

# PANAVIA™ V5

## Technical Guide

One cement, all cement indications  
Excellent bond strength  
Predictable results  
Natural aesthetics



IT HAS BEEN MORE THAN THIRTY YEARS SINCE THE LAUNCH OF THE FIRST GENERATION OF PANAVIA™



1983

PANAVIA™ EX



1993

PANAVIA™ 21



1998

PANAVIA™ F

# NOW, WITH THE ADVENT OF “PANAVIA™ V5”, A NEW CATALYST TECHNOLOGY IS BORN

The PANAVIA™ series has undergone continuous improvement since its launch in 1983. It was our first adhesive resin cement to contain the original adhesive monomer “MDP” which made it possible to use the cement not only for general cementation, but also for difficult prosthetic restoration situations, including adhesive bridges.

In 1993, we developed PANAVIA™ 21, a resin cement system consisting of a self-etching primer and resin paste, with a window dispenser to make it easier to use. More importantly, PANAVIA™ 21 offered a reduction in postoperative sensitivity. In 1998, PANAVIA™ evolved further with the development of PANAVIA™ F. This was a dual-cure cement that embodied two important concepts: assuring a secure seal at the adhesion interface plus improving marginal adaptability by use of surface-treated sodium fluoride and a photo-initiator.

Subsequently, in 2003 we brought out PANAVIA™ F2.0, which could be polymerized with an LED light-curing unit. As we indicated above, the PANAVIA™ series has been widely accepted in the worldwide dental materials market for many years, due to the delivery of excellent bond strength and marginal sealing.

In recent years, the growing demand for aesthetic restorations has substantially increased the variety of prostheses being used, promoting the widespread application of a variety of aesthetic materials to replace metal. These include zirconia, lithium silicate glass, and hybrid ceramics. A successful prosthetic treatment relies on a strong bond to the tooth structure of the prostheses made from these new materials. In addition, the cement needs to remain discoloration-free for a long period of time. Cements should also be available in a wide range of color variations, for better shade matching.

With the intention of attaining a higher level of prosthetic treatment, we have embarked on the development of a novel dental cement using a new catalyst technology. In 2015, we successfully developed PANAVIA™ V5, a new type of versatile dental cement that features superior color stability, as well as dramatically improved bond strength to tooth (especially to dentin), compared with that of our conventional products. Its predictable cementation procedure makes it suitable for many types of applications. These range from those requiring a very strong bond – such as for adhesive bridges, posts, or cores, to those where esthetics are of utmost importance – such as ceramic inlays or laminate veneers. PANAVIA™ V5 is a versatile adhesive resin cement that is indicated for almost all types of prostheses and clinical cases.



2003

PANAVIA™ F 2.0



2015

PANAVIA™ V5

# PANAVIA™ V5 KIT COMPONENTS

**ONE CEMENT, THAT PROVIDES  
A STRONG BOND AND  
OUTSTANDING ESTHETICS.**

## PANAVIA™ V5 PASTE

AUTOMIX TYPE

The paste is available in five shades: Universal, Clear, Brown and White (all of which are dual-cured) and Opaque (chemically-cured).



## PROSTHESIS

ALL YOU NEED TO PRETREAT PROSTHESES!

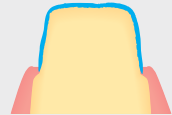
## CLEARFIL™ CERAMIC PRIMER PLUS

PROSTHESIS PRIMER

This is used to condition prosthetic surfaces. It contains silane-coupling agent and phosphate monomer (MDP) which makes it suitable for the pretreatment of porcelain, silica-based ceramic, composite resin, hybrid ceramics, zirconia/alumina, and metal. It can also be used for the pretreatment of titanium implant abutments. CLEARFIL™ CERAMIC PRIMER Plus can be applied and immediately dried. It does not need any waiting time. This is what we call "Apply & Go".



## TOOTH STRUCTURE AND ABUTMENTS



ALL YOU NEED TO PRETREAT ABUTMENTS  
(TOOTH STRUCTURE AND RESIN CORES!)

## PANAVIA™ V5 TOOTH PRIMER

SELF-ETCHING PRIMER

This is used to condition prepared tooth. The MDP in the primer makes it suitable for the pretreatment of resin cores and non-precious metal cores, as well as tooth structure.



\* Precious metal core surfaces need to be conditioned with Alloy Primer.

## PANAVIA™ V5 TRY-IN PASTE

SHADE MATCHING MATERIAL

Try-in Paste is used to evaluate the shade of the cement before cementation. It is available in five shades that correspond to those of PANAVIA™ V5. After trying-in the restoration, the Try-in Paste can be rinsed off easily with water.



## K-ETCHANT SYRINGE

ETCHING GEL (35% PHOSPHORIC ACID)

This etching gel is used to acid-etch enamel or the prosthesis. It has a proper consistency which makes it suitable for selectively etching enamel.



# PANAVIA™ V5 FEATURES

## 1 PREDICTABLE CEMENTATION PROCEDURE

- ✓ The cementation procedure is very predictable. First, you apply a single-liquid self-etching primer; next, a single-liquid prosthesis primer, and finally the automix paste.

## 2 STRONG BOND TO TOOTH STRUCTURE

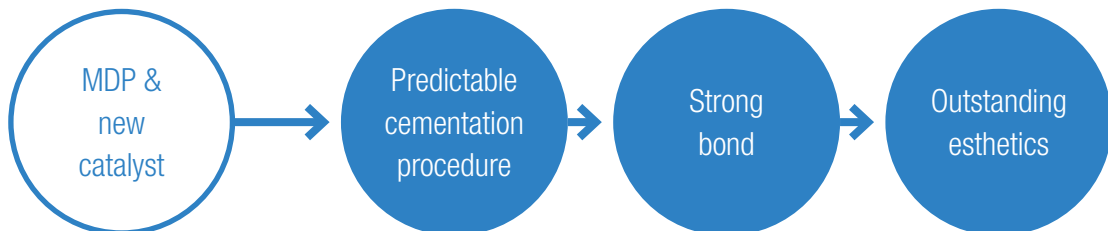
- ✓ The bond strength to dentin has been substantially improved (1.5 times greater in human tooth shear strength and 3 times in bovine tooth tensile strength, as compared with our conventional product).
- ✓ The bond strength to enamel is also high, like our previous product.

## 3 OUTSTANDING ESTHETICS

- ✓ Excellent color stability because of a new amine-free\* catalyst.
- ✓ Users can evaluate the cement shade in situ using the Try-in Paste provided.

\* Amine in self-cure mode.

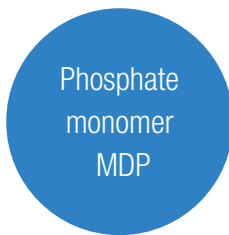
**PANAVIA** V5



# TWO IMPORTANT TECHNOLOGIES COMBINED IN PANAVIA™ V5

## AN ADHESIVE MONOMER (MDP) AND A NEW CATALYST SYSTEM

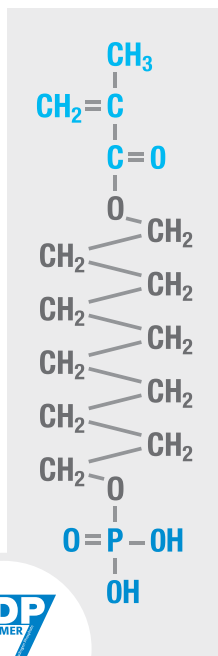
PANAVIA™ V5 is an excellent adhesive resin cement system that we have created using new technologies.



We began the research of adhesion technology in the early 1970s; in 1981, we succeeded in developing the phosphate monomer MDP. It is reported that MDP provides a strong bond not only to tooth structure, but also to metals and zirconia. MDP chemically bonds to hydroxyapatite to form a calcium salt that is hardly soluble in water.<sup>1</sup>

In addition, it is also reported that as level of MDP purity changes, the durability of the adhesion and the strength of the reaction to calcium also vary<sup>2</sup>, so that MDP, which was developed through our proprietary synthesis and purification technology, provides a highly durable adhesion.<sup>3</sup>

PANAVIA™ V5 Tooth Primer and CLEARFIL™ CERAMIC PRIMER PLUS contain a very pure MDP phosphate monomer. PANAVIA™ V5, therefore, forms a strong bond between the prosthesis and tooth structure.



## THE CHEMICAL STRUCTURE OF PHOSPHATE MONOMER MDP

### THE POLYMERIZABLE GROUP

Polymerizes with other monomers.

### THE HYDROPHOBIC GROUP

Gives the desired level of hydrophobicity (and therefore durability) to the monomer.

### THE HYDROPHILIC GROUP

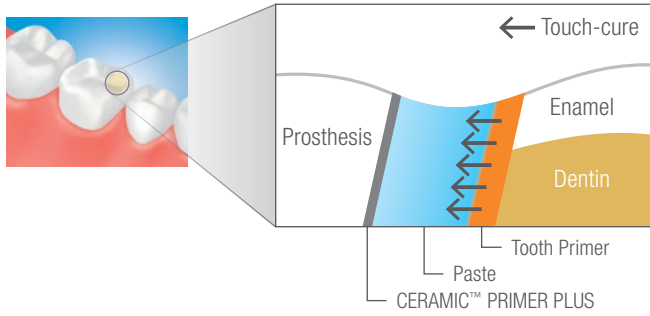
Bonds chemically to hydroxyapatite, calcium, zirconia, or metals.



<sup>1</sup> Y. Yoshida, K. Nagaoka, R. Fukuda, Y. Nakayama, M. Okazaki, H. Shintani, S. Inoue, Y. Tagawa, K. Suzuki, J. De Munch, B. Van Meerbeek: J Dent Res, 83 (6) : 454-458, 2004

<sup>2</sup> K. Yoshihara, N. Nagaoka, M. Inokoshi, T. Okihara, Y. Yoshida, B. Van Meerbeek: J Dent Res, 93 (Spec Iss C) : 29, 2014

<sup>3</sup> K. Yoshihara, N. Nagaoka, Y. Yoshida : Adhes Dent, 32 (3) : 159, 2014



**Paste working times**

When it comes in contact with  
 Tooth Primer at 37°C / 99°F 60 sec.  
 In a normal environment at 23°C / 73°F 2 min.

**Paste final curing times**

When it comes in contact  
 with Tooth Primer at 37°C / 99°F 3 min.  
 In a normal environment at 37°C / 99°F 5 min.  
 In a normal environment at 23°C / 73°F 10 min.

**Note: Tooth Primer promotes the polymerization of the cement at the adhesive interface.**



New catalyst

For resin cements to be able to deliver a strong bond, it is not enough for them simply to contain an adhesive monomer. It is necessary for that monomer to be polymerized effectively.

PANAVIA™ V5 uses an innovative “ternary catalytic system” consisting of a highly-stable peroxide, a non-amine reducing agent\* and a highly-active polymerization accelerator. Since this novel catalytic system does not contain amine, which causes cement discoloration, the hardened cement has unsurpassed color stability. In addition, the highly-active polymerization accelerator, which is also contained in Tooth Primer, is not only an excellent reducer that promotes polymerization effectively, but it is also capable of coexisting with the acidic MDP. We capitalized on this feature to develop a single-liquid Tooth Primer.

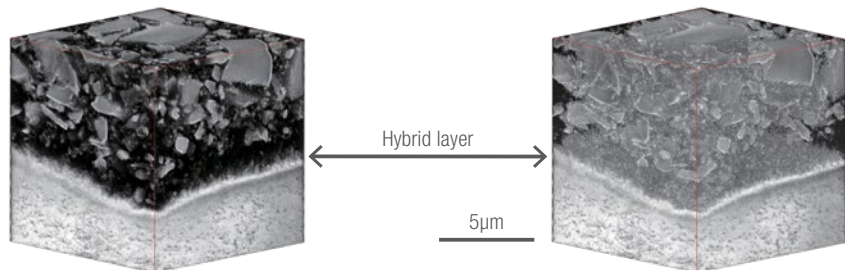
**PANAVIA™ V5 can be effectively sealed with “touch-cure”**

Tooth Primer has a novel highly-active polymerization accelerator. Polymerization is promoted at the adhesive interface where the tooth structure surface that has had Tooth Primer applied comes in contact with the Paste. This kind of polymerization is called “touch-cure”. This seals the interface securely while it unites the tooth structure and prosthesis with a very strong bond.

**3D SEM pictures of the adhesive interface with dentin**

The adhesive interface between PANAVIA™ V5 and human dentin was observed in 3D using a focused ion beam scanning electron microscope (FIB-SEM), which is a combination of a focused ion beam system and a scanning electron microscope. The results show the cement joined in close contact with the dentin.

\* Amine in self-cure mode.



An unmodified 3D image.

The image after the resin matrix has been rendered transparent.

3D SEM Photo courtesy of Dr. N. Nagaoka and Dr. K. Yoshihara, Okayama Univ. Japan

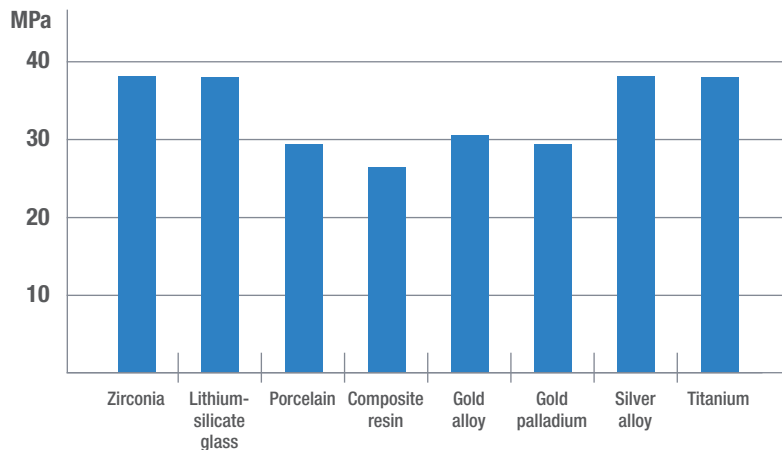
# USE PANAVIA™ V5 TOOTH PRIMER FOR THE PRETREATMENT OF TOOTH STRUCTURE AND ABUTMENTS

Predictable cementation procedure

We have succeeded in changing the self-etching primer from a 2-bottle liquid to a single-bottle liquid formulation. The use of a new polymerization accelerator, which coexists well with MDP, makes it possible to attain a self-etching primer as a single-bottle.



**Bond strength to prostheses (after 3000 thermal cycles)**



**Measurement conditions:**

Sandblasting (zirconia, metals other than titanium, composite resin)  
 Polishing with #1000 grit (porcelain, glass, titanium)  
 Adherent surface: 5 mm ø  
 After CERAMIC PRIMER PLUS was applied to the adherent surface, PANAVIA™ V5 was applied over it and the prosthesis was held under pressure. The margins of the prosthesis were light-cured from two directions for 10 seconds each, using Pen Cure 2000. The assembly was immersed in water (37°C) for one day, subjected to thermal cycling (4-60°C, 3000 times), and then evaluated for bond strength.

**Measuring instrument:**

Autograph AG-100kN (Shimadzu) at a crosshead speed of 1 mm/min.

Measured by Kuraray Noritake Dental Inc.: The values may vary according to the measurement conditions.



## USE CLEARFIL™ CERAMIC PRIMER PLUS FOR THE PRETREATMENT OF PROSTHESES

CLEARFIL™ CERAMIC PRIMER PLUS, containing the phosphate monomer MDP, as well as a silane-coupling agent, can be used all by itself to pretreat the following prostheses:

- ✓ Porcelain
- ✓ Composite resin
- ✓ Zirconia/alumina
- ✓ Silica-based ceramics
- ✓ Hybrid ceramics
- ✓ Metal

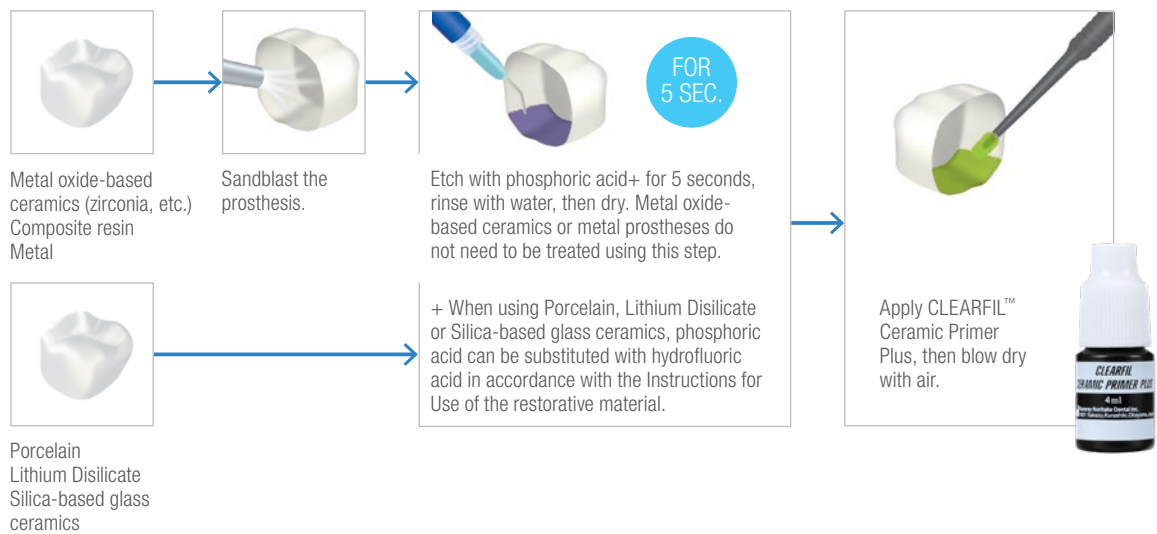


## APPLICATION 1

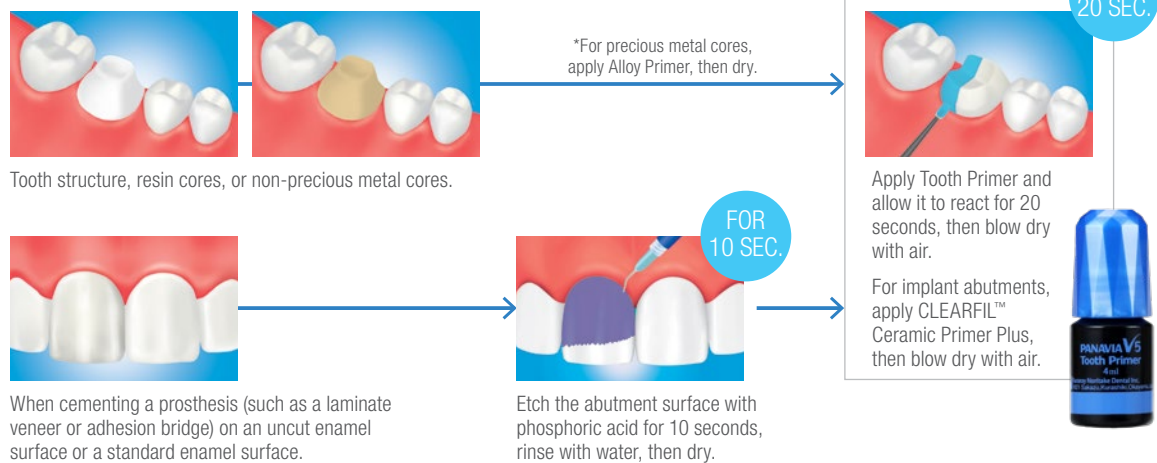
### CEMENTATION OF CROWNS, BRIDGES, INLAYS, ONLAYS AND VENEERS

Clean and dry the tooth surface in the usual manner. As necessary, trial fit the prosthetic using the Try-in paste, wash and remove.

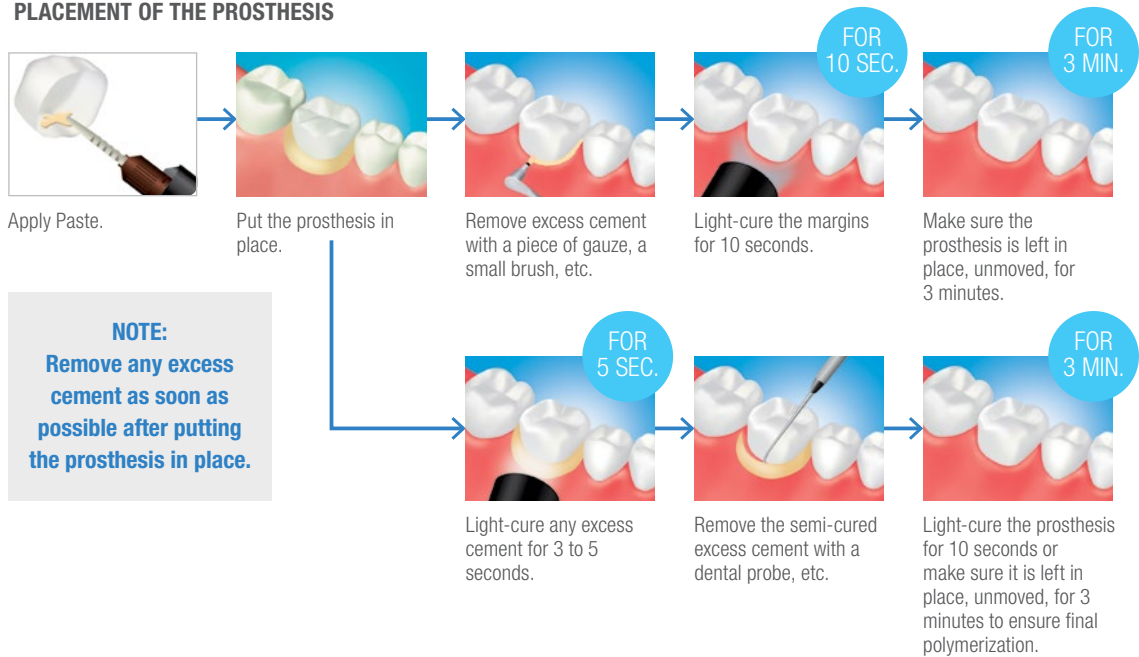
#### CONDITIONING THE PROSTHETIC RESTORATION SURFACE



#### PRETREATMENT OF ABUTMENTS



## PLACEMENT OF THE PROSTHESIS



### Before paste comes in contact with Tooth Primer

Working time (23°C / 73°F) 2 minutes

### After paste comes in contact with Tooth Primer

Working time (37°C / 99°F) 60 seconds



For more information: [www.PanaviaV5guide.eu](http://www.PanaviaV5guide.eu)

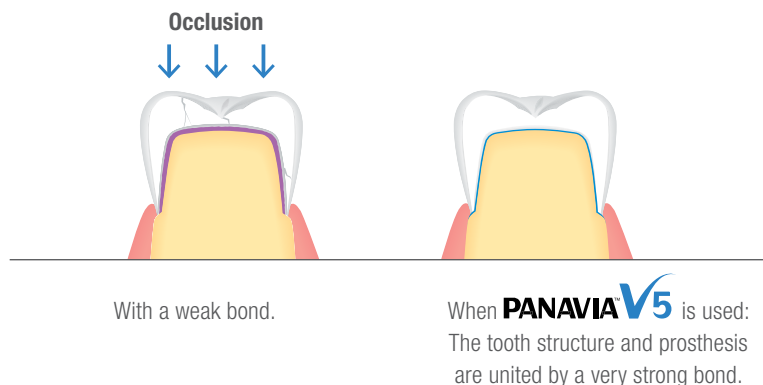
# STABLE TENSILE AND SHEAR BOND STRENGTHS



Strong bond

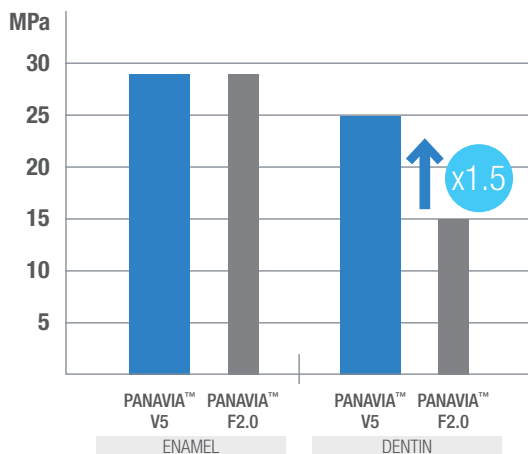
In our pursuit of a stronger bond to tooth structure, we have substantially improved the bond strength to dentin, as compared with our previous product.

PANAVIA™ V5 is suitable for applications where an especially strong bond is required, such as the cementation of adhesive bridges; posts; and cores. PANAVIA™ V5 bonds to tooth structure, especially to dentin, much more strongly than our previous product. Its high tensile and shear bond strengths make it suitable for the cementation of fragile prostheses or those that tend to bend easily due to occlusion, or for applications where it is difficult to fashion a form that provides stable retention.



## Bond strength to tooth structure

(human tooth shear strength: after 3000 thermal cycles)

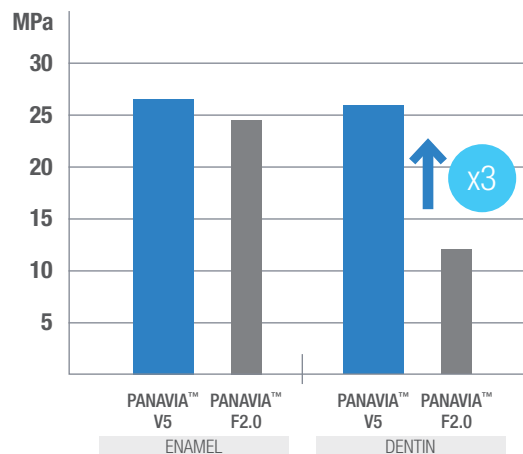


### Measurement conditions

The specimens were human teeth polished with #1000 grit (for the shear bond strength test) and bovine teeth polished with #1000 grit (for the tensile bond strength test), over a 3 mm adherent surface area. Their margins were light cured from two directions using Pen Cure 2000 for 10 seconds each (for the shear bond strength test), or chemically cured (for the tensile bond strength test). After curing, they were immersed in 37°C water for one day, subjected to thermal cycling (4-60°C, 3000 times (TC3000) or 4000 times (TC4000)), and evaluated according to type for either shear bond strength or tensile bond strength.

## Bond strength to tooth structure

(bovine tooth tensile strength: after 4000 thermal cycles)



### Measurement instrument

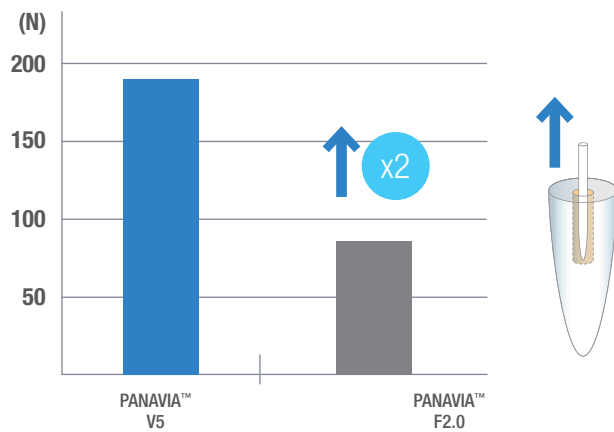
Autograph AG-100kN (Shimadzu), crosshead speed of 1 mm/min (for shear bond strength test) or 2 mm/min (for tensile bond strength test)

Measured by Kuraray Noritake Dental Inc.:The values may vary according to the measurement conditions.

## A STRONG BOND TO ROOT CANAL DENTIN

Root canal dentin is more fragile than crown dentin. In addition, root canal dentin has to be cleaned and disinfected with an irrigant, which interferes with the development of a stable bond. This is why root canals have a reputation of being difficult clinical sites in terms of obtaining a strong bond to tooth structure. PANA VIA™ V5 provides a far stronger bond to root canal dentin than our previous product does, making it suitable for the cementation of posts and cores.

### The pulling resistance of the post to the root canal dentin



Paste can be inserted directly into the root canal using the endo tip available for PANA VIA™ V5.

#### Measurement conditions

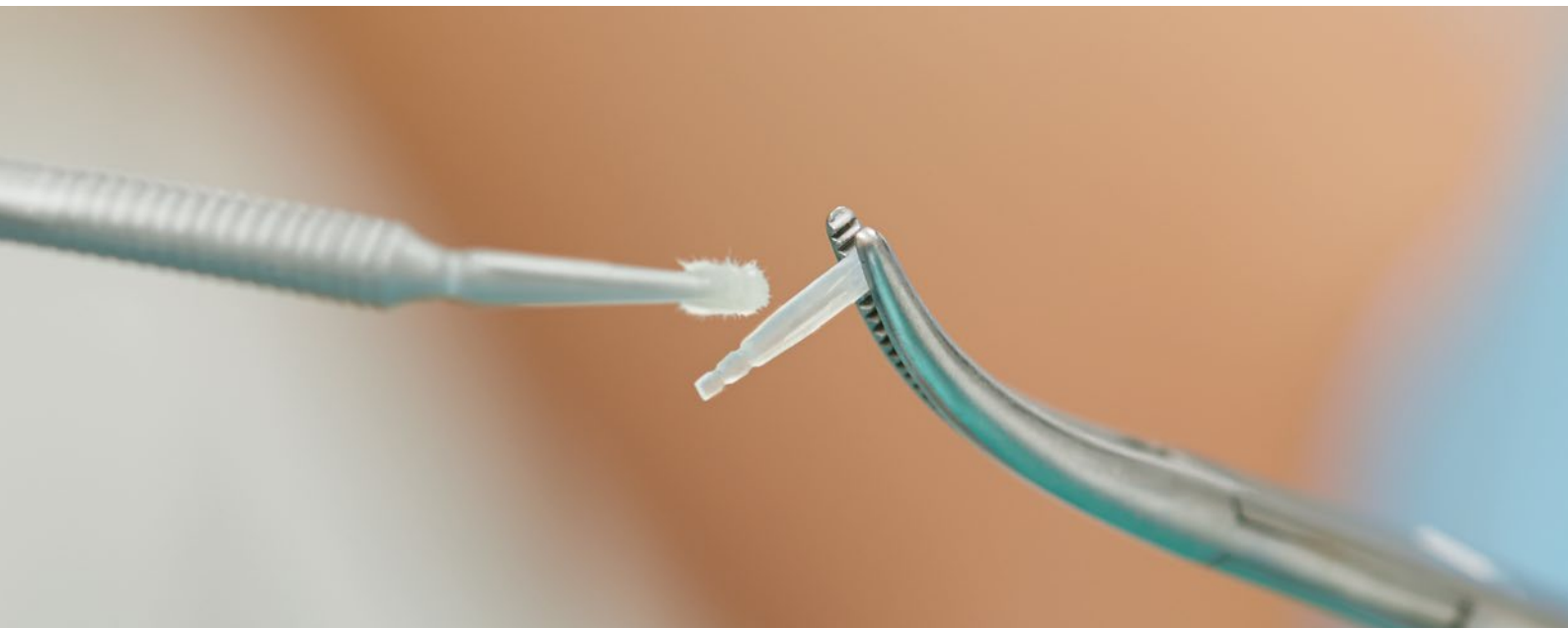
Bovine root dentin: cavity size 1.2 mm diameter and 5 mm in depth  
Post: AD Post II

The margins of the hole in each tooth specimen were light-cured using Pen Cure 2000 from two directions for 10 seconds each to form a pseudo-root canal into which the post was implanted. The tooth and post assembly was immersed in 37°C water for one day and measured for pulling resistance.

#### Measuring instrument

Autograph AG-100kN (Shimadzu) at a crosshead speed of 0.75 mm/min.

Measured by Kuraray Noritake Dental Inc.: The values may vary according to the measurement conditions.



# BETTER COLOR STABILITY AND FLUORESCENCE, SIMILAR TO THAT OF NATURAL TEETH



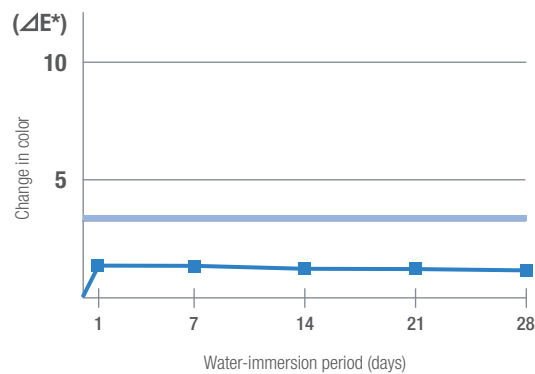
Outstanding esthetics

Suitable for applications where esthetics are of the utmost importance, such as: Laminate veneers; ceramic inlays; etc

PANAVIA™ V5 employs the novel technology of an amine-free catalyst\*. The use of this technology means that hardened PANAVIA™ V5 cement retains better color stability than our previous cement product that used a BPO-amine catalyst.

\* Amine in self-cure mode.

## Color stability of hardened cement



PANAVIA V5

### Measurement conditions

The specimen, 0.25 mm thick, was immersed in water (at 70°C) and then subjected to measurement against a white background.

### Measurement instrument

Spectrophotometer SE6000 (Nippon Denshoku), light source: D65/2

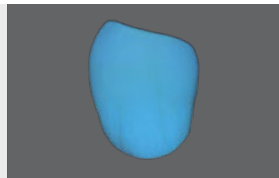
Measured by Kuraray Noritake Dental Inc.: The values may vary according to the measurement conditions.

## Fluorescence similar to that of natural teeth

Natural Tooth



When exposed to ultraviolet light



Hardened PANAVIA™ V5 Cement



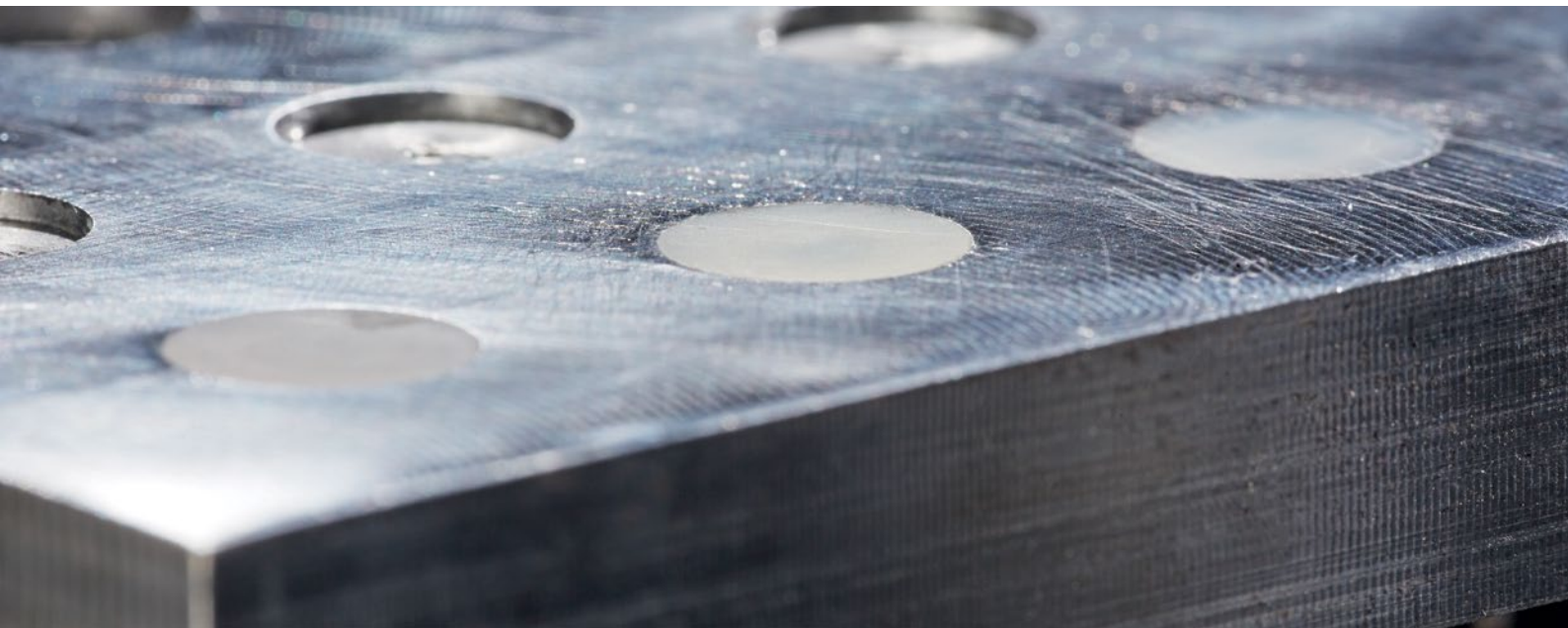
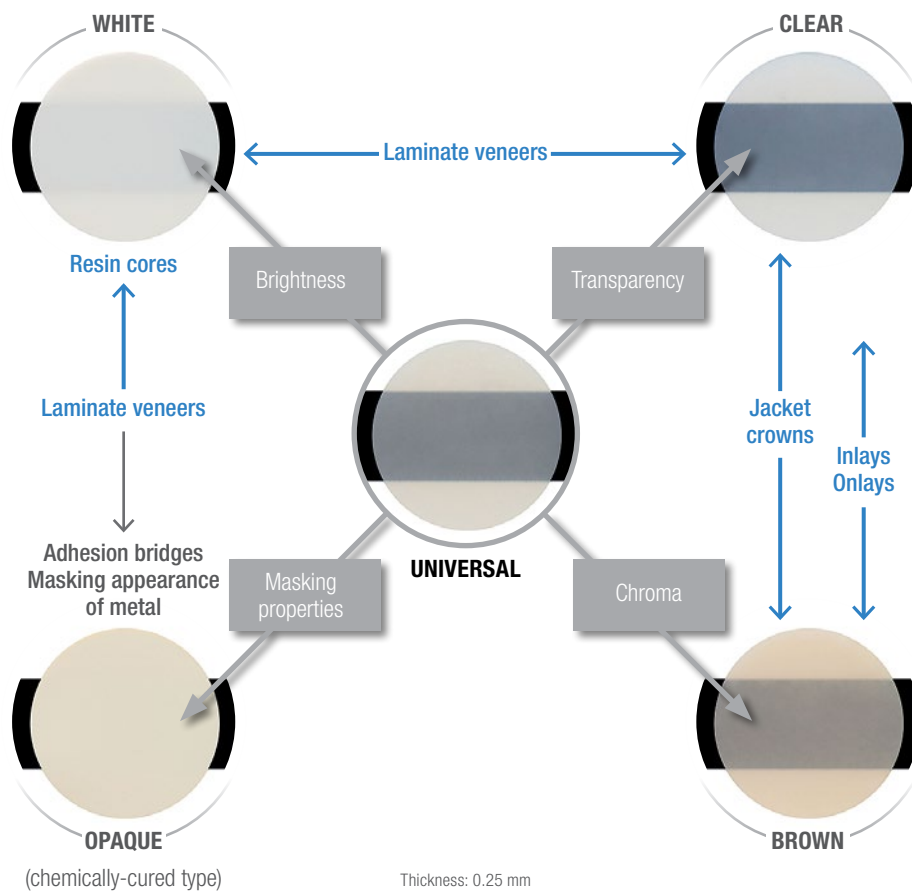
When exposed to ultraviolet light



Photographed by Kuraray Noritake Dental Inc.: The results may vary according to the photographic conditions.



## FIVE SHADE VARIATIONS INCLUDING UNIVERSAL



# APPLICATION WITH ANTERIOR PROSTHESES MADE OF HIGHLY TRANSLUCENT KATANA™ ZIRCONIA

## INDICATION 1) CEMENTATION OF CROWNS, BRIDGES, INLAYS AND ONLAYS.

For more detailed information, refer to the Instructions for Use.



**After preparing the abutments**  
An anterior bridge made of crown and bridge resin has become dislodged. The abutments are vital teeth.



**Prosthesis**  
A PFZ bridge with a frame fabricated using KATANA™ Zirconia HT12.



**Application of Try-in Paste**  
Evaluate the shade of the cement before cementation.



**Pretreatment of the prosthesis (A)**  
Sandblast the prosthesis (at 0.3 to 0.4 MPa), clean with an ultrasonic cleaner for 2 minutes, then dry.



**Pretreatment of the prosthesis (B)**  
Apply CERAMIC PRIMER PLUS and blow dry with air.



**Pretreatment of the abutments (C)**  
Apply Tooth Primer, allow it to react for 20 seconds, then blow dry with air.



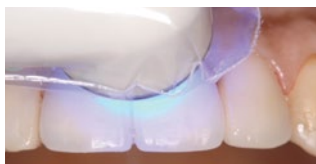
**Try-in**  
After checking the cement's shade, rinse the prosthesis and tooth surface with water to remove Try-in Paste.



**Application of Paste**  
Use Universal.



**Placement of the prosthesis**  
After placement, remove excess cement using a piece of gauze, a small brush, etc.



**Light-curing**  
Light-cure the entire surface of the prosthesis, including the margins.



**Final polymerization**  
Make sure the prosthesis is left in place, unmoved, for 3 minutes.

## RELATED PRODUCTS



Noritake KATANA™ Zirconia



CERABIEN™ ZR





Κλινική Οδοντολογική  
Κλινική Οδοντολογική  
SM  
TOOTH PRIMER

## CENTRAL INCISOR VENEERS WITH PANA VIA™ V5

By Dr. Irfan Abas (Dental implantologist & restorative dentist)



Definitive preparation (frontal)



The veneers constructed by the dental technician



Checking the fit of the veneers



Treatment with selfetching primer PANAVIA™ V5 Tooth Primer (left on for 20 sec.)



Etching of the lithium disilicate veneers with hydrogen fluoride



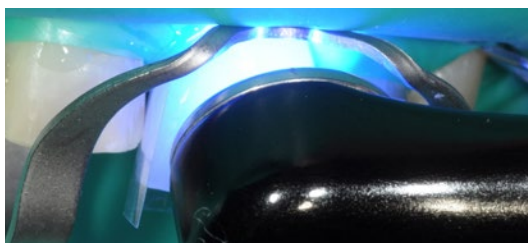
CLEARFIL™ CERAMIC PRIMER Plus MDP-silane primer applied to the veneers



PANA VIA™ V5 Paste spread over the veneer



Veneer fitted and excess removed



Light curing (minimum 10 sec.)



Immediately post-op



Two months post-op

## ORDER INFORMATION



### PROFESSIONAL KIT - #3600-EU

PANAVIA™ V5 Tooth Primer (2 ml), CLEARFIL™ CERAMIC PRIMER PLUS (2 ml), PANAVIA™ V5 Paste [one syringe per shade (2.4 ml / 4.2 g): Universal (A2), Clear, Brown (A4), White, Opaque], PANAVIA™ V5 Try-in Paste [one syringe per shade (1.8 ml): Universal (A2), Clear, Brown (A4), White, Opaque], K-ETCHANT Syringe (3 ml), 30 Mixing tips, 10 Endo tips (S)<sup>1</sup>, 50 Applicator brushes (fine<silver>)<sup>1</sup>, 1 Mixing dish (FPN)<sup>1</sup>, 20 Needle tips (E)<sup>1</sup>



### STANDARD KIT - Universal (A2) #3601-EU - Clear #3602-EU

PANAVIA™ V5 Tooth Primer (2 ml), CLEARFIL™ CERAMIC PRIMER PLUS (2 ml), PANAVIA™ V5 Paste [one syringe per shade (4.6 ml / 8.1 g): Universal (A2), Clear], K-ETCHANT Syringe (3 ml), 15 Mixing tips, 5 Endo tips (S)<sup>1</sup>, 50 Applicator brushes (fine<silver>)<sup>1</sup>, 1 Mixing dish (FPN)<sup>1</sup>, 20 Needle tips (E)<sup>1</sup>

### INTRODUCTORY KIT - Universal (A2) #3604-EU - Clear #3605-EU

PANAVIA™ V5 Tooth Primer (2 ml), CLEARFIL™ CERAMIC PRIMER PLUS (2 ml), PANAVIA™ V5 Paste [one syringe per shade (2.4 ml / 4.2 g): Universal (A2), Clear], 10 Mixing tips, 50 Applicator brushes (fine<silver>)<sup>1</sup>, 1 Mixing dish (FPN)<sup>1</sup>

## FIVE ESTHETIC SHADES<sup>2</sup>

Dual-cure:

Universal (A2)

Clear

Brown (A4)

White

Self-cure:

Opaque



## REFILL

### PANAVIA™ V5 TOOTH PRIMER (4 ML) #3635-EU

### CLEARFIL™ CERAMIC PRIMER PLUS (4 ML) #3637-EU

### PANAVIA™ V5 PASTE (4.6 ML / 8.1 G), 20 MIXING TIPS

Universal (A2)	#3611-EU	Clear	#3612-EU
Brown (A4)	#3613-EU	White	#3614-EU
Opaque	#3615-EU		

### PANAVIA™ V5 TRY-IN PASTE (1.8 ML)

Universal (A2)	#3621-EU	Clear	#3622-EU
Brown (A4)	#3623-EU	White	#3624-EU
Opaque	#3625-EU		

### K-ETCHANT Syringe (3 ML), 20 Needle tips (E) #3252-EU

### Mixing tip (20 Mixing tip) #3626-EU

### Endo tip (S) (20 Endo tip (S)) #3629-EU

<sup>1</sup>The letter code in brackets describes the exact type of accessory. <sup>2</sup>The actual shades may differ from the printed shades here.

## YOUR CONTACT

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- Before using this product, be sure to read the Instructions for Use supplied with the product.
- The specifications and appearance of the product are subject to change without notice.
- Printed color can be slightly different from actual color.

"PANAVIA", "CLEARFIL" and "AUTOMIX" are trademarks of Kuraray Co., Ltd.

"KATANA" and "CERABIEN" are trademarks of Noritake Co., Ltd.



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