

Application Guide

Intraoral repairs with iBOND® Universal

Giving a hand to oral health.



KULZER
MITSUI CHEMICALS GROUP

Content

01

The effectiveness of
intraoral repairs p. 04

02

Why iBOND Universal is ideal for
intraoral repairs p. 05

03

Intraoral repair of a silicate/glass
ceramic p. 07

04

Intraoral repair of a gold inlay p. 10

05

Intraoral repair of a composite
restoration p. 12

06

Intraoral repair of a porcelain-
fused-to-PFM bridge p. 14

FAQs

p. 17

Introduction

For a long time, repairs of restorations have had the touch of something unprofessional, something that should only have to last for a short period of time. Everybody tried it, somehow, but it was not talked about, as it was often anything but aesthetic and did not feel as state of the art. Thanks to universal adhesives as a new category in materials, new treatment options have opened up. These materials bond to a variety of different materials, enabling the dentist to repair defective restorations.

In addition, there is consensus in the international scientific community that restorations with localised defects should be repaired rather than replaced. This approach is truly minimally-invasive, as it preserves sound tooth structure that would otherwise be removed. Prof. Roland Frankenberger from the University of Marburg, Germany, an internationally reputed expert for adhesive dentistry, stated during the IAAD meeting 2017 that “the re-dentistry cycle kills more teeth than caries!”¹

Composite restorations have an average replacement time of 5.7 years.² Every replacement enlarges the cavity until at some point the pulp is affected. Post-operative complications can occur, eventually endodontic treatment may be necessary and possibly fail. When asked, patients favour minimally-invasive treatment. They prefer to avoid post-operative discomfort, endodontics and costly prosthetics or implants.

In the past, several studies have confirmed the longevity of restoration repairs.^{3,4,5} In 2013, an important review paper already gave recommendations on treatment decisions for imperfect restorations along with repair protocols.⁶

It can be summarised that restoration repairs should be the preferred treatment option for localised restorative defects. They save time, money and sound tooth structure for the patient. The dental office may benefit from satisfied patients and their word-of-mouth recommendation.

iBOND Universal supports dental practitioners perfectly in increasing the lifetime of restoration repairs.



Dr. med. dent. Janine Schweppe
Global Scientific Affairs Manager
Direct Restorations
Hanau (Germany), October 2017

A handwritten signature in black ink, appearing to read 'Janine Schweppe'.

01

The effectiveness of intraoral repairs

Did you know?

Localised restoration defects, such as fractures and chippings, often still result in the total replacement of the restoration. Yet, recent clinical studies show that repairs are a state-of-the-art treatment of localised restoration defects. They help preserve sound tooth tissue and prolong the restoration lifecycle, as every replacement destroys more sound tooth structure.



02

Why iBOND Universal is ideal for intraoral repairs

The biggest challenge with intraoral repairs lies in the compatibility of the adhesive to the different materials. Depending on the restoration, the adhesion must work on tooth surfaces and various dental materials.

iBOND Universal works on most dental materials with just one bottle. There will be no accidental mix-up of different repair kits for different materials. The universal bonding agent iBOND Universal allows dentists to repair defective direct and indirect restorations, damaged crowns and bridges in only a couple of minutes. The following sections show how that is done.



Your benefits at one glance

- iBOND Universal provides reliable and long-term bond strength with all dental materials to be repaired.
- No mixing-up of different repair kits. It works on most dental materials with just one bottle.
- No need to apply the hazardous hydrofluoric acid in the mouth of the patient; use iBOND Ceramic Primer intraorally for silanisation of silicate ceramic prior to iBOND Universal.
- Stand out from the competition by treating your patients minimally-invasively and at lower costs on a state-of-the-art quality level.



For more information on intraoral repairs with iBOND Universal visit:
www.kulzer.com/intraoral-repair



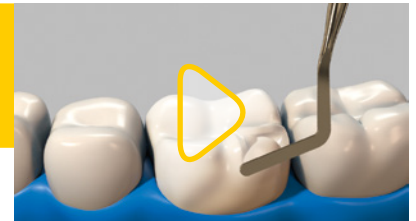
Watch the videos to learn more about intraoral repairs with iBOND Universal!



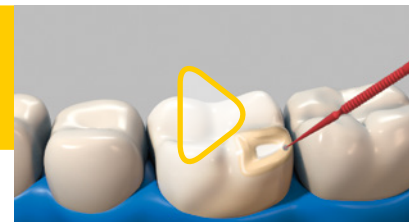
Explaining intraoral repairs with
iBOND Universal
www.kulzer.com/ibond-ior-video



Step-by-step intraoral repair of silicate/
glass ceramics
www.kulzer.com/ibond-ceramics-video



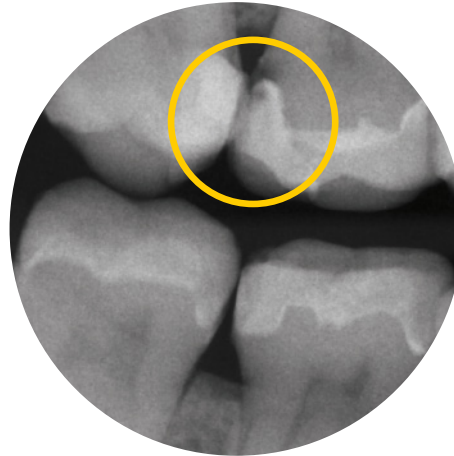
Step-by-step intraoral repair of
zirconia-based restorations
www.kulzer.com/ibond-zirconia-video



03

Intraoral repair of a silicate/glass ceramic

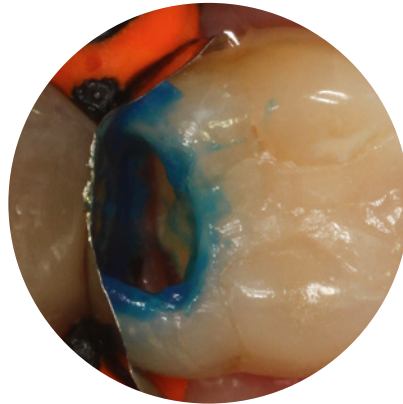
1. Clinical situation:
secondary caries at silicate
ceramic inlay 16 distal. Caries
caused by the restoration 17.
This restoration had a huge
void where food was trapped.



Restoration 17 showing the
massive discoloured void in
the mesial aspect of the
composite restoration. The
void was open towards the
interproximal surface.



2. Tooth 16 after excavation of massive caries underneath the silicate ceramic inlay. Restoration 17 was previously repaired, using iBOND Universal and resin composite. A tight sectional matrix was applied and adjusted to shape the restoration surface. The tight fit of the matrix enabled a proper contamination control. The ceramic was roughened by a fine diamond bur. Alternatively, an intraoral sandblasting of the ceramic surface can be done.



3. Selective enamel etching using iBOND Etch gel.



4. Silanisation of silicate ceramic surface only, using iBOND Ceramic Primer.

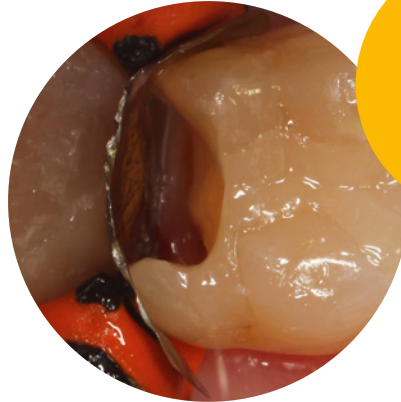


iBOND Ceramic Primer



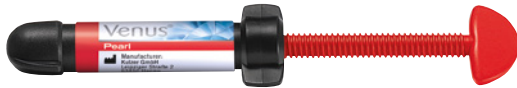
iBOND Universal

5. Glossy surface of entire cavity after application, air drying and light curing of iBOND Universal.



iBOND Universal

6. Final restoration of 17 and 16 using Venus Pearl immediately after treatment.



Venus Pearl – The nano-hybrid composite



iBOND Universal

- Enables tooth-preserving treatments.
- No need to use hazardous hydrofluoric acid intraorally on the glass/silicate ceramic.

04

Intraoral repair of a gold inlay

1. Clinical situation:
localised caries on gold inlay margin.



2. Excavated cavity after removal of caries. Bur-roughened inner metal surface. The metal surface can also be roughened by an intraoral sandblasting device.

3. Selective enamel etching of cavity. Ensure that the phosphoric acid does not touch the metal surface. This would lower the bond strength of the adhesive to the metal, as phosphoric acid leaves a cover of phosphate on the metal. In that case, the MDP-monomer which bonds via phosphoric groups to metal cannot bond directly to the covered metal.



Tip: Zirconia must not be etched using phosphoric acid either!



iBOND Universal

4. Glossy surface of entire cavity after application, air drying and light curing of iBOND Universal



5. Repair using Venus Diamond Flow.



Venus Diamond Flow – The flowable nano-hybrid composite



iBOND Universal

- Enables repairs of metal restorations such as inlays
- Thus avoids massive further costs of indirect restorations
- Preserves sound tooth tissue
- Supersedes the provision of several repairing kits for different materials.

05

Intraoral repair of a composite restoration



1. Clinical situation:
chipped composite restoration.



2. Roughening of broken surface
using a fine diamond bur.

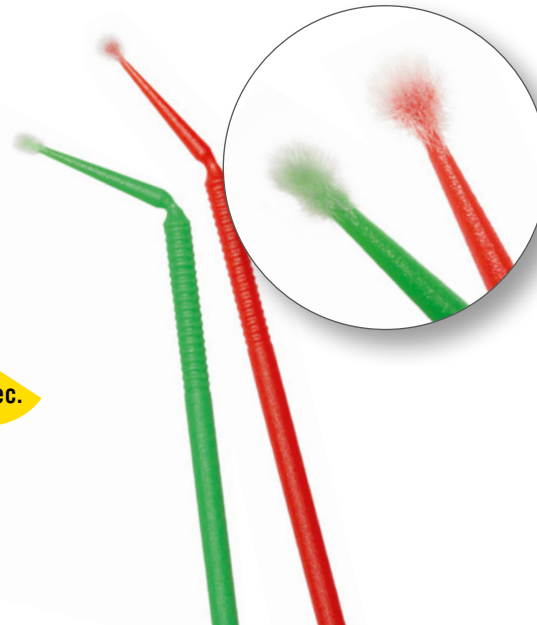


iBOND Universal



3. Application of iBOND Universal
by gently rubbing for 20 seconds.

20 sec.



Tip: Choose the applicator tips depending on the size of the cavity: Red for big cavities and green for smaller ones.



4. Restoration after application of Venus Pearl.



5. Finished and polished composite repair.

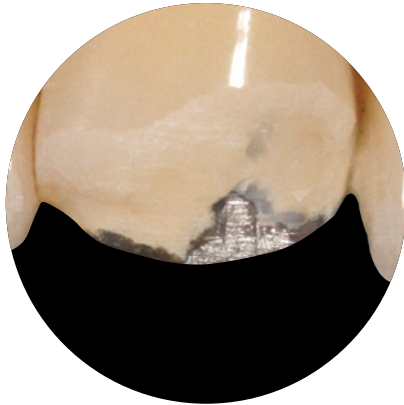


iBOND Universal enables

- Minimally invasive repairs of composite restorations
- Preservation of sound tooth structure
- The increase of the restoration longevity.

06

Intraoral repair of a porcelain-fused-to-PFM bridge



courtesy of U. Krueger-Janson, Frankfurt, Germany

1. Clinical situation:
chipping of the veneering ceramic of a porcelain-fused-to-metal bridge. The surface was treated by a fine diamond bur. Alternatively, the restoration surface can be sandblasted.

2. Sandblasted ceramic and metal surface.

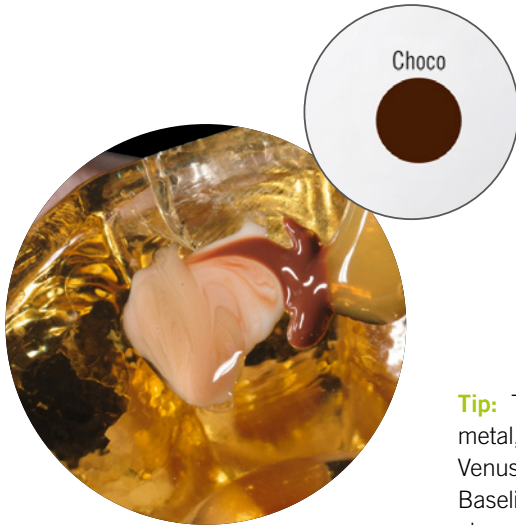
3. Silanisation with iBOND Ceramic Primer to get adhesion to glass/silicate ceramic. Followed by application, air drying and light curing of iBOND Universal.



Tip: Sandblasting is not mandatory but leads to better results in bond strength.



iBOND Ceramic Primer iBOND Universal



Tip: To mask the greyish metal, use a mixture of Venus Diamond Flow Baseline and Venus Color choco.





4. Masking the metal surface with a mixture of Venus Diamond Flow Baseline and Venus Color, shade choco.

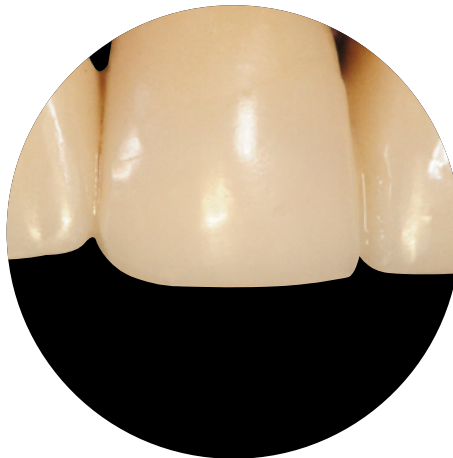


5. Layering of restoration using Venus Pearl and polishing.



iBOND Universal

- Enables repairs of indirect restorations (porcelain-fused-to metal or porcelain-fused to zirconia).
- Increases the longevity of the restoration.
- Avoids of unnecessary extensive costs for the patients.



6. Final restoration



iBOND Ceramic Primer



iBOND Universal

FAQs

Which surfaces can be bonded with iBOND Universal?

iBOND Universal can bond to the following surfaces: zirconia, precious and non-precious alloys as well as composites/composomers. To bond and repair silicate ceramics, apply iBOND Ceramic Primer to the fractured ceramic surface prior to iBOND Universal.

For which material does iBOND Universal require a primer (silane)?

iBOND Universal requires iBOND Ceramic Primer only on silicate/glass ceramics.

Why is a primer (silane) for silicate/glass ceramic required?

For the bonding to silicate ceramics the ceramic surface always needs to be pre-conditioned with an additional silane. Therefore, iBOND Ceramic Primer needs to be applied on the fractured ceramic surface prior to the application of iBOND Universal. An independent study from the University of Erlangen has shown that it is always recommended to silanise silicate ceramic surfaces with an extra silane to obtain higher bond strength when working with universal adhesives.⁷

Can I buy the Ceramic Primer separately?

Yes, iBOND Ceramic Primer (1x4 ml) is available as a refill (Art. code: 66061416).

In which repair situations can I use a phosphoric acid etchant prior to iBOND Universal?

Some dental practitioners clean restoration surfaces using phosphoric acid etchants prior to a repair. This may be done if the fractured surface is made of silicate/glass ceramic or composite. If the surface to be repaired is made of metal or zirconia, the surface must never be touched by phosphoric acid. Bonding to metal and zirconia surfaces is done through the phosphoric groups of the MDP-monomer which is also an ingredient of iBOND Universal. If the metal or zirconia surface previously came into contact with the phosphoric acid, the metal or zirconia surface will be covered with phosphate. This makes it impossible for the phosphoric groups of the MDP-monomer to bond to the metal and zirconia surface.

FAQs

When can I repair and when should I make a replacement?

A recently published review article from the University of Munich has defined 4 treatment options for defective restorations:

1. Monitoring of restorations in case of minor shortcomings as restoration discolouration or small marginal imperfections which do not bear disadvantages for the patient if left untreated.
2. Refurbishment of a restoration if the shortcoming can be adjusted without the need of adding new restoration material. Examples are removal of overhangs, polishing of discoloured margins, sealing of small voids or pores.
3. A repair is indicated if the restoration has localised shortcomings which require the addition of restorative material. A repair needs to be done, if the imperfections would lead to a deterioration if left untreated. Examples are localised caries adjacent to the filling margins, fractures of the restoration material or the surrounding tooth, marginal gaps.
4. A replacement is indicated if the restoration shows generalised or serious issues which require a treatment. Also, if the defect cannot be accessed completely or is not reasonable, a replacement of the restoration should be done. Examples for necessary replacements are massive caries or a variety of shortcomings on one tooth.⁸

What is the benefit of using the iBOND Universal system for intraoral repairs of silicate (glass) ceramics?

When placing indirect restorations made of silicate ceramic, the ceramic surface needs to be etched using hydrofluoric acid followed by the application of a silane such as iBOND Ceramic Primer.

The extraoral usage of hydrofluoric acid for etching the ceramics is safe. In contrast, the intraoral usage of hydrofluoric acid contains the risk of severe necrosis of mucosal tissue or even bone necrosis. When using hydrofluoric acid during an intraoral repair on silicate ceramics, tight fitting rubber dam needs to be applied and the acid needs to be handled with extra care.

Thanks to the iBOND Universal system, this risk can be avoided. Here the hazardous usage of hydrofluoric acid is not needed for intraoral repairs of silicate ceramics. The usage of iBOND Ceramic Primer followed by the application of iBOND Universal on the ceramic surface is sufficient.

What pre-treatment is necessary to the preparation and/or tooth when repairing a restoration?

Roughen the surface of the substrate to be repaired using a fine diamond bur or sandblasting. Rinse thoroughly and dry with an oil-free air flow. In case of silicate and glass ceramics, the restoration surface needs to be pre-treated with iBOND Ceramic Primer.

Apply iBOND Universal subsequently in a gentle rubbing motion for 20s, air dry and light cure for 10s prior to the application of the composite.

What happens if iBOND Ceramic Primer accidentally comes into contact with the tooth surface?

Do not apply iBOND Ceramic Primer on enamel or dentine as it reduces the bond strength to the tooth. Use a thin brush (for example our green applicator tip) for applying it on the restoration in narrow cavities. If accidentally the tooth surface is contaminated by iBOND Ceramic Primer, rinse it off with water-air stream before starting the bonding procedure as described in the instructions for use.



Further product information on iBOND Universal
www.kulzer.com/ibond

¹ Frankenberger R: Lecture at the Meeting of the International Academy for Adhesive Dentistry in Philadelphia, PA, USA, June 2017.

² National Institute of Dental and Craniofacial Research: Increasing the Service Life of Dental Resin Composites.
https://www.nidcr.nih.gov/grantsandfunding/See_Funding_Opportunities_Sorted_By/ConceptClearance/CurrentCC/DentalResinComposites.htm

³ Fernandez E *et al.*: Can repair increase the longevity of composite resins? Results of a 10-year clinical trial. *Journal of Dentistry* 43 (2015): 279-86.

⁴ Martin J *et al.*: Minimal invasive treatment for defective restorations: five-year results using sealants. *Operative Dentistry* 38 (2), 2013:125-33.

⁵ Gordan VV *et al.*: Repair or replacement of restorations: a prospective cohort study by dentists in The National Dental Practice-Based Research Network. *JADA* 246 (12), 2015: 895-903

⁶ Hickel R *et al.*: Repair of restorations – Criteria for decision making and clinical recommendations. *Review. Dental Materials* 29 (2013): 28-50

⁷ Zorzin J, Wendler M, Belli R, Petschelt A, Lohbauer U: Tensile bond strength of universal adhesives to lithium disilicate ceramic. Poster 62 at the European Dental Materials Meeting, 2015.

⁸ Hickel R, Brühshaver K, Ilie N: Review. Repair of restorations – Criteria for decision making and clinical recommendations. *Dent Mat* 29, 2013:28-50.

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