Kerr | Bonding Agents / **OptiBond All•In•One**

Technical Bulletin

OptiBond All•In•One

OptiBond® All-In-One is a single-component, light-cure, self-etch adhesive that combines all the ingredients needed for etching, priming and bonding into a single bottle, eliminating the need for separate steps in the bonding process. With no mixing required, this product has significantly simplified the restorative procedure, becoming more consistent and much less technique-sensitive. OptiBond All-In-One can be used for the bonding of both direct and indirect restorations. Delivery options come in the 100-pack Unidose® and Bottle Kit.

Features and Benefits

Features	Benefits
7th-generation adhesive	Single component – greatly simplifies the restorative procedure
Nano-etching	Provides high mechanical retention
Direct and indirect restorations	Excellent adhesion to enamel, dentin, porcelain and advanced ceramics – even indirect metal-based restorations only when used with NX3 resin cement
Nanofilled, fluoride releasing	High bond strength, minimized microleakage and sensitivity, prevention of secondary caries
Ternary solvent system	Water, acetone and ethanol provide effective enamel etching, enhanced material stability and uniform adhesive layer

Material Composition

Monomers

- Glycerol phosphate dimethacrylate (GPDM) – self-etching adhesive monomer
- Co-monomers including mono- and di-functional methacrylate monomers

Solvents – water, acetone and ethanol

Photo-initiator – camphorquinone (CQ)-based photo-initiator system

Fillers – three nano-sized fillers

Fluoride-releasing fillers – sodium exafluorosilicate and ylterbium floride

Key Differentiators

No additional components required – Ready right out of the bottle or Unidose device, no mixing necessary

Bond strength – Unique nano-etching delivers high mechanical retention for long-term bond durability

Ternary Solvent System – Provides enhanced shelf-life stability, nano-etching ability, and a homogeneous adhesive layer

Universal use – Excellent adhesion to enamel, dentin, porcelain and ceramics – even indirect metal-based restorations when used with NX3 – no separate dual-cure activator required

Minimized post-op sensitivity – Proven filled adhesive technology greatly reduces microleakage and postoperative sensitivity concerns

Releases fluoride – Not all 7th-generation self-etch bonding agents have this capability

Unidose device – Free-standing delivery device for ease-of-use

Independent bonding data – Available on kerrdental.com

OptiBond name – The most trusted name in bonding

Universal Applications

Tremendous flexibility enables OptiBond All-In-One to work for all indications, both direct and indirect. Key to this product's uniqueness is the ternary solvent system, which is comprised of three solvents – water, acetone and ethanol – providing superior bonding as a result of more effective enamel etching. Adhesive performance does not degrade over time, therefore material shelf-life stability is enhanced. A homogeneous adhesive layer maintains a uniform composition as solvents are removed during air drying. This reduces the chance for phase separation and bubble (void) formation known to occur in other brands.

Direct Restorations

Using Kerr's well-proven GPDM (glycerol phosphate dimethacrylate) adhesive monomer and filled adhesive technologies coupled with OptiBond All-In-One's unique ternary solvent system provides excellent adhesion to all dental substrates, including dentin, enamel, metal alloys (both precious and nonprecious), porcelain and advanced ceramic system such as zirconium oxide (e.g., Lava).

Bond Strength of Single-Component Self-Etch Adhesives to Human Dentin and Uncut Bovine Enamel

	Dentin	Uncut Enamel
OptiBond® All•In•One	35.0	28.2
Clearfil® S3 Bond	30.4	21.7
GBond™	10.3	23.0
iBond™	20.2	11.3
Xeno® IV	32.2	21.6

Study conducted by Dr. James Dunn of Loma Linda University: Direct bonding using light-cure Herculite XRV composite resin. Data available upon request.

Bond Strength of OptiBond All-in-One to Various Dental Substrates

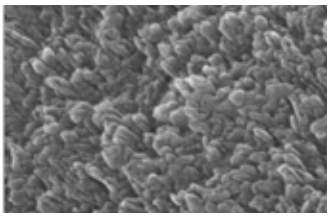
Dentin	Enamel	Porcelain	Zirconia (Lava)	Gold	Rexillium	Composite
36.5	25.9	29.6	29.7	28.5	34.2	28.3

Internal testing. Direct bonding using light-cure Herculite XRV composite resin. Data available upon request.

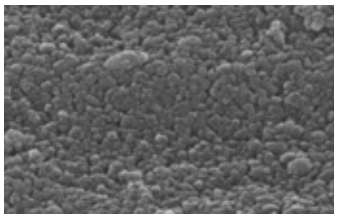
Indirect Restorations

Low film thickness (~5 microns) makes OptiBond All-In-One well-suited for indirect restorations since it will not interfere with final seating.

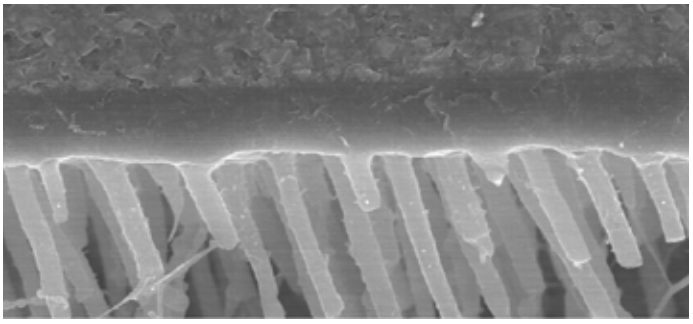
- Most light-cure or dual-cure resin cements (e.g. NX3 Nexus® Third Generation) can be used with OptiBond All-In-One adhesive to cement indirect restorations as long as there is good light accessibility.
- Indirect bond strengths to a variety of dental substrates are excellent.
- NX3 Dual-Cure, both in self-cure mode or dual-cure mode, is the only cement recommended for use with OptiBond All-In-One for indirect situations where there is little to no light accessibility. No dual-cure activation is needed for the adhesive



OptiBond All-In-One Adhesive – Magnification 50,000x



Competitive 7th-Generation Adhesive – Magnification 50,000x



This SEM photograph shows the composite, adhesive, and dentin bonding interfaces. Excellent monomer penetration into dentinal tubules shows well-defined resin tags.

Bond Strength of OptiBond All-in-One to Various Dental Substrates Using NX3 Cement*

Dentin	Enamel	Porcelain (VMK 95)	VitaBlocs® Mark II (Cerec)	Gold	Rexillium
32.6	26.7	27.2	29.3	23.1	25.2

Internal testing. Data available upon request.
*OptiBond All-In-One adhesive was light-cured. NX3 Cement was self-cured.

NX3, and OptiBond All-In-One

Chemistry incompatibilities between acidic adhesives and resin cements in dark-cure mode are well-documented in scientific research. Acidity levels of self-etch, single-component bonding agents are much higher than their total-etch predecessors. The redox initiator system in most resin cements is comprised of a BPO catalyst and a tertiary amine activator. Upon curing of the adhesive, there is an oxygen-inhibited layer on the surface. When the resin cement comes in contact with the adhesive in a self-cure or dark-cure mode, uncured acidic monomers within the oxygen-inhibited layer of the adhesive can neutralize the tertiary amine, adversely affecting the self-cure mechanism of the resin cement. The end result is poor adhesion at the adhesive/cement interface. In addition, phase separation occurs because most resin cements are rather hydrophobic and self-etch adhesives are rather hydrophilic, further compromising the adhesion. There is, however, a solution to this problem. When OptiBond All-In-One is paired with NX3, this incompatibility becomes nonexistent, resulting in greatly enhanced bond strengths for indirect self-cure indications. A proprietary redox initiator system is the reason behind NX3's unique features, making it acid-tolerant and enabling it to self-cure efficiently in the presence of acidic monomers. Because it is compatible with OptiBond All-In-One, NX3 is the only solution for situations where there is little to no light penetration.