CLEARFIL™ SE BOND

RESIN-BASED DENTAL ADHESIVE SYSTEM



CLEARFIL SE BOND

Technical information

‹CLEARFIL SE BOND› SYSTEM FEATURES

CLEARFIL SE BOND is a light-cured bonding system consisting of a self-etching primer and bonding agent. It offers the following important clinical features:

1. Easy application

CLEARFIL SE BOND is a true two-step bonding system. Both CLEARFIL SE BOND Primer and Bond are single-liquid components, so no mixing is required before application. They can be dispensed and used immediately. Additionally, because CLEARFIL SE BOND Primer is not rinsed after application, another step is eliminated over traditional bonding systems, which typically employ a phosphoric acid etch and water rinse procedure.

2. Fast procedural time

Single-liquid components and no-rinse procedure of CLEARFIL SE BOND alone save considerable procedural time over traditional bonding systems. In addition, the application time for the primer and overall light-cure time have also been significantly reduced.

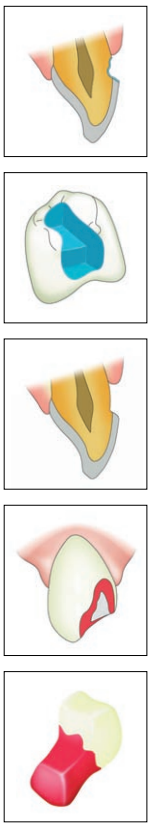
CLEARFIL SE BOND Primer effectively etches and primes tooth structure in 20 seconds, and CLEARFIL SE BOND Bond light-cures in 10 seconds, for a total procedural time of just 30 seconds (excluding applying and drying time).

3. Strength and versatility

CLEARFIL SE BOND, like CLEARFIL LINER BOND 2V, provides extremely high bond strength to dentin and enamel, and also to metals and porcelain. Because it bonds so well to all tooth structure and dental materials, its range of clinical usefulness is greatly enhanced. CLEARFIL SE BOND is indicated for the following clinical applications:

2steps
No rinsing
No mixing





1. Direct filling restorations using light-cured composite or compomer
2. Cavity sealing as a pretreatment for indirect restorations
3. Treatment of hypersensitive and/or exposed root surfaces
4. Intraoral repairs of fractured facing crowns made of porcelain, hybrid ceramics or composite resin using light-cured composite
5. Surface treatment of prosthetic appliances made of porcelain, hybrid ceramics or cured composite resin

UNTIL NOW / THE HISTORY OF BONDING SYSTEMS

Kuraray has been at the forefront of adhesion technology for over twenty years. Our research has constantly focused on providing the dental profession with better performing, easier to use products.

1. The birth of adhesion dentistry

Dr. Michael Buonocore is well known for his contribution to adhesion dentistry; that is, identifying phosphoric acid solution as an effective surface treatment for enamel. He and his colleagues discovered that etching enamel with phosphoric acid created microscopic surface irregularities that resin filling materials could flow into and interlock with-allowing mechanical bonding stronger than previously obtainable. This was the birth of adhesion dentistry. Enamel bonding systems consisting of phosphoric acid etching agent and a resin bonding agent made their market debut soon after.

2. Seeking for chemical factor of adhesion





Many companies attempted to improve on the newly developed enamel bonding systems, with the goal being chemical adhesion to tooth structure-rather than mechanical interlocking of the resin material alone. Kuraray succeeded in developing the chemically adhesive dental monomer: the phosphate monomer, Phenyl-P. In 1978, Kuraray launched CLEARFIL BOND SYSTEM F-the first dental bonding system to offer both mechanical and chemical adhesion to enamel and dentin. Kuraray also introduced the total etching concept developed by Dr. Takao Fusayama, whereby enamel and dentin are etched simultaneously with phosphoric acid before application of the adhesive monomer. Total etching is now a universally accepted procedure and it forms an integral part of the wet bonding technique described later in this manual.
In 1981, Kuraray developed a new phosphate monomer, MDP (10-Methacryloyloxydecyl dihydrogen phosphate), which improved adhesion to dentin. MDP was incorporated into the successful CLEARFIL NEW BOND and CLEARFIL PHOTO BOND adhesive systems. MDP not only improved enamel and dentin adhesion, but also produced excellent adhesion to dental metals. This led to the development of the PANAVIA dental adhesive cement, which in turn opened the way for new restorative techniques that relied on strong adhesion to dental metals and porcelain.

3. Towards improved dentin priming



The development of reliable "second-generation" bonding systems-in other words, those that successfully adhered to both enamel and dentin-led to the popularization and acceptance of composite resin restoratives. However, this generation of bonding systems still exhibited relatively weak adhesion to dentin-a potential problem in root surface restorations, for example, where the cavity margin is in the dentin surface. In answer to this, Kuraray concentrated its research efforts on improved dentin adhesion and developed CLEARFIL LINER BOND SYSTEM. This system was designed with very specific goals:

1) Avoid potential damage to the dentin (especially its collagen content) caused by phosphoric acid.
2) Achieve optimal conditioning of the dentin, with particular attention to the collagen network.
3) Simplify the conditioning procedure by allowing simultaneous treatment of enamel and dentin.

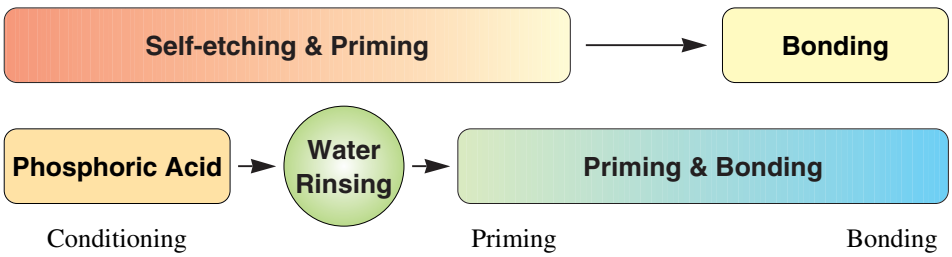
To accomplish these goals, Kuraray developed CA Agent, a citric acid-based solution that provided milder and yet still effective etching when compared to phosphoric acid; and SA Primer, which restored decalcified collagen fibrils to their original height, thus allowing the bonding monomer, MDP, to penetrate fully. The clinical performance of the new bonding system was excellent, with stronger dentin adhesion, thorough dentin sealing. With this new approach to dentin conditioning, Kuraray paved the way towards the development of self-etching primers.

4. Self-etching primers-the future of adhesion dentistry

As clinically successful as CLEARFIL LINER BOND SYSTEM was, it required a relatively large number of procedural steps, with its two-stage tooth conditioning system. Kuraray sought to simplify the procedure, while maintaining the previous development goals of gentle yet effective dentin conditioning.

Kuraray introduced the next generation adhesive system CLEARFIL LINER BOND 2, one of the world's first light-cured, self-etching and priming bonding system. Based on technology developed for PANAVIA 21 ED Primer, this system featured the self-etching primer LB Primer. LB Primer used the acidic phosphate monomer, Phenyl-P, in combination with water and other components to duplicate the gentle etching effect of CA Agent and the conditioning effect of SA Primer, in one step.

During this time, other manufacturers embraced the total etching technique and combined it with single bottle bond components. These "one-bottle" bonding systems (a misnomer as they still require a separate phosphoric acid etching component) popularized the "wet bonding technique."



While the wet bonding technique is used with "one-bottle" bonds that unify priming and bonding, Kuraray's self-etching and priming system unifies etching and priming. Both approaches produce excellent bond strength. The advantages of Kuraray's system include gentler etching, elimination of water rinsing, dentin sealing (which virtually eliminates post-operative sensitivity) and a fast, two-step procedure.

The shortcomings of "one-bottle" bonds using the wet bonding technique include the potential for excessive dentin decalcification, and their reliance on very careful moisture control to achieve good bonding and sealing results.

Kuraray is firmly committed to self-etching technology. The newest bonding systems CLEARFIL LINER BOND 2V and CLEARFIL SE BOND both employ self-etching primers. CLEARFIL LINER BOND 2V adds the versatility of dual-cure capability, which allows its use in virtually any clinical situation, including indirect restorations.

CLEARFIL SE BOND is designed for light-cure restorations only, and offers an extremely fast and simple clinical procedure.



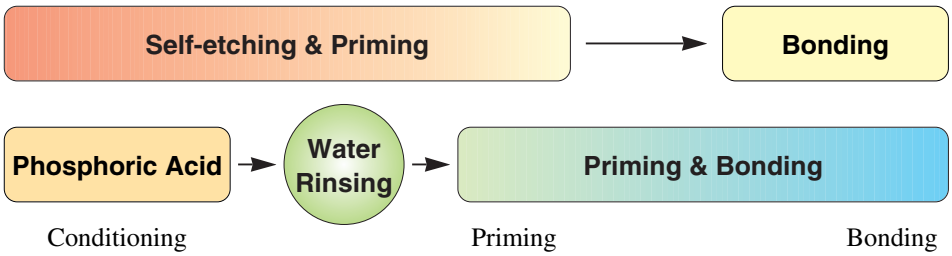


NOW / ‹CLEARFIL SE BOND› SYSTEM TECHNOLOGY

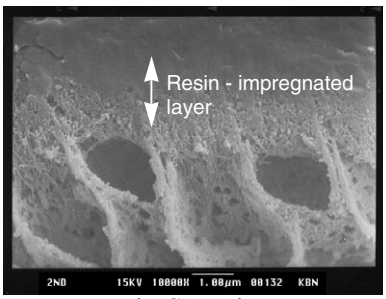
1. Self-etching primer technology

(1) Basic adhesion mechanism

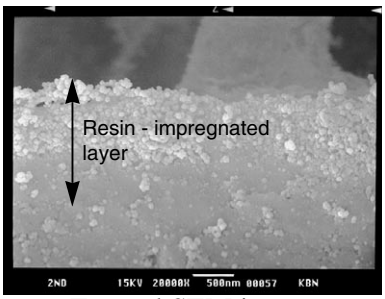
- CLEARFIL SE BOND Primer contains an acidic phosphate monomer which penetrates dental tissue well and dissolves the smear layer created during cavity preparation. This replaces the need for a separate phosphoric acid etching and water rinsing procedure as used with traditional bonding systems.
- The acidity of the Primer has been optimized to allow simultaneous treatment of enamel and dentin: it etches enamel enough to ensure good bond adaptation, while not excessively decalcifying the collagen structure of the dentin.
- Importantly, the primer remains diffused throughout the dentin tissue after treatment: it is not rinsed away. Therefore, the collagen network does not collapse, but remains fully supported, which allows excellent penetration of the bond component. The Primer reverts to a neutral pH after treatment of enamel and dentin with deminenalization. Together they create a strong, stable bonding layer with excellent dentinal sealing.



- The figures below are SEM (Scanning Electron Microscope) images of human enamel and dentin treated with CLEARFIL SE BOND.
- In the dentin SEM image, it can be observed that the Primer has penetrated and diffused throughout the dentin, creating an approximately 1µm deep hybrid layer.
- In the enamel SEM image, the primer has clearly penetrated and etched the enamel prism and interstitial material, creating a network of unique, micro-mechanical resin tags.



Dentin SEM image

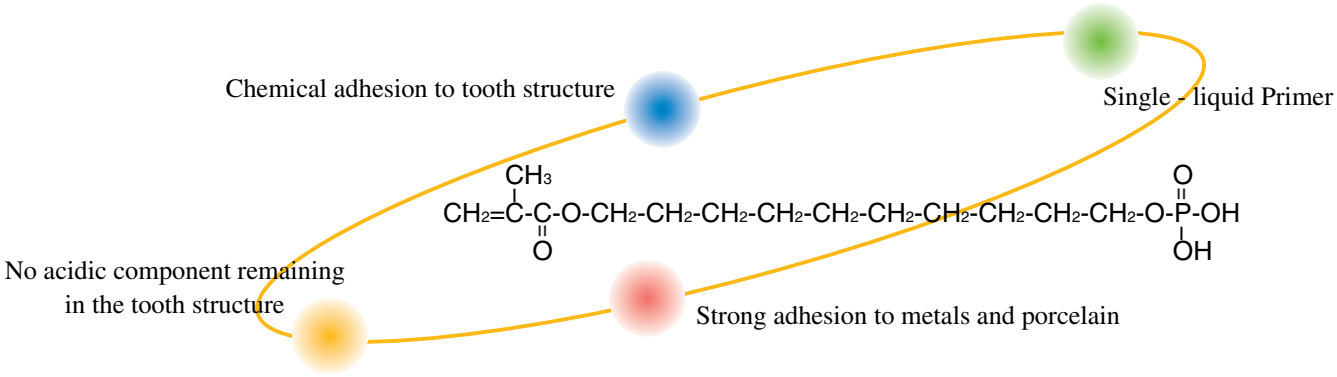


Enamel SEM image

Department of Operative Dentistry
Department of Dental Materials
Faculty of Dentistry
Okayama University

(2) CLEARFIL SE BOND Primer characteristics

- CLEARFIL SE BOND Primer contains the proprietary acidic phosphate monomer, MDP developed by Kuraray and used in the PANAVIA and CLEARFIL bonding product series, including CLEARFIL LINER BOND 2V. MDP offers the following beneficial clinical characteristics:

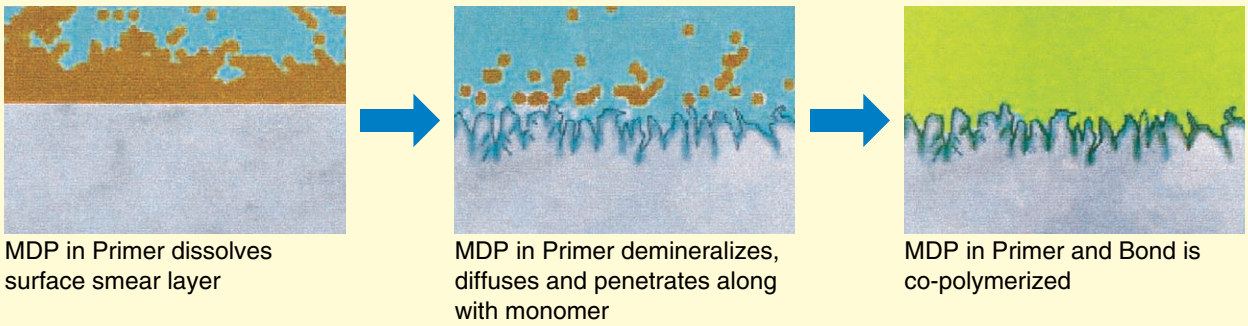


1. Mechanical and chemical adhesion to tooth structure

- MDP contains phosphate group in its molecular structure that bond chemically with calcium exposed during priming.
- MDP also bonds mechanically, because it diffuses and polymerizes throughout the tooth structure. The dual bonding mechanism ensures very strong, stable adhesion.

2. Polymerization capability

- Self-etching primers contain one of two kinds of etching components: a non-polymerizable acid such as maleic acid, or a polymerizable monomer like MDP.
- The benefit of self-etching bonding system using MDP is that it is sufficiently polymerized after application and irradiation of bond, so it provides high-durable bond strength.



MDP in Primer dissolves surface smear layer

MDP in Primer demineralizes, diffuses and penetrates along with monomer

MDP in Primer and Bond is co-polymerized

3. Single liquid system compatibility

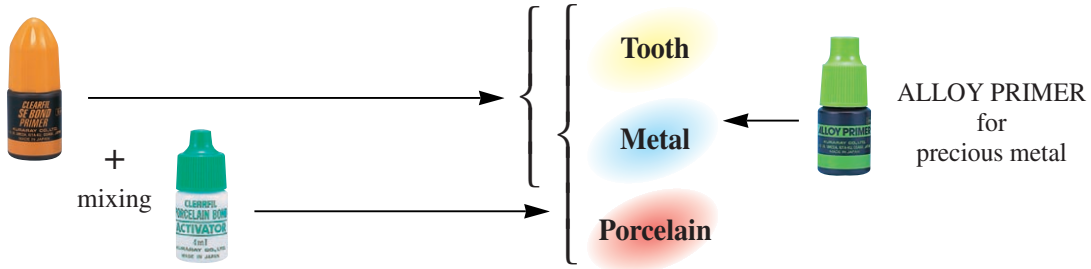


- Self-etching primers have been supplied as two separate liquids, which were mixed just before application.
- The acidic component and HEMA were packaged separately, along with water in each, until actual mixing and application to prevent the deterioration of monomer ingredients.
- MDP, however, is stable with HEMA, and hence these two components, plus water, may be combined into a single-liquid formulation. This simplifies and speeds up application.

4. Mechanical and chemical adhesion to dental materials

- MDP bonds well to dental metals, particularly non-precious metals. The excellent clinical performance of the PANAVIA product series, which employs MDP, attests to this.
- MDP also facilitates very high bond strengths to porcelain and cured composite. MDP activates the silane-coupling agent, CLEARFIL PORCELAIN BOND Activator, which promotes chemical bonding with the porcelain or cured composite surfaces.
- By mixing CLEARFIL SE BOND Primer with CLEARFIL PORCELAIN BOND Activator, an effective agent for simultaneous surface treatment of porcelain or cured composite, dental metals, and tooth structure, is created.

Note: For precious metals, an initial application of ALLOY PRIMER is recommended for optimal bond strength.

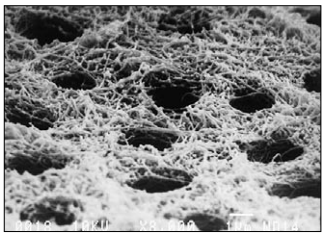


2. Advantages over phosphoric acid based systems

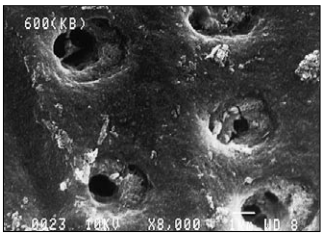
(1) Mild acid gentler on tooth structure

CLEARFIL SE BOND Primer does not excessively decalcify and weaken dentin tissue and collagen fibers.

- The picture below left shows an SEM image of prepared human dentin treated with phosphoric acid. The image confirms that the peritubular dentin has been extensively decalcified and that the dentinal tubules exhibit enlarged, funnel-shaped, openings.
- Treating prepared dentin with phosphoric acid – because it is a relatively strong acid – can result in excessive decalcification and exposure of the collagen fiber network. The collagen network may collapse upon itself, creating a physical barrier to the penetration of the bonding agent to the full depth of the decalcified zone, and resulting in weak, unsupported dentin. This in turn may result in decreased strength within the dentin tissue and impaired overall adhesion durability.
- CLEARFIL SE BOND Primer is mildly acidic, with a pH of 2.0, and therefore can be used without fear of excessive decalcification. At the same time, because it penetrates and adapts to tooth structure so well, it provides reliable and effective surface treatment.



Phosphoric acid decalcification zone SEM image



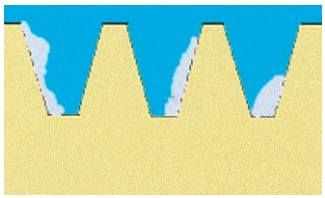
CLEARFIL SE BOND Primer decalcification zone SEM image

Department of Operative Dentistry, Faculty of Dentistry, Tokyo Medical and Dental University

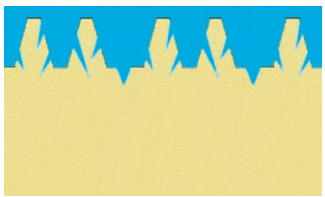
(2) Formation of a uniform hybrid layer

CLEARFIL SE BOND promotes the formation of a uniform hybrid layer.

- With conventional bonding systems, primers and/or bonding agents are introduced into the dentinal tissue following phosphoric acid etching and water rinsing. However, in many cases the phosphoric acid may have decalcified the tooth structure deeper than the primer and bonding agent are able to penetrate. As described earlier, the full penetration of the monomer may also be inhibited should the unsupported collagen fibers collapse upon themselves. Any areas within the tooth structure that are not fully penetrated by the bonding monomer will become weak links in the overall restoration.
- CLEARFIL SE BOND Primer decalcifies only as deeply as it penetrates. And because the acid is polymerizable phosphate monomer, complete support for the decalcified tissues is provided by its co-polymerization with the bonding component. In this way, CLEARFIL SE BOND eliminates the problem of void formation, and creates a very uniform hybrid layer.



With conventional bonding systems, the phosphoric acid may decalcify the tooth structure deeper than the primer and bonding agent are able to penetrate.



CLEARFIL SE BOND Primer decalcifies only as deep as it penetrates and no void is formed.

(3) Dramatically reduced technique sensitivity

CLEARFIL SE BOND does not employ the technique sensitive "wet bonding" procedure.

- The majority of bonding systems employing phosphoric acid etching specify the use of the "wet bonding" technique, which requires critical attention to the amount of moisture left on the preparation surface after water rinsing.
- Accurate moisture control is a requirement for success with the "wet bonding" technique systems because water acts as the wetting agent to allow permeability. If the preparation is dried excessively after water rinsing, the primer and bond will not sufficiently penetrate the tooth structure and weak, unsupported voids will result. Alternatively, if excessive water is allowed to remain, this will dilute the bonding monomer excessively and reduce adhesion.
- In clinical situations, however, it is extremely difficult to precisely control the amount of moisture remaining on the preparation surface due to variables such as the strength and duration of the air stream used for drying, or the amount of moisture blotted with sponges. The depth of the preparation will also affect the amount of moisture removed with such procedures.
- With CLEARFIL SE BOND, the preparation may be dried extensively following application of the primer; there is very little possibility of over- or under-drying the preparation. With the consistent surface treatment afforded by this priming procedure, far greater adhesion consistency can also be obtained, regardless of the clinical case or operator.

3. Comparison with CLEARFIL LINER BOND 2V

• CLEARFIL SE BOND is chemically very similar to CLEARFIL LINER BOND 2V. With its single liquid components and shortened procedural time, CLEARFIL SE BOND was developed for rapid, effective, light-cure applications, whereas CLEARFIL LINER BOND 2V offers greater versatility thanks to its dual-cure capability. Both provide exceptional bonding performance. The following chart illustrates the similarities and differences between the two products.

Product Name	CLEARFIL™ SE BOND	CLEARFIL™ LINER BOND 2V
Components	 Single-liquid type primer Single-liquid type bond	 Dual-liquid type primer Single- or dual- liquid type bond
Procedural Time	1. Priming for 20 seconds (no mixing required) 2. Bond application and light curing for 10 seconds (30 seconds in total)	1. Priming for 30 seconds (mixing required) 2. Bond application and light curing for 20 seconds (50 seconds in total)
Polymerization Method	Light-cure only	Light-cure, chemical-cure or dual-cure
Clinical Indications	• Direct filling restorations using light-curing composite or compomer • Cavity sealing as a pretreatment for indirect restorations • Treatment of hypersensitive and/or exposed root surfaces • Intraoral repairs of fractured facing crowns made of porcelain, hybrid ceramics or composite resin using light-curing composite • Surface treatment of prosthetic appliances made of porcelain, hybrid ceramics or cured composite resin 	• Direct filling restorations using light-curing and chemical-curing composite • Cavity sealing as a pretreatment for indirect restorations • Treatment of hypersensitivity • Intraoral repairs of fractuted porcelain restorations using light-curing composite • Cementing porcelain or composite inlays/onlays using resin cement • Bonding to metals and porcelain when used with CLEARFIL PORCELAIN BOND ACTIVATOR and ALLOY PRIMER • Bonded amalgam restorations 
Basic Components	Primer : MDP, HEMA, dimethacrylate monomer, water, catalyst Bond : MDP, HEMA, dimethacrylate monomer, microfiller, catalyst	
Technical Characteristics	CLEARFIL SE BOND : • Faster priming procedure due to lower pH • Faster light cure time due to modified catalysts • Single liquid components CLEARFIL LINER BOND 2V: • Dual cure bond capability allows for use in indirect restorations • Dual liquid primer component	

‹CLEARFIL SE BOND› SYSTEM PERFORMANCE

1. System components

CLEARFIL SE BOND is composed of Primer and Bond, with the principle ingredients of each shown here.



Primer

MDP
HEMA
Dimethacrylate monomer
Water
Photoinitiator



Bond

MDP
HEMA
Dimethacrylate monomer
Microfiller
Photoinitiator

2. Adhesion performance

(1) Adhesive strength

Figures 1 through 3 show the tensile bond strengths of CLEARFIL SE BOND to bovine enamel, bovine dentin, metal and porcelain, following (a) 24hrs, and (b) 4,000 thermal-cycles. CLEARFIL SE BOND exhibits high tensile bond strength to all of these materials.

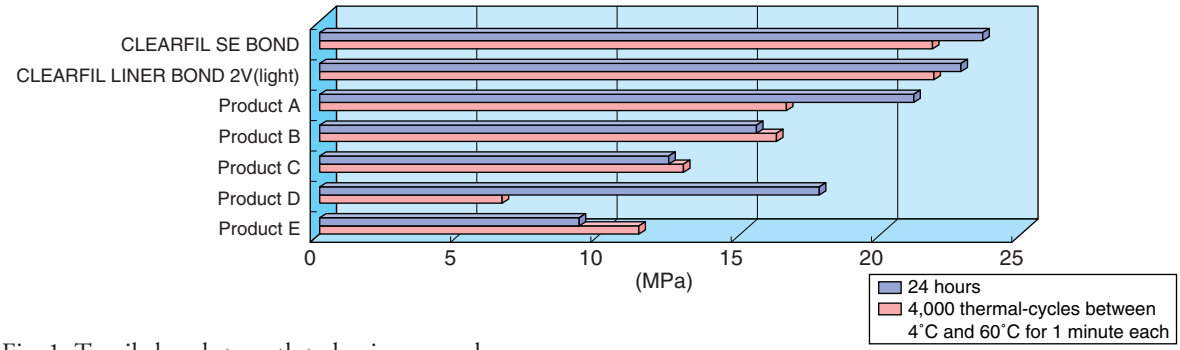


Fig. 1 Tensile bond strength to bovine enamel

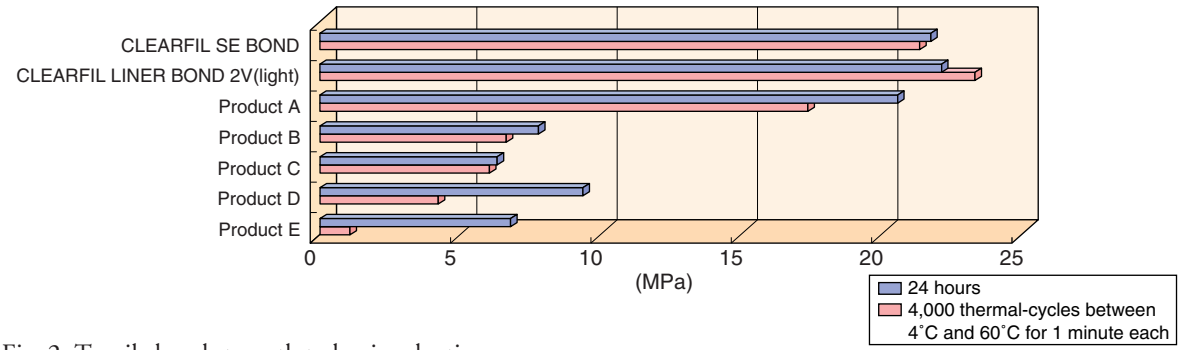


Fig. 2 Tensile bond strength to bovine dentin

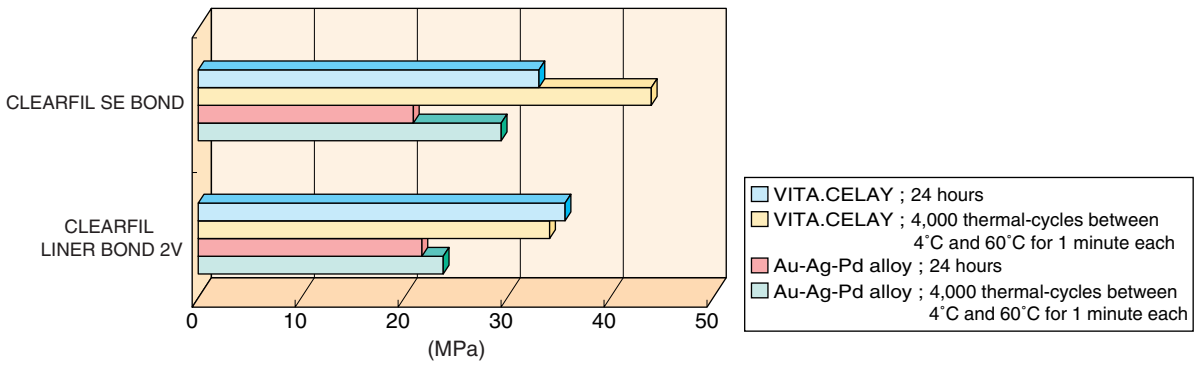


Fig. 3 Tensile bond strength to metal and porcelain

(2) Adhesion to human dentin

- Figure 4 shows the tensile strength of CLEARFIL SE BOND to human dentin measured by the micro tensile bond test.
- CLEARFIL SE BOND shows virtually identical tensile bond strength at the enamel-dentin interface as CLEARFIL LINER BOND 2V.
- The results of the micro-tensile bond strength test confirm that CLEARFIL SE BOND provides adhesive strength comparable to the natural tooth's enamel-dentin interface.

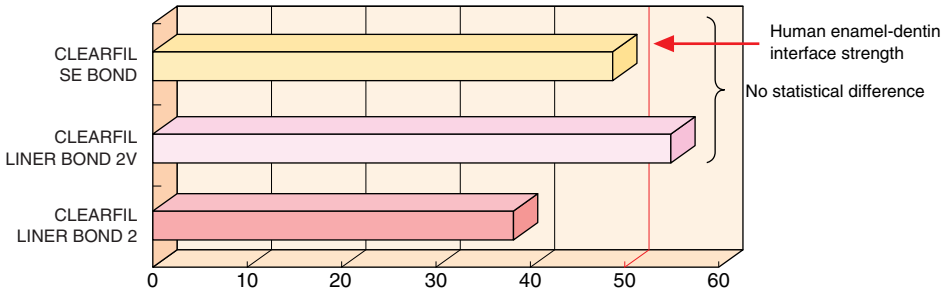


Fig. 4 Human dentin tensile adhesive strength measured by micro-tensile method [10]
(Data provided by the Department of Conservative Dentistry, Faculty of Dentistry, Tokyo Medical and Dental University. *The Japanese J Conservative Dent* 41 Autumn Issue 4-5)

(3) Adhesion to uncut human enamel

- The self-etching primers used in CLEARFIL LINER BOND 2V and CLEARFIL SE BOND have been shown to promote high bond strength to prepared enamel. There has been some concern amongst clinicians, however, that a self-etching primer will not sufficiently etch uncut enamel, for example in the cavity periphery.
- The results of a micro-tensile bond strength test to uncut human enamel show that CLEARFIL SE BOND provides adhesive strength equal to or exceeding that of a "wet technique" bonding system utilizing phosphoric acid etching. These test results suggest that CLEARFIL SE BOND Primer will etch uncut enamel sufficiently to promote good bonding of restorative material overlapping the cavity margin.

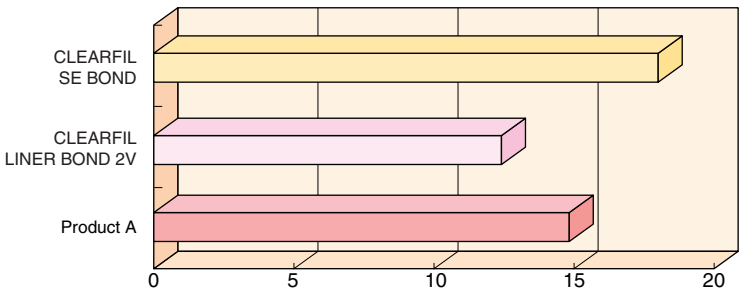


Fig. 5 Human enamel (uncut) adhesive strength measured by micro tensile method
(Data provided by the Department of Operative Dentistry, Faculty of Dentistry, Tsurumi University. *The Japanese J Adhesive Dent* 16. No.4.)

(4) Adhesion to compomer restoratives

- CLEARFIL SE BOND provides high bond strength not only to composite resin restoratives, but to compomer restoratives as well.
- As the following test results illustrate, average bond strengths obtained with CLEARFIL SE BOND in many cases exceed those obtained with the bonding systems included or recommended for use with the compomer restorative systems.

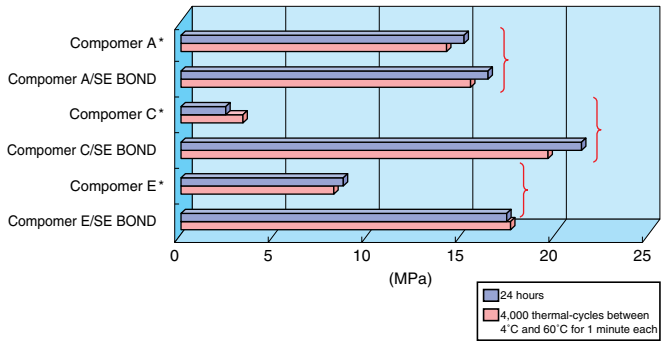


Fig. 6 Tensile bond strength to bovine enamel

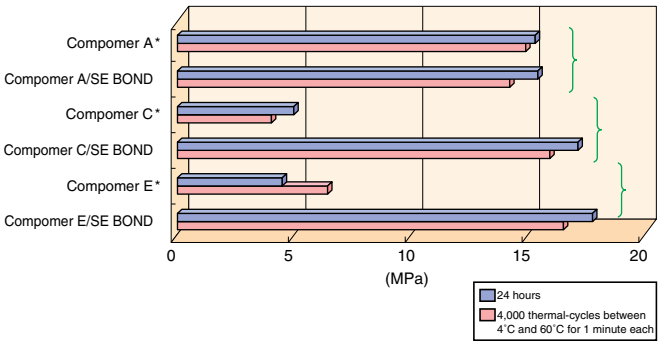
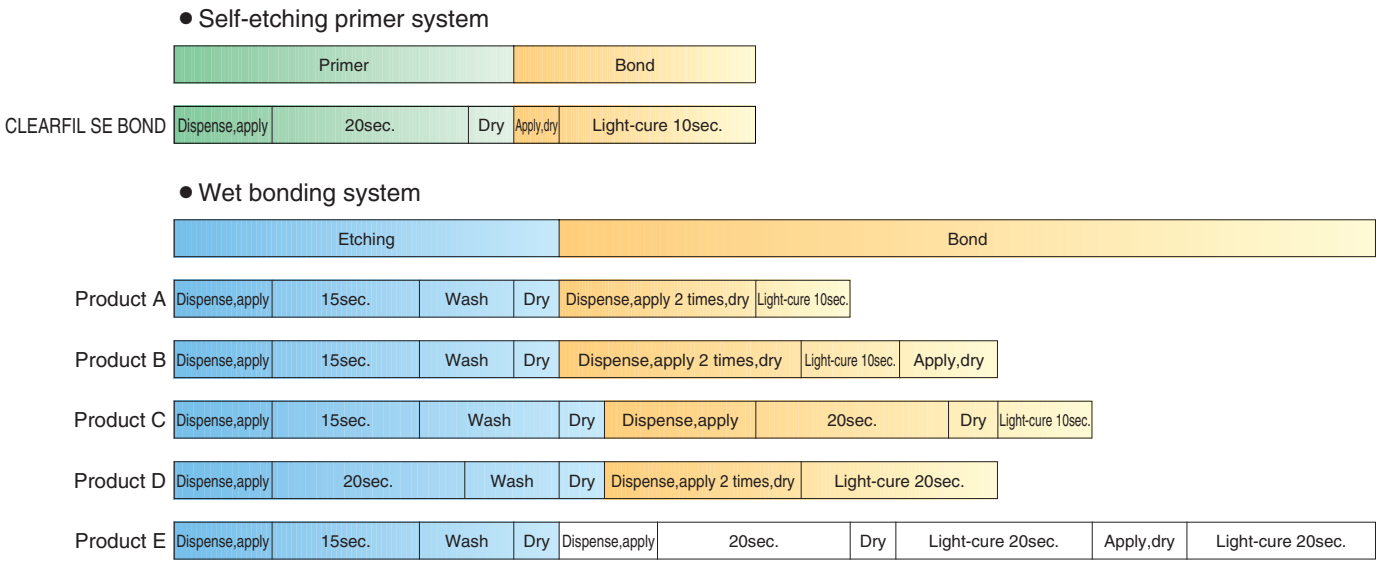


Fig. 7 Tensile bond strength to bovine dentin

* Bonding systems included or recommended for use with the each compomer restorative systems were used.

3. Clinical procedure

CLEARFIL SE BOND uses an identical clinical procedure for both composite resin and compomer restoratives. The clinical procedure is considerably simpler and faster than that for many other bonding systems as the comparison chart below illustrates.

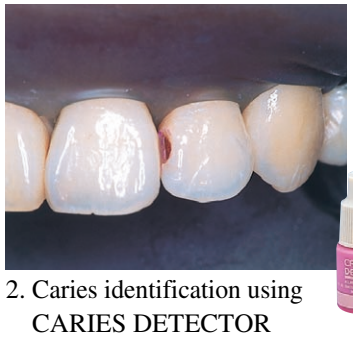


〈CLEARFIL SE BOND〉 CLINICAL EXAMPLES

1. Direct filling restorations using light-cure composite



1. Before restoration



2. Caries identification using CARIES DETECTOR



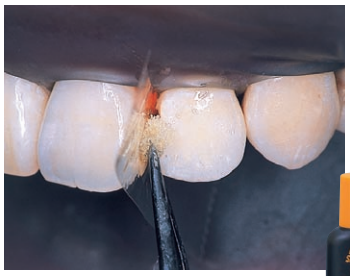
3. Cavity preparation



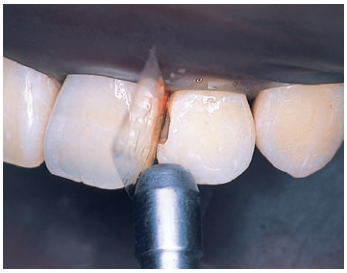
4. Apply CLEARFIL SE BOND Primer and leave for 20 seconds



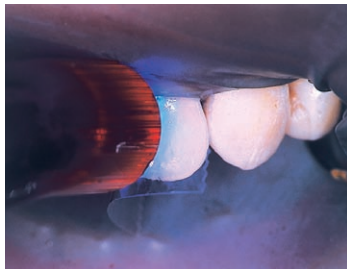
5. Dry thoroughly with mild air flow



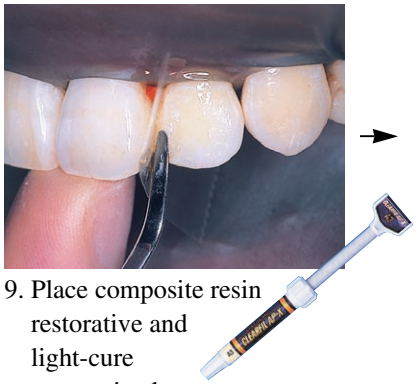
6. Apply CLEARFIL SE BOND Bond



7. Air flow gently



8. Light-cure for 10 seconds



9. Place composite resin restorative and light-cure appropriately



10. Completed restoration

2. Treatment of hypersensitive tooth



1. Before restoration



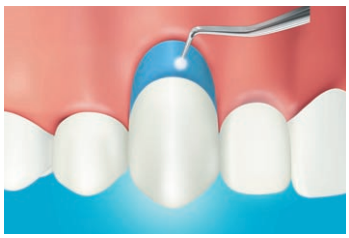
2. Apply CLEARFIL SE BOND Primer, leave for 20 seconds, and dry with mild air flow



3. Apply CLEARFIL SE BOND Bond, air flow gently and light-cure for 10 seconds



4. Apply CLEARFIL LINER BOND 2 PROTECT LINER F and light-cure for 20 seconds



5. Remove unpolymerized resin with alcohol moistened cotton roll



6. Completed restoration

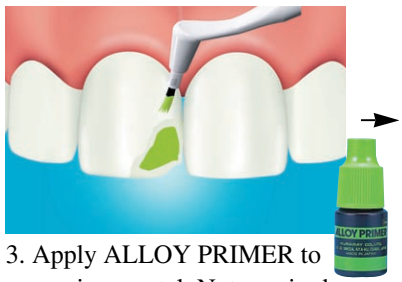
3. Intraoral repair of porcelain



1. Before restoration



2. Apply K-ETCHANT GEL to porcelain surface, leave for 5 seconds, wash and dry with air



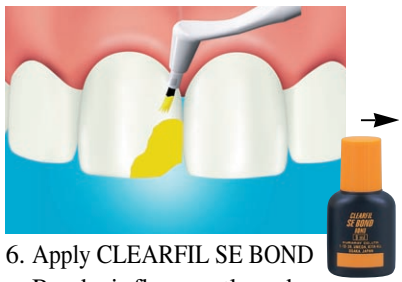
3. Apply ALLOY PRIMER to precious metal. Not required for non-precious metal



4. Apply CLEARFIL SE BOND Primer mixed with CLEARFIL PORCELAIN BOND ACTIVATOR and leave for 20 seconds



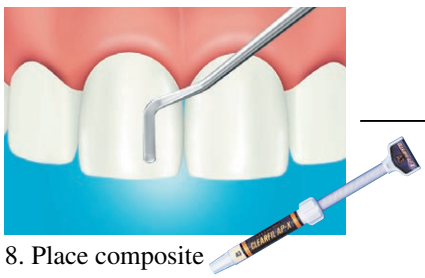
5. Dry thoroughly with mild air flow



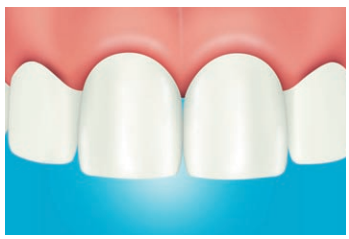
6. Apply CLEARFIL SE BOND Bond, air flow gently and light-cure for 10 seconds



7. Apply PHOTO CLEARFIL OPAQUER and light-cure for 40 seconds



8. Place composite resin restorative and light-cure appropriately



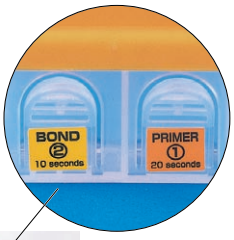
9. Completed restoration

〈CLEARFIL SE BOND〉 ADDITIONAL NOTES ON USE

1. Loading the Outer Case



1) Remove the Outer Case cap
2) Push the Outer Case clasp to open it
3) Remove bottle caps of CLEARFIL SE BOND Primer and Bond, then set the bottles into the Outer Case
4) Close the Outer Case, ensuring that the clasp engages



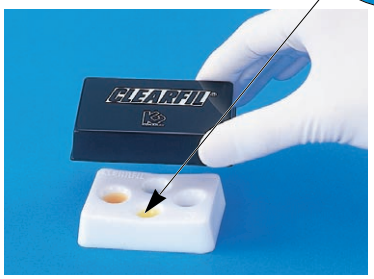
2. Dispensing and using CLEARFIL SE BOND



1) Remove the Outer Case cap by pulling it straight up

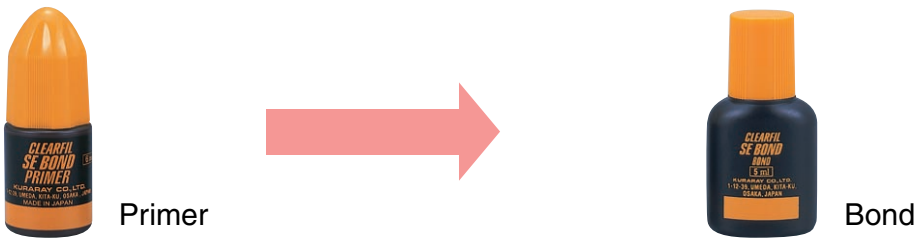


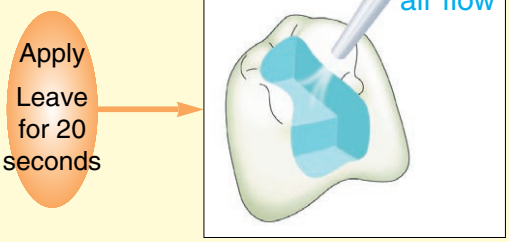
2) Invert the Outer Case and push on the press points to dispense appropriate amounts of Primer and Bond. Do not mix the Primer and Bond



3) Use the Primer and Bond within three minutes of dispensing. Cover the mixing dish with the light-blocking plate to prevent accidental light-curing by ambient light (avoid placing the mixing dish in the vicinity of the operating light or strong natural light). Do not confuse the Primer (orange) with the Bond (yellow)

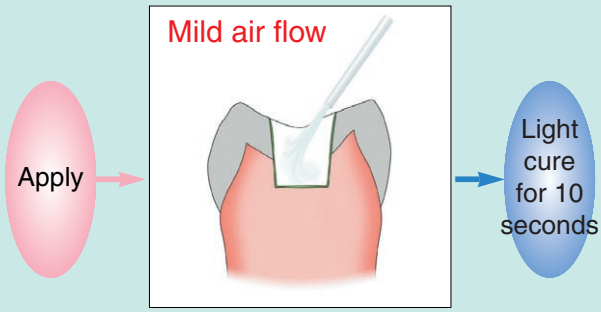
3. For optimum performance with CLEARFIL SE BOND





Apply a generous amount of Primer

Use mild air flow to dry the Primer ; strong air flow may displace it



After applying the Bond, distribute it evenly in the preparation, using mild air flow. Do not use a strong air blast. Any "puddling" or excessive thinning of the Bond will decrease bond strength.

References

1) KIDA, K., MOMOI, Y. and KOHNO, A. : Bond Strength of Resin Systems to Unground and Ground Enamel, *J Dent Res* 78 Special Issue 1017 (1999)

2) NAKATSUKA, K. and ARIKAWA, K. : Adhesive Characteristics of a New Bonding System "KBN", *J Dent Res* 78 Special Issue 2291 (1999)

3) LATTA, M.A., PITRUZZELLO, R.M., KELSEY, M.N. and BARKMEIER, W.W. : Laboratory Evaluation of the KBN Adhesive System, *J Dent Res* 78 Special Issue 2293 (1999)

4) KUBO, S., KONISHI, Y., YOKOTA, H. and HAYASHI, Y. : Effect of One-bottle Self-etching Primer on Microleakage of Cervical Restorations, *J Dent Res* 78 Special Issue 2965 (1999)

5) INOUE, H., INOUE, S., UNO, S., KOMATSU, H. and SANO, H. : Adhesion of new simplified adhesive system to human dentin, *J Dent Res* 78 Special Issue 2998 (1999)

6) AKIMOTO, N., YOKOYAMA, G., KOHNO, A., SUZUKI, S. and COX, C.F. : Bonding to Dentin with New Self-etching Primer System, *J Dent Res* 78 Special Issue 3004 (1999)

7) MASEKI, T., SUDA, S., NITTA, T., NARA, Y., TANAKA, H. and DOGON, I.L. : Bond Strength and Microleakage of Resin Adhesive Systems adopting "One-bottle" Self-etching Primer, *J Dent Res* 78 Special Issue 3426 (1999)

8) YAMAUCHI, J., NAKABAYASHI, N. and MASUHARA, E. : Adhesive Agents for Hard Tissue Containing Phosphoric Acid Monomers, *Am Chem Soc Polymer Preprints* 20 (1) 594-595 (1979)

9) OMURA, I. And YAMAUCHI, J. : Correlation Between Molecular Structure of Adhesive Monomer and Adhesive Properties, *Trans. International Congress on Dental Materials* 356 (1989)

10) HARADA, N., YAMAGUCHI, S., OGATA, M., NAKAJIMA, M. and TAGAMI, J. : Tensile Bond Strength of a Newly Developed One-bottle Self-etching Resin Bonding System "KBN" to Various Dental Substrates, *The Japanese J Conservative Dent* 42 Autumn Issue A-5 (1998)

NOTE:

Please read CLEARFIL SE BOND Instructions for Use thoroughly before using the product.
PANAVIA and CLEARFIL are trademarks of KURARAY CO., LTD.
CELAY is a trademark of VITA Zahnfabrik, H. Rauter GmbH & CO KG Bad Säckingen, Germany.

WARRANTY:

All data other than from quoted articles, herein is based on actual measurements performed by KURARAY CO., LTD.
KURARAY CO., LTD. will replace any product that is proved to be defective.
Neither KURARAY CO., LTD. nor the distributor accepts liability for any loss or damage, direct, consequential or special, arising out of the application or use of or the inability to use these products. Before using, the user should determine the suitability of the products for the intended use and the user assumes all risk and liability whatsoever in connection therewith.

Manufactured by
KURARAY CO., LTD.
1-12-39, Umeda, Kita-Ku, Osaka 530-8611, JAPAN
1970EUT-01
Printed in Japan 11/99