

**kuraray**

*Noritake*

**PANAVIA™ V5**

**TECHNICAL INFORMATION**

## **CONTENTS**

<b>INTRODUCTION</b>	<b>3</b>
<b>PANAVIA™ V5 KIT COMPONENTS</b>	<b>4</b>
<b>PANAVIA™ V5 FEATURES</b>	
Overview	<b>5</b>
<b>TWO IMPORTANT TECHNOLOGIES COMBINED IN PANAVIA™ V5</b>	
MPD monomer and a new chemically-cured catalyst system	<b>6</b>
<b>PANAVIA™ V5 FEATURES</b>	
Predictable cementation procedure	<b>8</b>
Strong bond	<b>12</b>
Outstanding esthetics	<b>14</b>
<b>CLINICAL CASE</b>	
Application with anterior prosthetics made of highly translucent zirconia	<b>16</b>
<b>PRODUCT RANGE</b>	<b>18</b>

## INTRODUCTION

**It has been 30 years since the launch of the first generation PANAVIA™.**  
**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, however 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 adhesive interface plus improving marginal adaptability by use of surface-treated sodium fluoride and a photo-initiator. Subsequently, in 2003 we released PANAVIA™ F2.0,

which could be polymerized with an LED curing light. 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 esthetic restorations has substantially increased the variety of prostheses being used, promoting the widespread application of a variety of esthetic 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 dental adhesive 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 dentine), 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 adhesive bridges, posts and cores to those where esthetics are of utmost importance – such as ceramic inlays or veneers. PANAVIA™ V5 is a versatile adhesive resin cement that is indicated for almost all types of prostheses and clinical cases.



1983

PANAVIA™ EX



1993

PANAVIA™ 21



1998

PANAVIA™ F



2003

PANAVIA™ F 2.0



2015

**PANAVIA™ V5**

## PANAVIA™ V5 KIT COMPONENTS

One cement. All cement indications. One prime procedure.

### CLEARFIL™ CERAMIC PRIMER PLUS

Prosthetic 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 ceramics, 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".



### PANAVIA™ V5 Paste

Automix Type

The paste is available in five shades: Universal (A2), Clear, Brown (A4) and White (all of which are dual-cured) and Opaque (chemically-cured).



### PANAVIA™ V5 Tooth Primer

Self-Etch 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.

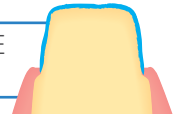


PROSTHETIC

ALL YOU NEED TO PRETREAT PROSTHETICS!

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

TOOTH STRUCTURE AND ABUTMENTS



### 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 an optimal consistency which ensures it is suitable to selectively etch enamel.





## PANAVIA™ V5 FEATURES

### Overview

#### 1 Predictable cementation procedure

- The procedure is simple and highly predictable. First, you apply a single-bottle self-etch primer to the tooth; next, a single-bottle prosthetic primer to the prosthetic and finish with the automix paste.

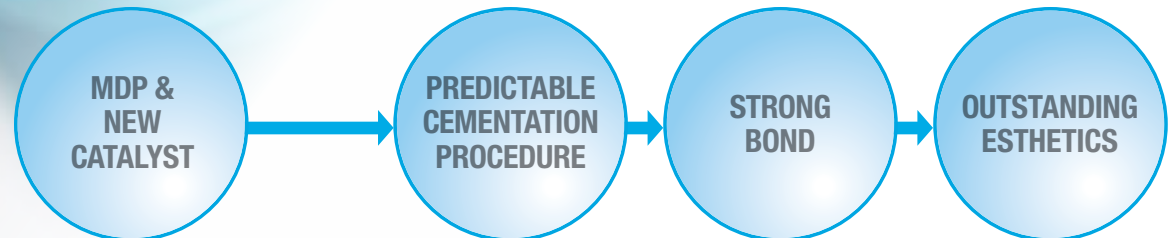
#### 2 Strong bond to tooth structure

- The bond strength to dentine has been substantially enhanced (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 remains high, as per our previous products.

#### 3 Outstanding esthetics

- Excellent color stability due to the new amine-free\* catalyst.
- Users can evaluate the cement shade in situ using the Try-in Paste provided.

PANAVIA™ V5



\* Amine in self-cure mode.

## TWO IMPORTANT TECHNOLOGIES COMBINED IN PANAVIA™ V5 AN ADHESIVE MONOMER (MDP) AND A NEW CATALYST SYSTEM

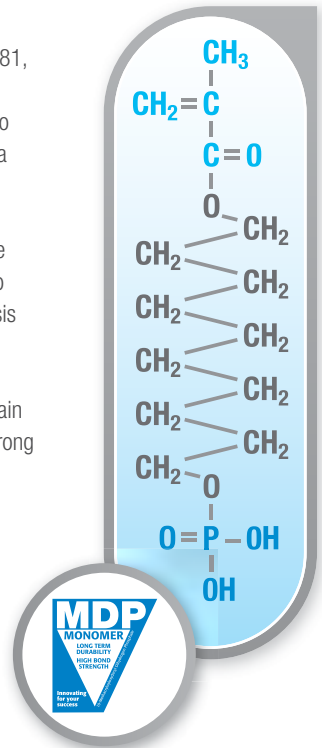
PANAVIA™ V5 is an esthetic, adhesive resin cement system that we have created using new technologies.

### PHOSPHATE MONOMER MDP

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, however also to metals and zirconia. MDP chemically bonds to hydroxyapatite to form a calcium salt that exhibits extremely low solubility in water.<sup>1</sup>

In addition, it is also reported that as the 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 purified 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

**NEW  
CATALYST**

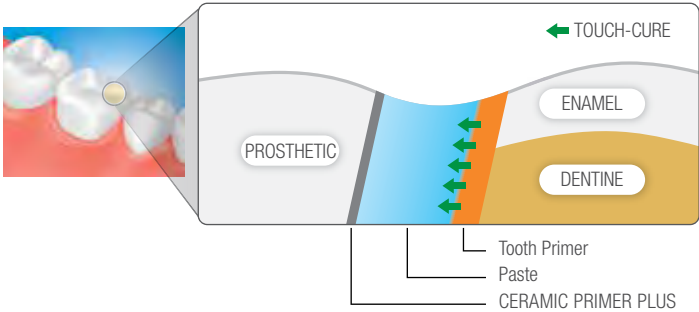
For resin cements to be able to deliver a strong bond, it is not enough for them simply to contain an adhesive monomer. It is necessary for that monomer to be polymerized effectively.

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 cured 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, however it is also capable of coexisting with the acidic MDP. We capitalized on this feature to develop a single-bottle Tooth Primer.

**PANAVIA™ V5 is effectively activated with “touch-cure”**

Tooth Primer has a new, 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 mode of polymerization is called “touch-cure”. This seals the interface securely while it unites the tooth structure and prosthetic with an exceptionally strong bond.

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



**Paste working times**

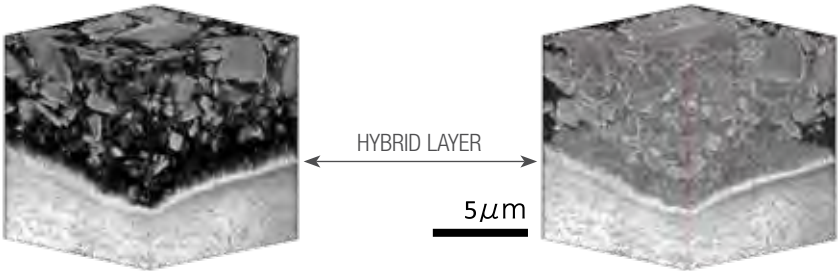
When it comes in contact with Tooth Primer at 37°C / 99°F 60 sec.  
In a normal environment at 23°C / 73°F 2 min.

**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.

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

The adhesive interface between PANAVIA™ V5 and human dentine 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 dentine.



An unmodified 3D image

The image after the resin matrix has been rendered transparent.

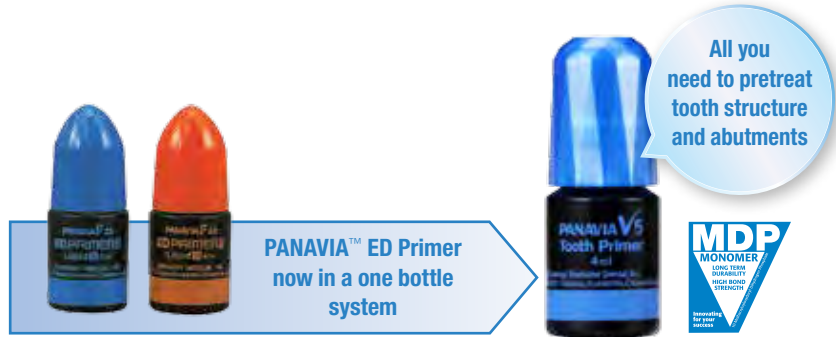
3D SEM Photo courtesy of Dr. N. Nagaoka and Dr. K. Yoshihara, Okayama Univ. Japan  
\*Amine in self-cure mode.



**PREDICTABLE CEMENTATION PROCEDURE**

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

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



**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 PenCure 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.

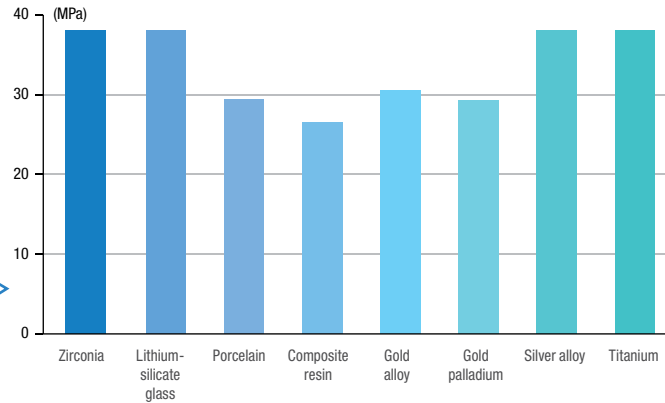
**USE CLEARFIL™ CERAMIC PRIMER PLUS FOR THE PRETREATMENT OF PROSTHETICS**

CLEARFIL™ CERAMIC PRIMER PLUS is a single component silane coupling agent, containing the phosphate monomer MDP, used to pretreat the following prosthetic materials:

- Porcelain
- Composite resin
- Zirconia/alumina
- Silica-based ceramics
- Hybrid ceramics
- Metals



**Bond strength to various prosthetics (after 3000 thermal cycles)**



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



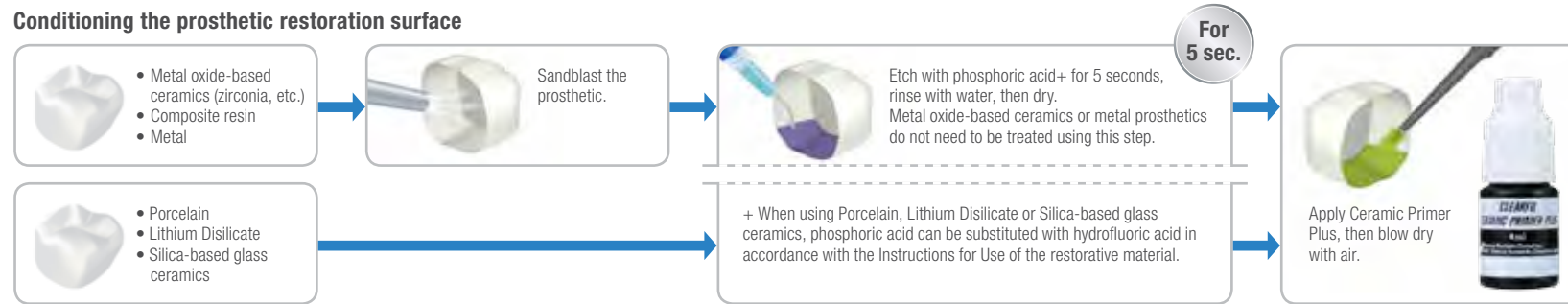




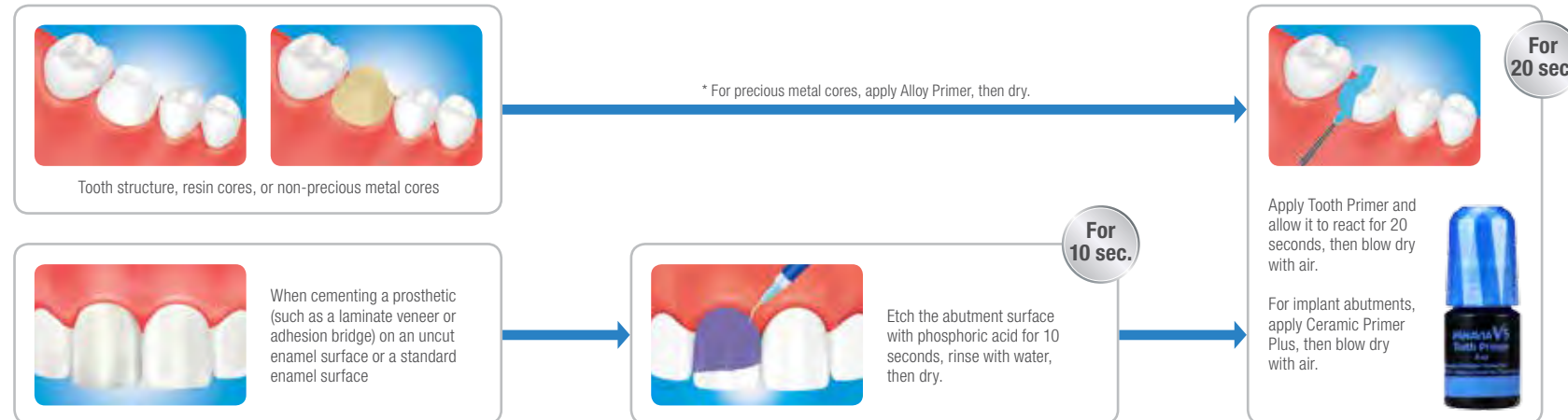
## APPLICATION 1) CEMENTATION OF CROWNS, BRIDGES, INLAYS, ONLAYS AND VENEERS

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

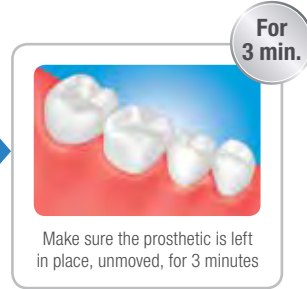
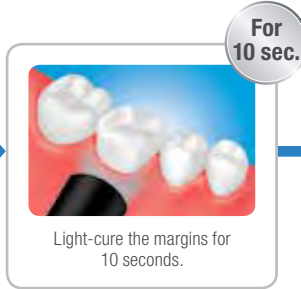
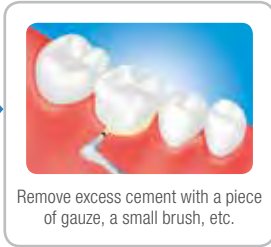
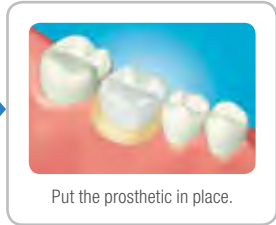
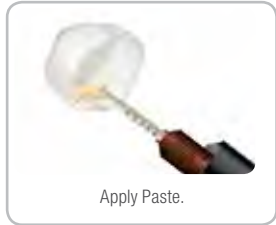
### Conditioning the prosthetic restoration surface



### Pretreatment of abutments

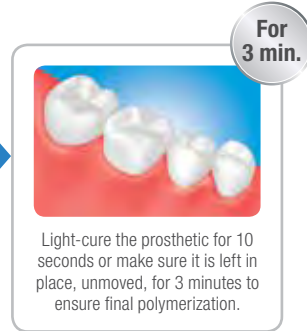
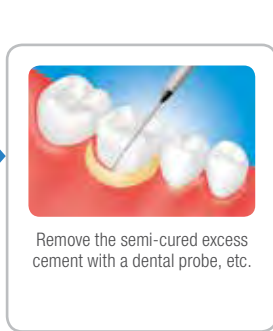


## Placement of the prosthetic



**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



**NOTE: Remove any excess cement as soon as possible after placing the prosthetic.**



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

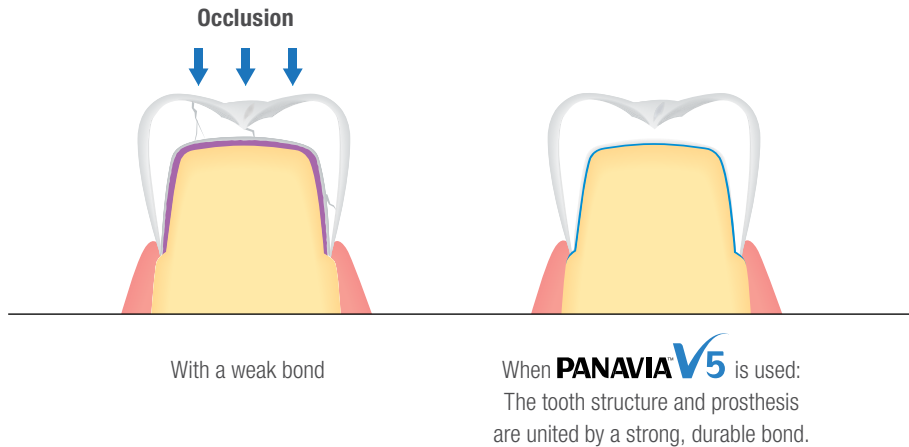


# STRONG BOND

In our pursuit of a stronger bond to tooth structure, we have substantially improved the bond strength to dentine.

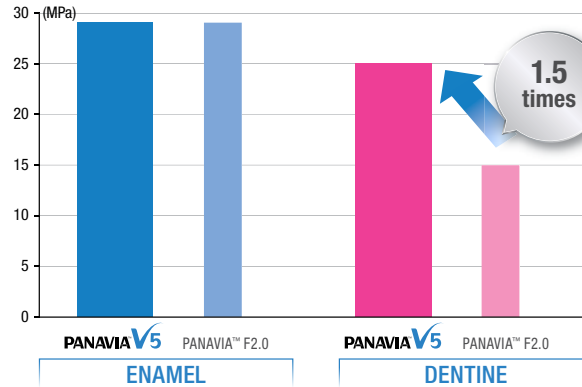
PANAVIA™ V5 is suitable for applications where a superior bond is required, such as the cementation of adhesive bridges, posts and cores.

PANAVIA™ V5 builds on the success of our gold standard PANAVIA™ chemistry with increased bond strengths to tooth structure. Its high tensile and shear bond strengths make it suitable for the cementation of fragile prostheses or those that tend to flex easily due to occlusion, or for applications where it is difficult to fashion a form that provides stable retention.



## STABLE TENSILE AND SHEAR BOND STRENGTHS

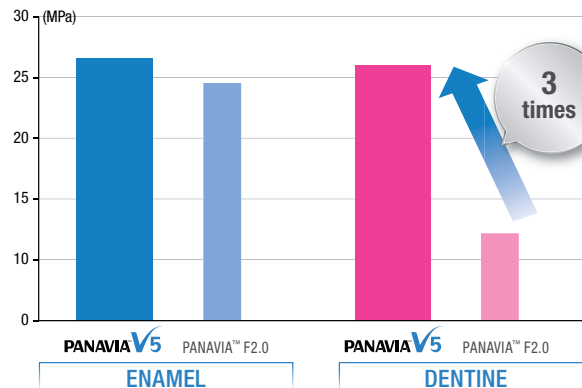
Bond strength to tooth structure (human tooth shear strength: after 3000 thermal cycles)



### 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 PenCure 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.

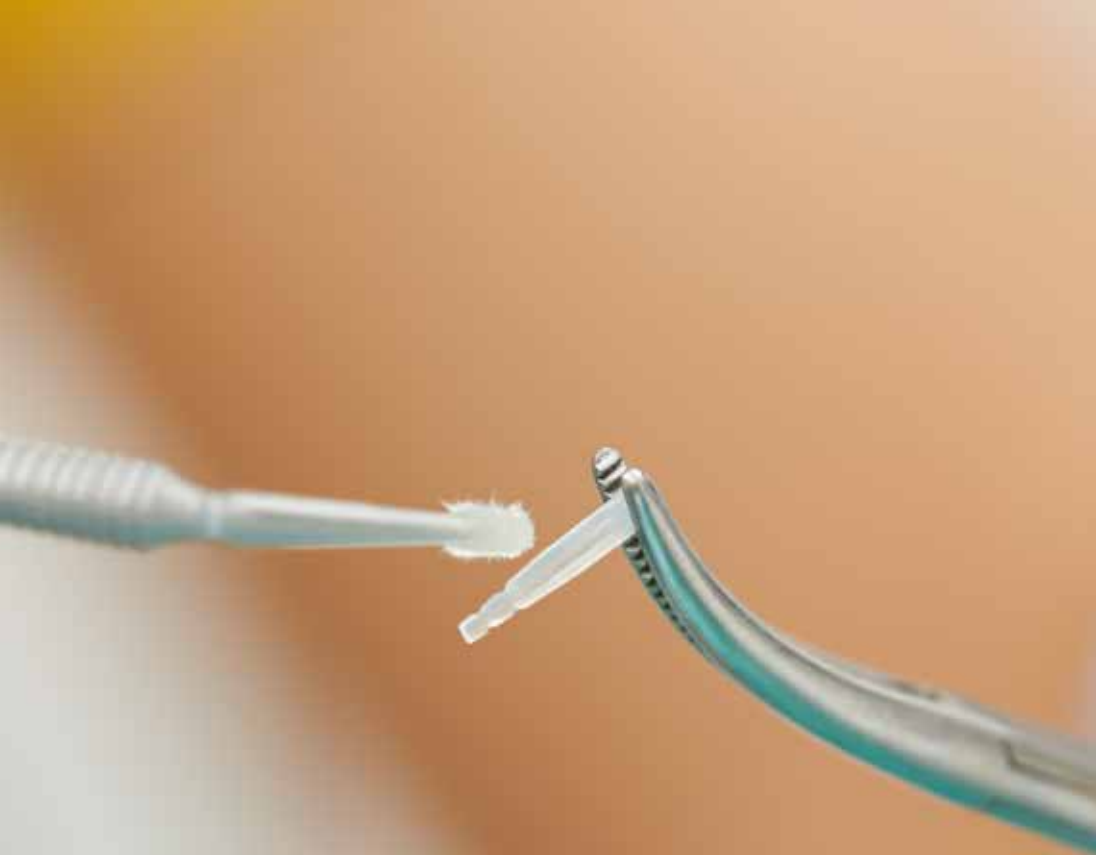
Bond strength to tooth structure (bovine tooth tensile strength: after 4000 thermal cycles)



### 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)

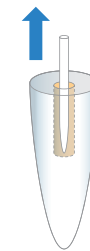
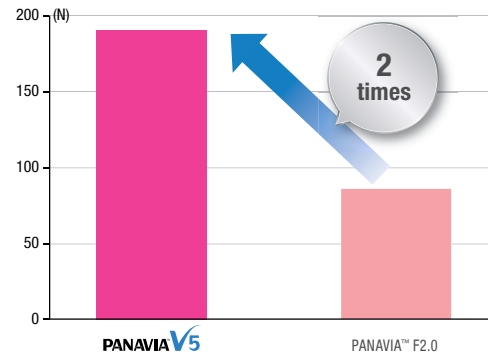
Measured by Kuraray Noritake Dental Inc.: The values may vary according to the measurement conditions.



## A STRONG BOND TO ROOT CANAL DENTINE

Root canal dentine is more fragile than coronal dentine. In addition, root canal dentine has to be cleaned and disinfected with irrigants, which can interfere 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. PANAVIA™ has a superior bond to root canal dentine than its predecessor, ensuring it is suitable for the cementation of posts and cores.

### Tensile resistance of the post to the root canal dentine



#### Measurement conditions

Bovine root dentine: 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 PenCure 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 tensile 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.



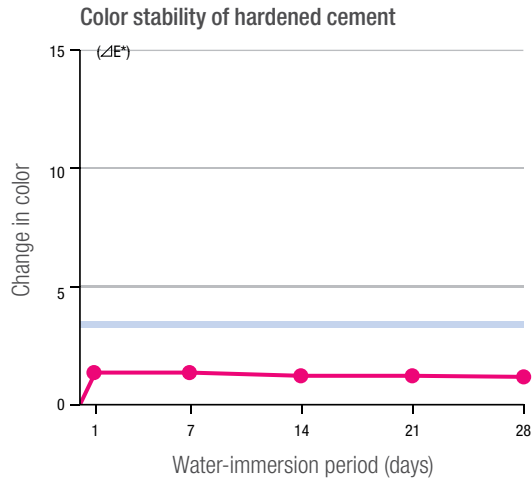
Paste can be inserted directly into the root canal using the endo tip available for PANAVIA™ V5.

## OUTSTANDING ESTHETICS

Suitable for applications where esthetics are of the utmost importance, such as: Veneers, ceramic inlays, etc.

PANAVIA™ V5 employs an amine-free catalyst\* technology. The use of this technology ensures cured PANAVIA™ V5 cement retains outstanding color stability.

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



**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

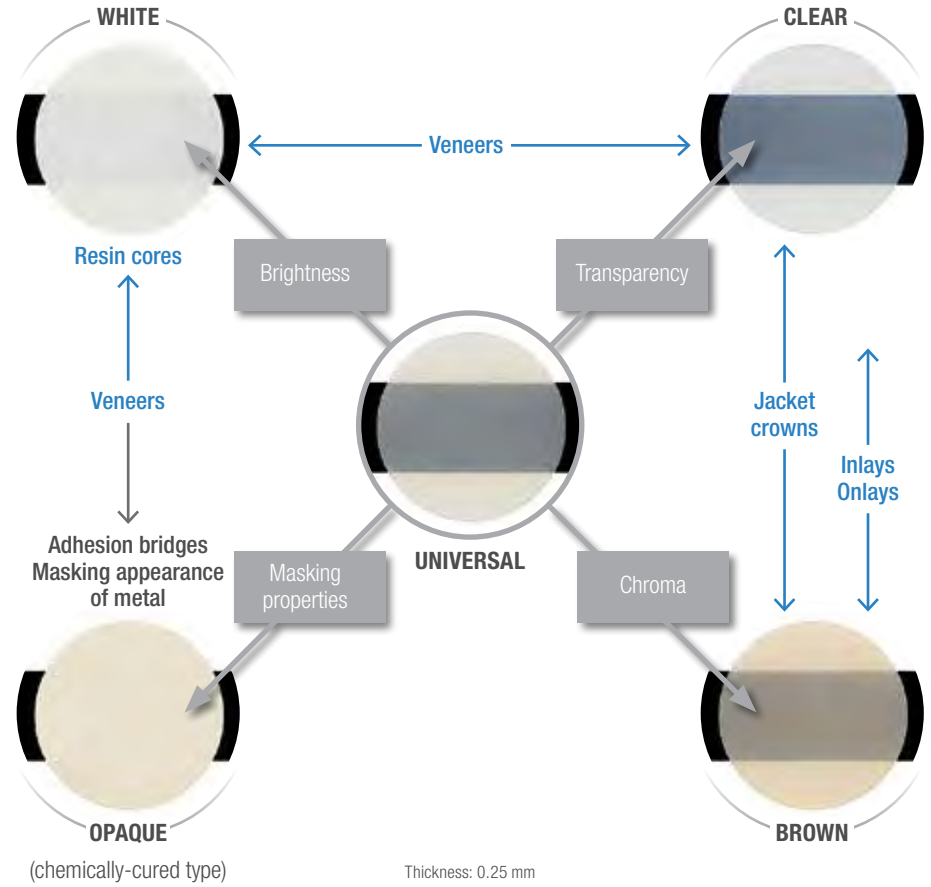


Photographed by Kuraray Noritake Dental Inc.:  
The results may vary according to the photographic conditions.





### FIVE SHADE OPTIONS INCLUDING UNIVERSAL





## APPLICATION WITH ANTERIOR PROSTHETICS 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.



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



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



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



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



**Pretreatment of the prosthetic (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.



**Application of Paste**  
Use Universal.



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



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



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

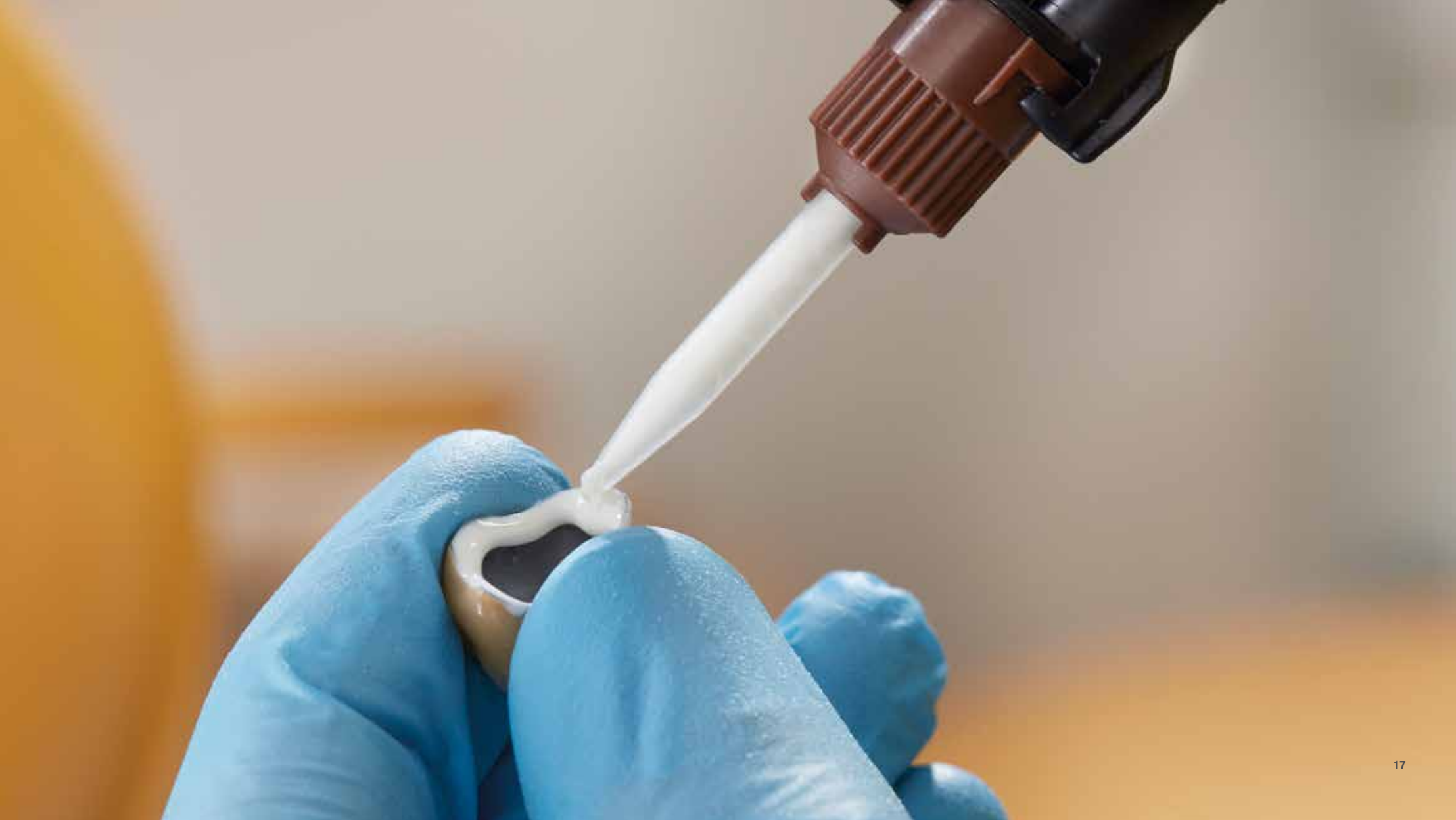
## RELATED PRODUCTS



Noritake KATANA™ Zirconia



CERABIEN™ ZR FC Paste Stain





## PRODUCT RANGE

### PANAVIA™ V5

#### PROFESSIONAL KIT - #281600

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,  
50 Applicator brushes (fine), 1 Mixing dish, 20 needle tips



### PANAVIA™ V5

#### STANDARD KIT

#### Universal (A2) #281601 - Clear #281502

PANAVIA™ V5 Tooth Primer (2 ml)

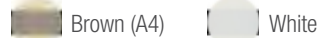
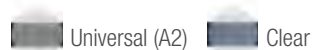
CLEARFIL™ CERAMIC PRIMER PLUS (2 ml)

PANAVIA™ V5 Paste [one syringe per shade (4.6 ml / 8.1 g):  
Universal (A2) or Clear]

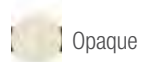
K-ETCHANT Syringe (3 ml), 15 mixing tips, 5 endo tips,  
50 Applicator brushes (fine), 1 Mixing dish, 20 needle tips

### FIVE ESTHETIC SHADES<sup>1</sup>

Dual-cure:



Self-cure:



## REFILL

- 1 **PANAVIA™ V5 Tooth Primer** (4 ml), #282635
- 2 **CLEARFIL™ CERAMIC PRIMER PLUS** (4 ml), #282637
- 3 **PANAVIA™ V5 Paste** (4.6 ml / 8.1 g), 20 mixing tips  
Universal (A2) #281511  
Clear #282612  
Brown (A4) #282613  
White #282614  
Opaque #282615
- 4 **PANAVIA™ V5 Try-in Paste** (1.8 ml),  
Universal (A2) #282621  
Clear #282622  
Brown (A4) #282623  
White #282624  
Opaque #281625
- 5 **K-ETCHANT Syringe** (2 x 3 ml), 2 x 20 needle tips, #282252  
Mixing tip (20 mixing tips), #282626  
Endo tip (20 endo tips), #282629



## MANUFACTURER

Kuraray Noritake Dental Inc.  
OTE Center Bldg.  
1-1-3 Otemachi  
Chiyoda-ku, Tokyo 100-0004  
Japan

Tel +81 (0)3 6701 1710  
Fax +81 (0)3 6701 1805  
Website [www.kuraraynoritake.com](http://www.kuraraynoritake.com)



**Kuraray Noritake Dental Inc.**

2-28 Kurashiki-cho, Tainai, Niigata 959-2653, Japan

## DISTRIBUTOR (AUST)

Henry Schein Halas  
Phone 1300 65 88 22  
Fax 1300 65 88 10  
Email [Customer.Care@henryschein.com.au](mailto:Customer.Care@henryschein.com.au)  
Website [www.henryschein.com.au](http://www.henryschein.com.au)

## DISTRIBUTOR (NZ)

Henry Schein Dental  
Phone 0800 808 855  
Fax 0508 808 555  
Email [orders@henryschein.co.nz](mailto:orders@henryschein.co.nz)  
Website [www.henryschein.co.nz](http://www.henryschein.co.nz)

PANAVIA and CLEARFIL are registered trademarks of Kuraray Co., Ltd.

- The following products are referred to as follows in this brochure:  
PANAVIA™ V5 Paste: Paste, PANAVIA™ V5 Try-in Paste: Try-in Paste, PANAVIA™ V5 Tooth Primer: Tooth Primer, CLEARFIL™ CERAMIC PRIMER PLUS: CERAMIC PRIMER PLUS
- Measurement data cited in this brochure were obtained by Kuraray Noritake Dental Inc. The values may vary according to the measuring conditions.
- The colors shown in this brochure may be different from those of the actual product.
- The specifications and appearance are subject to change without notice. Before using this product, read the Instructions for Use.