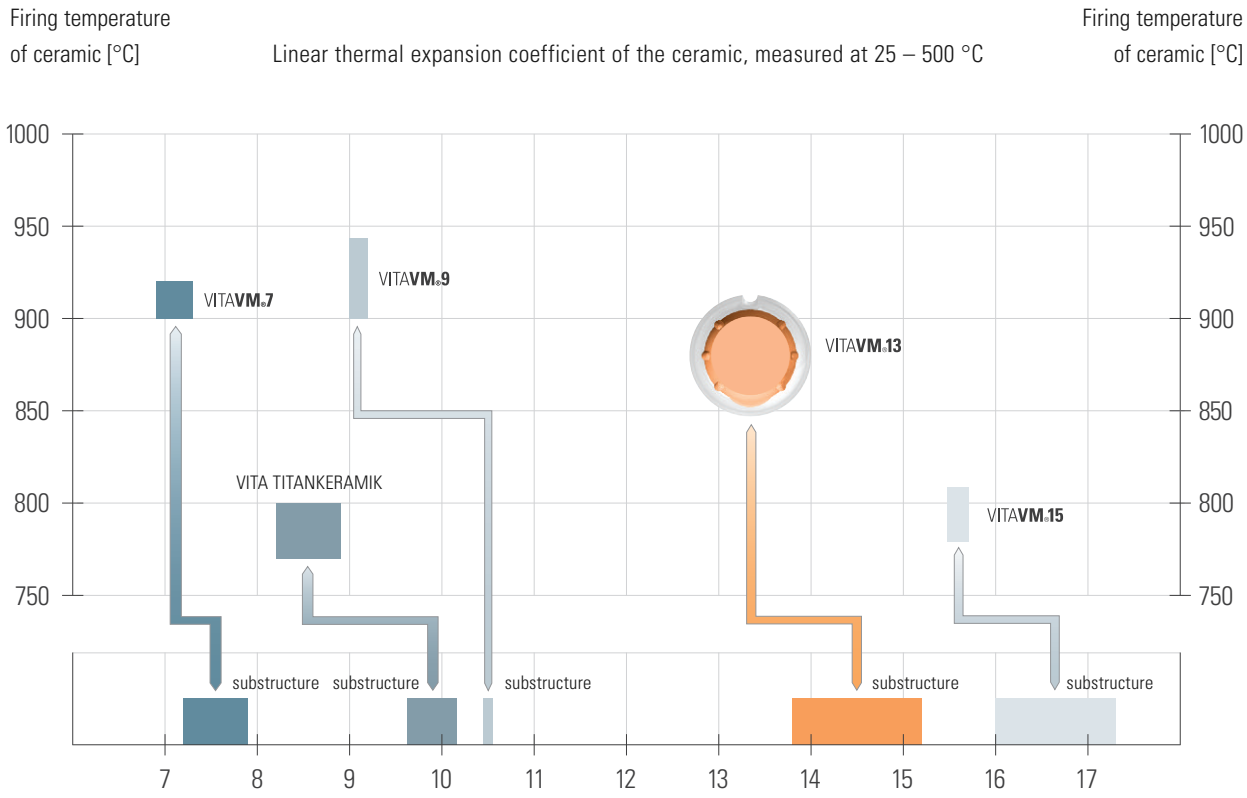
VITA**VM**®**13** – Physical properties	Unit of measurement	Value
CTE (25 – 500 °C) OPAQUE	$10^{-6} \cdot K^{-1}$	13.6–14.0
Transformation point OPAQUE	°C	approx. 570/577
CTE (25 – 500 °C) BASE DENTINE	$10^{-6} \cdot K^{-1}$	13.1–13.6
Softening point BASE DENTINE	°C	approx. 635
Transformation point BASE DENTINE	°C	approx. 560/565
Solubility BASE DENTINE	µg/cm²	approx. 12
Density BASE DENTINE	g/cm³	approx. 2.5
3-point flexural strength BASE DENTINE	MPa	approx. 120
Average particle size BASE DENTINE	µm	approx. 18
Adhesive bond testing (ISO 9693) BASE DENTINE	MPa	approx. 43

Similarity to natural tooth enamel

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. Prober, B. Abozenada "Zweiphasige Vollglas-Verblendkeramik", (Quintessenz Zahntech 30, 1, 32-45 [2004])

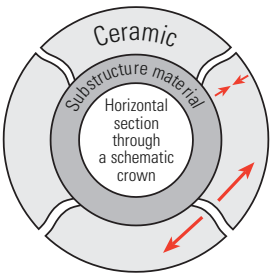
For alloys in the CTE range of approx. 13.8–15.2 · 10^{-6} · K^{-1}



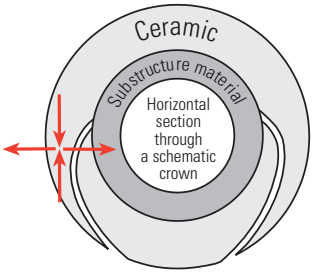
Linear thermal expansion coefficient of the substructure material, measured at 25 – 500 °C
(alloys measured at 25 – 600 °C)

VITA VM 7 CTE (25–500°C) 6.9–7.3 · 10^{-6} · K^{-1}	VITA In-Ceram ALUMINA, CTE (25–500°C) 7.2–7.6 · 10^{-6} · K^{-1} VITA In-Ceram SPINELL, CTE (25–500°C) 7.5–7.9 · 10^{-6} · K^{-1} VITA In-Ceram ZIRCONIA, CTE (25–500°C) 7.6–7.8 · 10^{-6} · K^{-1} VITA In-Ceram AL, CTE (25–500°C) approx. 7.3 · 10^{-6} · K^{-1}
VITA TITANKERAMIK CTE (25–500°C) 8.2–8.9 · 10^{-6} · K^{-1}	For titanium and titanium alloys CTE of titanium (25-500°C), approx. 9.6 · 10^{-6} · K^{-1} CTE of Ti6Al4V (25-500°C), approx. 10.2 · 10^{-6} · K^{-1}
VITA VM 9 CTE (25–500°C) 9.0–9.2 · 10^{-6} · K^{-1}	VITA In-Ceram YZ CTE (25–500°C), approx. 10.5 · 10^{-6} · K^{-1}
VITA VM 13 **CTE (25–500°C) 13.1–13.6 · 10^{-6} · K^{-1}**	**High gold content, reduced precious metal content, palladium-based and non-precious alloys** **CTE (25–600°C) 13.8–15.2 · 10^{-6} · K^{-1}** *
VITA VM 15 CTE (25–500°C) 15.5-15.7 · 10^{-6} · K^{-1}	Multi-indication alloys CTE (25–600°C) 16.0–17.3 · 10^{-6} · K^{-1} *

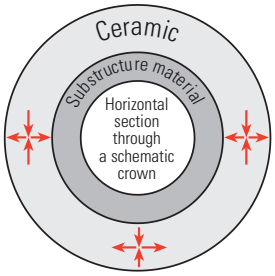
* For further information on alloys see under downloads in the internet.



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 flaking.



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. The type of furnace, the location of the temperature sensor, the firing trays and the size of the workpiece during the firing cycles are decisive for the result of firing.

Our recommendations for the firing temperatures (regardless of whether these are given orally, in writing or by means of practical demonstration) are based on our own wide practical experience and test results. The user, however, should consider this information only as a general guideline. 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 accordingly.

The decisive factor for the firing procedure is not the firing temperature indicated on the furnace display, but the appearance and the surface quality of the firing object after firing.

> ⚠ **Attention:** Firing trays may also have a major influence on the result. All firing temperatures for VITAVM are based on the use of black 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°C - from the reference value given depending on the furnace; in such cases the temperature needs to be raised accordingly.

A light surface glaze confirms that the ceramic has been fired correctly. If, however, the ceramic surface has a milky and inhomogeneous appearance, the temperature is too low. Approach the correct firing temperature in steps of 5–10°C.

Substructure design

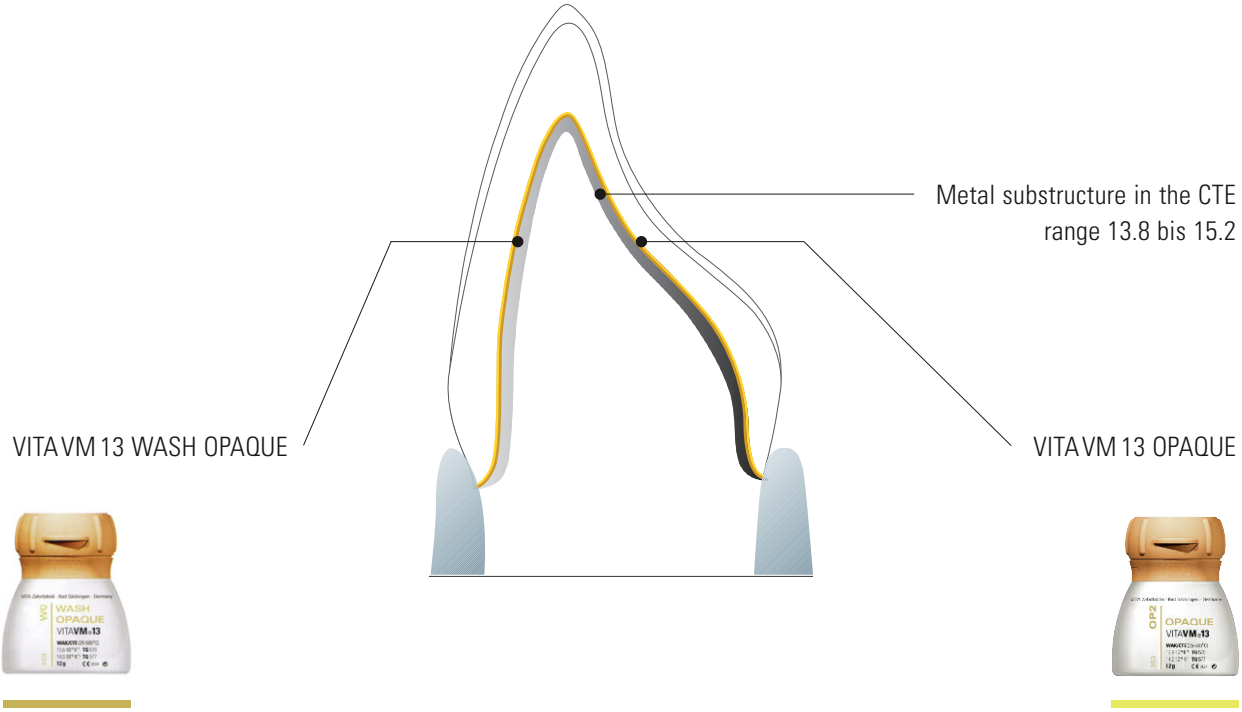
Crowns and bridge units which are to be veneered with ceramic must be modeled in reduced anatomical size. A minimum wall thickness of 0.4 mm is required order to ensure a minimum wall thickness of 0.3 mm after finishing. Avoid sharp edges, undercuts and deep grooves. The stability can be further increased 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 13.8–15.2 · 10^{-6} · K^{-1} has shown that good results can be achieved when the CTE of the alloy (measured at 25 – 600 °C) is within the range 14.0–14.4 · 10^{-6} · K^{-1}. In the case of alloys with a CTE (25 – 600 °C) >14.5 · 10^{-6} · K^{-1}, slow cooling should be used from the 1st dentine firing onwards.
> If the alloy has a higher CTE value, cooling in the 900°C – 700 °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. You will find this at www.vita-zahnfabrik.com under Download/Veneering Materials/Alloy List.

Layer thickness of ceramics

When designing a ceramic restoration, the layer thickness should be distributed homogeneously over the entire surface to be veneered. 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 non-precious alloys

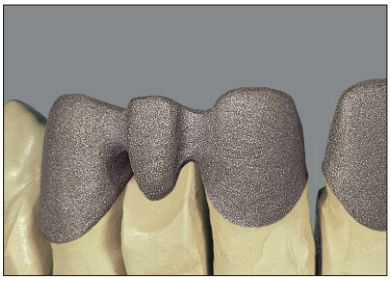
Wash opaque (WO) and the respective opaque material (OP) or SUN OPAQUE (SO) materials are available for the washbake. WO, OP and SO have the same chemical-physical properties and hence are perfectly suitable for the washbake.

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 framework 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. In the case of non-precious alloys use a pressure of 250 µm and a pressure of 3 - 4 bar. 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 the oxidation firing etched in a clean, warm acidic bath for approx. 5 min. Steam off all traces of etching residue.

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.

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 heed 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 opaque firing:

	Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°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 can be applied to the dry substructure.
The opaque can also be applied using the VITA SPRAY-ON procedure.
See page 26 for the classification table for opaque porcelains.

Recommended firing – opaque firing:

	Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°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 non-precious alloys

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

– When veneering non-precious alloys use only special ceramic crucibles.
– 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 follow 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 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 non-precious alloys

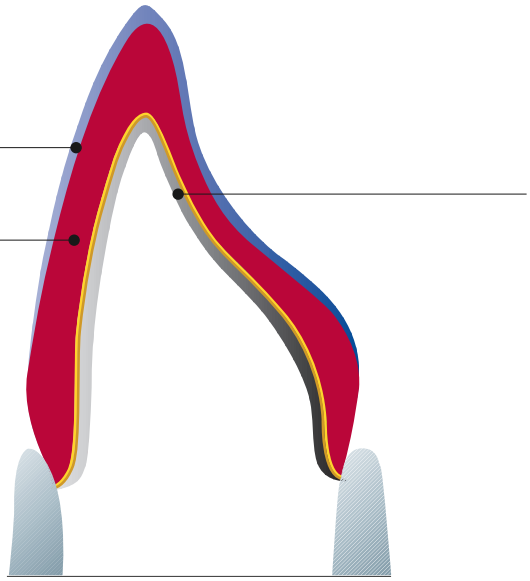
	Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°C	→ min.	VAC min.
Powder	500	2.00	5.52	75	940	2.00	5.52
Paste	500	4.00	5.52	75	940	2.00	5.52

Recommended firing – opaque firing of non-precious alloys

	Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°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

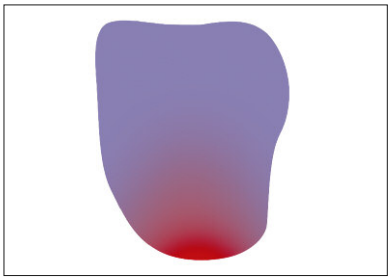


OPAQUE-coated metal substructure in the CTE range 13.8 – 15.2

VITA VM 13 BASE DENTINE

VITA VM 13 BASIC layering consists of the application of VITA VM 13 BASE DENTINE and VITA VM 13 ENAMEL following the application of WASH OPAQUE AND OPAQUE.

The color-carrying VITA VM 13 BASE DENTINE porcelains with their excellent masking properties provide perfect conditions for creating veneers with intensive shades. This two-layer system offers a reliable solution for achieving optimal shade reproduction particularly in the case of thin walls.



Furthermore, the intensive shade effect of the BASE DENTINEs allows generous use of the ENAMEL porcelains in order to achieve the desired translucency. The user is now able to create a natural-looking, lifelike restoration 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.

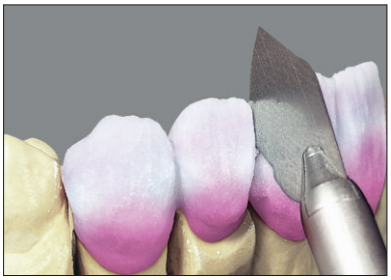
The use of CHROMA PLUS materials helps to achieve perfect shade reproduction in the cervical area.
To obtain a brighter or warmer shade, the respective BASE DENTINE can either be mixed with SUN DENTINE or replaced by SUN DENTINE. When using Chroma Plus or Sun Dentine materials, the final result of the restoration may differ significantly from the shade sample.

OPAQUE-coated metal substructures
To enable the restoration to be lifted off easily at a later stage, first insulate the model with the VITA Modisol pen.

Application of VITA**VM®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, remove the corresponding amount of BASE DENTINE porcelain according to the layering scheme.

Application of VITA**VM®13 ENAMEL**
Apply several small portions of ENAMEL to complete the tooth shape, 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 VITAVM 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 – 1st dentine firing:

Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°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.

Now apply BASE DENTINE starting from the neck area and add ENAMEL in the body area up to the incisal area.

Recommended firing – 2nd dentine firing:

Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°C	→ min.	VAC min.
500	6.00	6.44	55	870	1.00	6.44

Bridge and crown after 2nd dentine firing.

Finishing
Finish the bridge or crown. Prior to glaze firing the entire surface must be ground evenly, and grinding dust thoroughly removed.

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

Recommended firing - glaze firing

Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°C	→ min.	VAC min.
500	0.00	4.45	80	880	2.00	–

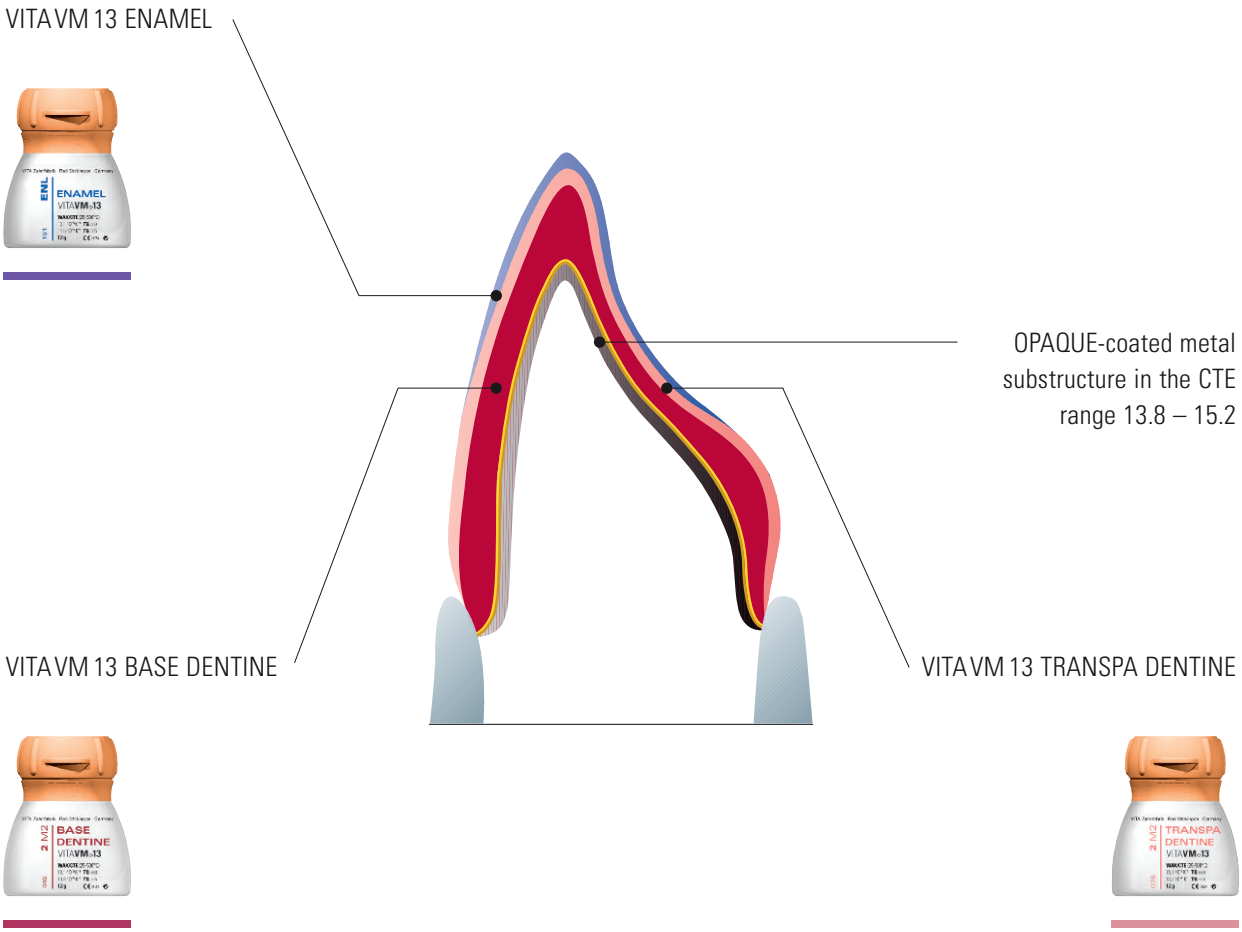
If required, the entire restoration can be coated with VITA Akzent GLAZE and then individualized with VITA Akzent stains.
(See VITA Akzent working instructions no. 771).

Recommended firing – glaze firing with VITA AKZENT®

Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°C	→ min.	VAC min.
500	4.00	4.45	80	880	1.00	–

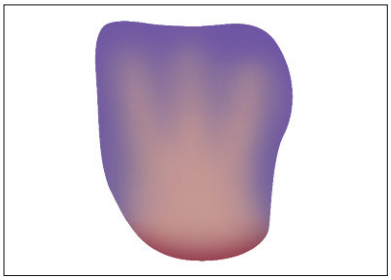
Completed restoration on the model.

⚠ **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 highly suitable.



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

In conjunction with the shade-carrying BASE DENTINE and the translucent TRANSPA DENTINE, the BUILD UP layering enables an increased impression of depth to be created in the restoration. With the three-layer method, this permits a reduced, and more individual application of the ENAMEL porcelains. This results in an extraordinarily close resemblance to what nature intended.

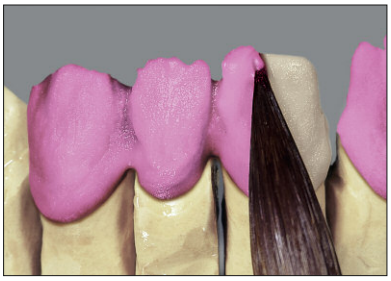


The shade intensity can be individually adjusted by the combination of ENAMEL and TRANSPA DENTINE porcelains in relation to the layer thickness of BASE DENTINE. An increased proportion of BASE DENTINE results in a more intensive shade, whereas a greater amount of TRANSPA DENTINE and ENAMEL reduces the intensity of the shade.

> ⚠ **Note:** The BASE DENTINE is what decisively influences the shade effect of the restoration. The TRANSPA DENTINE, like its natural counterpart, only has the function of creating a harmonious transition to the ENAMEL.

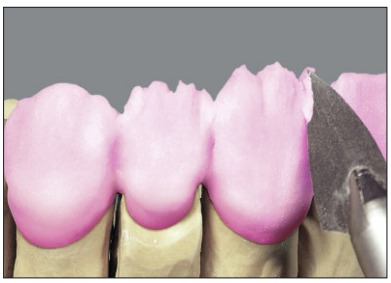
The use of CHROMA PLUS materials helps to achieve perfect shade reproduction in the cervical area. To obtain a brighter or warmer shade, the respective TRANSPA DENTINE can either be mixed with SUN DENTINE or replaced by SUN DENTINE. When using Chroma Plus or Sun Dentine materials, the final result of the restoration may differ from the shade sample.

OPAQUE-coated metal substructures
To enable the restoration to be lifted off easily at a later stage, first insulate the model with the VITA Modisol pen.



Application of VITA**VM®13 BASE DENTINE**
Apply BASE DENTINE over the whole surface starting from the neck in reduced tooth size. The centric, lateral and protrusive occlusion should be checked in the articulator already during this stage.

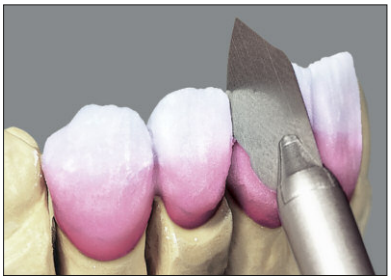
Application of VITA**VM®13 TRANSPA DENTINE**
DENTINE is applied in the required complete tooth shape.



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

Application of VITA**VM®13 ENAMEL**
Apply several small portions of ENAMEL in the upper third of the crown to complete the crown shape. To compensate firing shrinkage the size of the mould must be modeled slightly larger.

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



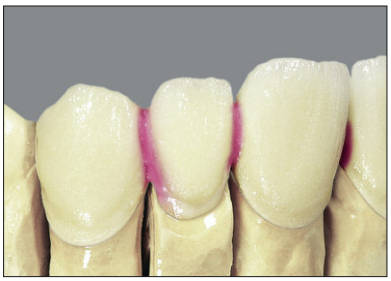
Before firing the individual units of bridges must be separated in the interproximal areas down to the substructure.

The applied porcelains ready for first dentine firing.

Recommended firing – 1st dentine firing:

Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx. °C	→ min.	VAC min.
500	6.00	6.55	55	880	1.00	6.55

Restoration after first dentine firing.



Corrections to 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.

Further corrections to shape in the body of the tooth with TRANSPA DENTINE ...

... and the incisal area with ENAMEL.

Recommended firing – 2nd dentine firing:

Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°C	→ min.	VAC min.
500	6.00	6.44	55	870	1.00	6.44

Bridge and crown after the 2nd dentine firing.

Finishing

Finish the bridge or crown. Prior to glaze firing the entire surface must be ground evenly and grinding dust thoroughly removed.

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

Recommended glaze firing

Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°C	→ min.	VAC min.
500	0.00	4.45	80	880	2.00	–

If required, the entire restoration can be coated with VITA Akzent GLAZE and then individualized using the VITA Akzent stains. (See VITA Akzent working instructions no. 771).

Recommended glaze firing with VITA AKZENT®

Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°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 highly suitable.

	Predr: °C	→ min.	↗ min.	↗ °C/min.	Temp. approx.°C	→ min.	VAC min.
Oxidation firing	Please heed 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 non-precious alloys**	500	2.00	5.52	75	940	2.00	5.52
WASH OPAQUE PASTE firing for non-precious alloys**	500	4.00	5.52	75	940	2.00	5.52
OPAQUE firing for non-precious alloys**	500	2.00	5.36	75	920	1.00	5.36
OPAQUE PASTE firing for non-precious 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
1st dentine firing	500	6.00	6.55	55	880	1.00	6.55
2nd 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	500	4.00	4.45	80	880	1.00	–
Correction 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 non-precious alloys see page 15

Notes:

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

Our recommendations for the firing temperatures (regardless of whether these are given orally, in writing or by means of practical demonstration) are based on our own wide practical experience and test results. The user, however, should consider this information only as a general guideline.

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 accordingly. The decisive factor for the firing procedure is not the firing temperature indicated on the furnace display, but the appearance and the surface quality of the firing object after firing.

Explanation of firing parameters:

Predr.	Starting temperature
→	Predrying time in min., closing time
↗	Heating up time in min.
↗	Temperature rise in °C per min.
Temp approx.°C	End temperature
→	Hold time for end temperature
VAC min.	Hold time for vacuum in min.

The following classifications are intended only as a general guideline!

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

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 the BASE DENTINE, TRANSPA DENTINE, ENAMEL and additional materials. The VITA VM MODELLING LIQUID makes excellent stability characteristics possible 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 VITAVM powder opaque materials.

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

VITA**VM**® **PASTE FLUID**
Especially 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 whilst ensuring good stability and 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 %).

VITA VM13 EFFECT LINER – to control the in-depth fluorescence of the restoration – can be used universally to enhance and intensify the basic shade – to enhance light distribution in the gingival area	EL1	snow	white	
	EL2	cream	beige	
	EL3	tabac	brown	
	EL4	golden fleece	yellow	
	EL5	papaya	orange	
	EL6	sesame	green-yellow	
VITA VM13 MARGIN – to create an esthetic transition in the case of a labially shortened metal coping – heat must be applied to the applied, plastified MARGIN porcelain; it is recommended to stabilize the shoulder by applying heat with a hairdryer or the heat radiation at the furnace opening	M1	icy beige	white	
	M4	wheat	yellow	
	M5	amber	amber	
	M7	seashell	light-beige	
	M8	tan	pastel-brown	
	M9	beach	light-orange	
VITA VM13 EFFECT CHROMA – shade-intensive modifier porcelains – to emphasize particular shaded areas of the tooth – for the individual adjustment of the lightness level in the neck, dentine and enamel area	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	
VITA VM13 MAMELON – highly fluorescent porcelain mainly used in the incisal area – for shade characterization between dentine and enamel	MM1	ecru	beige	
	MM2	mellow buff	warm yellow-brown	
	MM3	peach puff	tender orange	
VITA VM13 CHROMA PLUS – shade-intensive porcelains, best used in combination with BASE DENTINE – to effectively enhance the shade in the case of thin wall thicknesses	CP1	ivory	ivory-colored	
	CP2	almond	beige	
	CP3	moccasin	light orange-brown	
	CP4	caramel	orange	
	CP5	burlywood	green-brown	

VITA VM13 CORRECTIVE – with reduced firing temperature (800 °C) for corrections after the glaze firing – in three nuances for the neck, dentine and enamel area	COR1	neutral	neutral	
	COR2	sand	beige	
	COR3	ochre	brown	
VITA VM13 SUN OPAQUE – for mixing the respective opaque shades – in three different nuances	SO1	yellowish	yellowish	
	SO2	medium	orange	
	SO3	reddish	reddish	
VITA VM13 SUN DENTINE – 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	
VITA VM13 EFFECT ENAMEL – can be used for all enamel areas found in natural teeth – universally applicable translucent enamel effect porcelains – to create a natural impression 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	
VITA VM13 EFFECT PEARL – only suitable for surface, not inlaid effects – ideal for "bleached" restorations – for yellow and red nuances	EP1	pearl	shade in pastel-yellow	
	EP2	pearl blush	shade in pastel-orange	
	EP3	pearl rose	shade in pastel-rosé	
VITA VM13 EFFECT OPAL – to create an opalescent effect in restorations of youthful and very translucent teeth	EO1	opal	neutral, universally suitable	
	EO2	opal whitish	whitish	
	EO3	opal bluish	bluish	
	EO4	blue	blue	
	EO5	dark violet	dark violet	

VITA**VM**®**13 GINGIVA** – for reproducing the individual gingival situation – are applied and fired after the first or the second dentine firing respectively – the shade nuances range from orange-red to reddish to brownish red		G1	rose	dusky pink
		G2	nectarine	orange-pink
		G3	pink grapefruit	pink
		G4	rosewood	brown-red
		G5	cherry brown	black-red
		GOL	light flesh	light pink
		GOD	dark flesh	dark pink
VITA**VM**®**13 COLOR OPAQUE** – shade-intensive opaque porcelains for the characterization of enamel and cervical areas		CO1	gold	orange
		CO2	brown	brown
		CO3	lilac	purple

VITA**VM 13 BASIC KIT***/**/***
Basic Assortment for the BASIC layering

Quantity	Content	Material
1	12 g	WASH OPAQUE WO
5	12 g	OPAQUE° OP1 – OP5
3	12 g	SUN OPAQUE SO1 – SO3
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 a reduced assortment BASIC KIT SMALL
** also available as BASIC KIT classical in the VITA classical shades A1–D4 and as BASIC KIT SMALL classical with the following 6 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***/**
Supplementary assortment for the BASIC layering

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

* also available in the following 15 shades as BUILD UP KIT SMALL: 1M1, 1M2, 2M1, 2M2, 2M3, 2L1.5, 3L2.5, 3M1, 3M2, 3M3, 3R1.5, 3R2.5, 4M1, 4M2, 4M3
** also available as VITA VM 13 BUILD UP KIT classical in the VITAPAN classical shades A1–D4 and as VITA VM 13 BUILD UP KIT SMALL classical with 6 shades
° also available in 50g

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 wishing 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

* available as PROFFESSIONAL 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-light shades for the reproduction of bleached teeth

Quantity	Content	Material
1	12 g	OPAQUE OPO
3	12 g	BASE DENTINE 0M1–0M3
3	12 g	TRANSPA DENTINE 0M1–0M3
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 0M
1	–	Working instructions

* Also available with OPAQUE PASTE

VITA**VM 13 GINGIVA KIT***
Natural-looking gingiva porcelains

Quantity	Content	Material
5	12 g	GINGIVA G1–G5
2	12 g	GINGIVA OPAQUE GOL, GOD
1	–	Shade sample blade GINGIVA

* 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	–	Shade sample blade MARGIN

IMPORTANT INFORMATION:
Information on troubleshooting can be found under FAQs – metal ceramics – on our website.

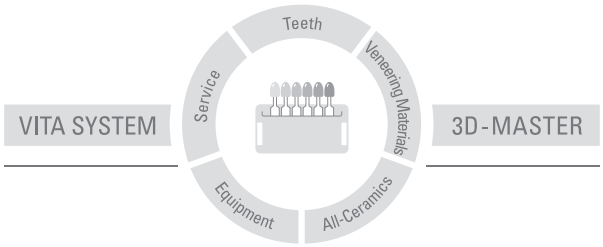
The following products are subject to obligatory labeling:		
VITA**VM**® **OPAQUE FLUID**	**Corrosive** Causes severe burns. Store under lock and key and out of the reach of children. Do not eat and drink while working. In case of eye contact rinse immediately and thoroughly with water and consult physician. Do not allow to penetrate the sewage system; this product and its container must be disposed of according to the regulations for hazardous waste. Wear appropriate protective clothing when working. Wear protective gloves and protective goggles/face mask. In case of accident or unwellness consult physician immediately (if possible, show this label).	
VITA SPRAY-ON **INDICATOR LIQUID und** **VITA SPRAY-ON LIQUID**	**Flammable** Keep container tightly closed and store in a well-ventilated place. Keep away from sources of ignition – do not smoke. Do not allow to enter into the sewage system. This product and its container must be disposed of according to the regulations for hazardous waste.	

For more details please see the corresponding Material Safety Data Sheets!

Safety at work, health protection	Wear suitable protective goggles/face mask, protective gloves and protective clothing when working. In case of dust formation use a suction unit or wear a dust mask.	

VITA VM 13 veneering ceramic is available in VITA SYSTEM 3D-MASTER and VITA classical A1 – D4 shades. Shade compatibility with all VITA 3D-MASTER and VITA classical materials is ensured.

With the unique VITA SYSTEM 3D-MASTER all natural tooth shades are systematically determined and completely reproduced.



Please note: Our products should be used according to the working instructions. We cannot be held liable for damages 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 applications. We cannot accept any liability if the product is used in conjunction with materials and equipment from other manufacturers which are not compatible or not authorized for use with our product. Furthermore, our liability for the correctness of this information is independent of the legal ground and, in as far as legally permissible, is limited to the invoiced value of the goods supplied excluding turnover tax. In particular, as far as legally permissible, we do not assume any liability for profit loss, for indirect damages, for consequential damages or for claims of third parties against the purchaser. Claims for damages based on fault liability (fault in making the contract, 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 these instructions for use: 04.11

After the publication of these working instructions any previous versions become obsolete. The current version can be found at www.vita-zahnfabrik.com

VITA Zahnfabrik has been certified according to the Guideline for Medical Devices and the following products bear the CE mark: CE 0124:

VITA**VM**®**13**
VITA AKZENT®

US 5498157 A · AU 659964 B2 · EP 0591958 B1

VITA

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