

# THE DENTAL ADVISOR™

"Improved Patient Care Through Research"



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**THE DENTAL ADVISOR** evaluates and rates dental products and equipment by objective clinical and laboratory protocols. The publication consists of clinical evaluations, comprehensive long-term evaluations, product comparisons and specialty reports. To subscribe, please call 734-665-2020.

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## Update: Self-etching Bonding Agents

Bonding agents for direct and indirect restorations continue to evolve. Sixth- and seventh-generation bonding agents eliminate the need for etching with phosphoric acid by the use of an acidic primer. The 6th-generation – Type I bonding agents have self-etching primer and adhesive components that are applied separately to the tooth. The 6th-generation – Type II self-etching adhesives are first mixed and then applied. The 7th-generation bonding agents are self-etching adhesives that require no mixing. These self-etching bonding agents dissolve the smear layer of tooth structure when applied and do not require rinsing.

### Characteristics

#### 6th-generation – Type I (Self-etching Primer and Adhesive)

- Two bottles, Liquid 1 – acidic primer, Liquid 2 – adhesive; acidic primer applied to tooth, followed by adhesive
- Unprepared enamel may require etching with phosphoric acid
- Light-cured formulation
- Solvent is water
- Four products have separate catalyst for dual curing capabilities (**Clearfil LINER BOND 2V**, **Contax**, **NANO-BOND**, **OptiBond Solo Plus Self-etch Adhesive System**)

Product	Company
<b>6th-generation – Type I (Self-etching Primer and Adhesive)</b>	
AdheSE	Ivoclar Vivadent
Clearfil LINER BOND 2V	Kuraray America
Clearfil PROTECT BOND	Kuraray America
Clearfil SE BOND	Kuraray America
Contax	Zenith/DMG
FL-Bond	Shofu
GC UniFil Bond	GC America
NANO-BOND	Pentron Clinical Technologies
OneCoat Self-Etching Bond	Coltène/Whaledent
ONE-STEP PLUS with TYRIAN SPE	Bisco
OptiBond Solo Plus Self-etch Adhesive System	SDS/Kerr
Prelude	Danville Materials
<b>6th-generation – Type II (Self-etching Adhesive)</b>	
3M ESPE Adper Prompt L-Pop	3M ESPE
Brush&Bond	Parkell
One-Up Bond F Plus	Tokuyama Dental Corp./ J. Morita USA
Tenure Uni-Bond with Gloss-n-Seal	Den-Mat
Touch&Bond	Parkell
Xeno III	DENTSPLY/Caulk
<b>7th-generation (No Mix, Self-etching Adhesive)</b>	
G-BOND	GC Corp.
iBOND	Heraeus Kulzer

### 6th-generation – Type II (Self-etching Adhesive)

- Two bottles or unit dose containing acidic primer and adhesive; a drop of each liquid is mixed and applied to the tooth
- Unprepared enamel may require etching with phosphoric acid
- Light-cured formulation
- Solvent is water

### 7th-generation (No-mix, Self-etching Adhesive)

- Single bottle containing acidic adhesive
- Unprepared enamel may require etching with phosphoric acid
- Light-cured formulation
- Solvent is water

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## THE DENTAL ADVISOR Recommends:

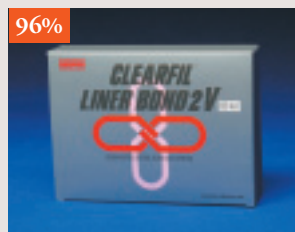
### 6th-generation – Type I



**Clearfil PROTECT BOND**  
(Kuraray America)



**AdbeSE**  
(Ivoclar Vivadent)



**Clearfil LINER BOND 2V**  
(Kuraray America)

### 6th-generation – Type II



**Xeno III**  
(DENTSPLY/Caulk)

Type of Cure*	Unit Dose	Filler Weight	Fluoride Release	Refrigeration Required	Number of Steps	Total Time	Bond Strength Enamel, MPa	Bond Strength Dentin, MPa	Cost/ml	Clinical Rating
LC	No	2%	No	No	6	51 sec	16	21	\$21.00	96%
DC	No	10%	No	Yes	6	66 sec	28	35	\$22.00	96%
LC	No	10%	Yes	Yes	5	46 sec	25	35	\$37.00	98%
LC	No	10%	No	Yes	5	46 sec	23	31	\$19.27	95%
LC	No	0%	Yes	No	3	60 sec	20	20	\$33.30	91%
LC	No	17%	Yes	No	5	33 sec	21	27	\$30.00	91%
LC	No	4%	No	Yes	4	38 sec	20	30	\$19.83	88%
DC, LC	No	>5%	No	Yes	5	63 sec	14	20	\$14.99	86%
LC	Yes	0%	No	No	7	54 sec	22	24	\$11.70	88%
LC	Yes	8.5%	No	No	6	50 sec	19	20	\$15.38	86%
DC, LC	Yes	15%	Yes	No	7	69 sec	28	25	\$30.92	92%
LC**	No***	25%	Yes	No	5	36 sec	25	27	\$25.98	na
LC	Yes	0%	No	No	4	38 sec	19	17	\$15.99	89%
LC	No	0%	No	No	3	33 sec	22	18	\$33.00	93%
LC	No	10%	Yes	Yes	3	25 sec	31	24	\$11.20	na
LC	No	0%	No	No	5	38 sec	NA	NA	\$13.25	92%
LC	No	0%	No	Yes	4	38 sec	12	2	\$18.00	na
LC	No	4.8%	Yes	No	4	38 sec	31	29	\$20.70	96%
LC	No***	5%	No	No	3	25 sec	20	20	\$22.50	ce
LC	Yes	0%	No	Yes	3	50 sec	18	22	\$25.00	92%

\*LC = light cured,  
DC = dual cured

\*\* Activator available for self-cured composites.

\*\*\* Will be available in unit dose soon.

na = not available

ce = currently evaluating

Costs are listed for comparison only and are not used to calculate the ratings; all costs shown in U.S. dollars.

## Update: Self-etching Bonding Agents *continued*

### Clinical Hints

- Teeth can be moist or dry – avoid pools of water or over-drying.
- Hemostatic agents and caries detectors – If contamination of the etched tooth occurs, rinse profusely with water and reapply the self-etching bonding agent.
- Drying the primer – Follow manufacturer's recommendations for evaporating the solvent. Water does not evaporate quickly, so apply air more vigorously.
- Eugenol-based temporary restorations – Avoid eugenol-based provisional materials. Use a non-eugenol material.
- Bleaching agents – Residual oxygen from home or office bleaching inhibits polymerization of bonding agents. Wait one week after bleaching before a bonding procedure. Color of bleached tooth may rebound during this time as well.
- LED light-curing unit – Be sure the bonding agent is compatible with your light-curing unit (see product's compatibility sheet). Bonding agents with initiators other than CQ (camphorquinone) may not be adequately cured by LED lights.
- Post-operative sensitivity – self-etching bonding agents dissolve the smear layer without exposing dentinal tubules, thereby minimizing post-operative sensitivity.

### Use of Phosphoric Acid

Most manufacturers of self-etching bonding agents recommend the use of phosphoric acid to etch uncut enamel before application of the self-etching primer or self-etching adhesive. Even so, the improvement in bond strength may not be large. If the phosphoric acid also etches dentin, the bond strength of the self-etching adhesive to dentin may be reduced. This reduction may occur if the self-etching adhesive fails to completely penetrate the additional demineralized dentin produced by the phosphoric acid etch.

### Compatibility with Self-cured Composites

6th-generation – Type I bonding agents are generally compatible with self-cured composite cores or resin cements. A compatible adhesive is applied to the primed tooth before the composite is applied. 6th-generation – Type II and 7th-generation bonding agents are generally not compatible with self-cured composite cores or resin cements. The acidity of the bonding agent can interfere with the setting of the composite. ■

### Other Featured Products



**GC Unifil Bond**  
(GC America)



**OneCoat Self-Etching Bond**  
(Coltène/Whaledent)



**One-Up Bond F Plus**  
(Tokuyama Dental Corp./J. Morita USA)



**Tenure Uni-Bond with Gloss-n-Seal**  
(Den-Mat)



**G-BOND**  
(GC Corp.)