

3M Science.
Applied to Life.™

Ketac™ Universal Glass Ionomer Restorative

Technical Data Sheet



Introduction

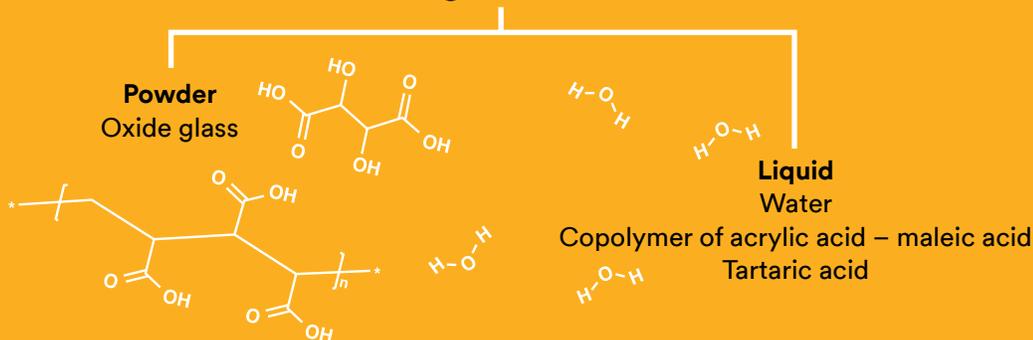
Ketac™ Universal Glass Ionomer Restorative is the latest development in a long history of proven glass ionomer technology from 3M. It's designed to save steps for a faster procedure, so it's ideal for treating pediatric, geriatric and teenage patients—who can be the most caries-prone and the most restless. Ketac Universal restorative offers low stickiness for easy handling AND reduces chair time with a simple 1-step placement ... so you can finish faster. The material can be used without preconditioning the cavity and without a coating, so it eliminates steps—yet still delivers compressive strength and surface hardness that are higher than several clinically proven glass ionomers which require a coating. Ketac Universal restorative is mixed by hand to initiate the acid-base setting reaction of the glass ionomer. The powder in the vial is not prone to humidity. The material is indicated for an extended range of indications, making it a universal solution for the dental practice.

Indications for Use¹

- Linings for single- and multiple-surface composite fillings
- Core build-up prior to crown placement
- Primary tooth fillings
- Stress-bearing Class I restorations with at least one additional support outside of the filling area
- Stress-bearing Class II restorations when the isthmus is less than half of the intercuspal distance and with at least one additional support outside of the filling area
- Cervical fillings, if aesthetics is not the prime consideration
- Single- and multiple-surface temporary fillings
- Fissure sealing

Composition

Ingredients*



BPA free

None of the ingredients present in the composition of Ketac™ Universal Glass Ionomer Restorative are BPA or substances using the BPA backbone in their structure. There are no BPA derivatives present, either.

Shades

Ketac Universal restorative is available in 6 shades: White, A1, A2, A3, A3.5 and A4.

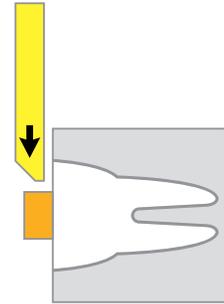


*Refer to MSDS for more information

¹See the Instructions For Use

Adhesion

To evaluate the influence of the conditioning step, adhesion was tested with and without a conditioner. Bond strength on human teeth was measured using a Shear Bond Test. The material was cured on exposed human enamel/dentin. Specimens were then kept at a relative humidity of over 95% for 24 hours. Adhesion was subsequently tested in a universal testing machine cell until failure.



Bond Strength to Enamel and Dentin of Ketac™ Universal Glass Ionomer Restorative

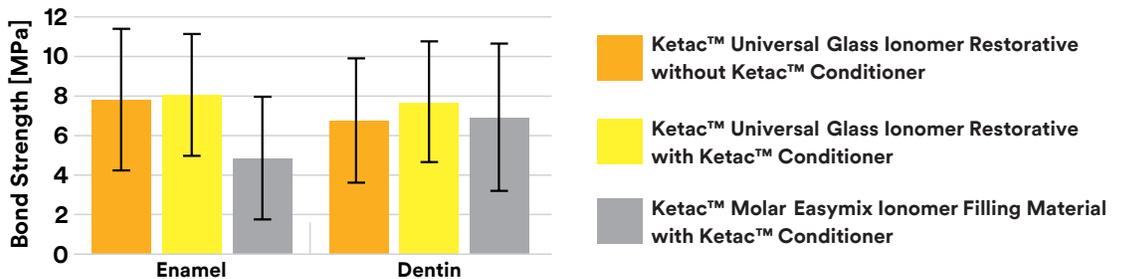


Figure 1: Adhesion to enamel and dentin. The adhesion values of Ketac™ Universal Glass Ionomer Restorative without a conditioner are comparable to the adhesion values of Ketac™ Universal restorative and Ketac™ Molar Easymix Ionomer Filling Material Restorative with a conditioner. Therefore, the application of a conditioner prior to placement of Ketac Universal restorative is not necessary.

Source: 3M internal data

Ketac™ Universal Glass Ionomer Restorative offers comparable adhesion values whether used with or without a conditioner, so a conditioner is not necessary.



The results are in line with multiple in vivo and in vitro studies, which have shown that using a conditioner does not necessarily improve the adhesion of glass ionomers to the natural tooth structure. Literature shows that application of a conditioner prior to placement of the filling is successful in removing the “smear” layer. However, this step is not necessary, possibly because there is adequate free acid in glass ionomers to dissolve the smear layer at the time of the restoration placement.*

*One-year survival of occlusal ART restorations in primary molars placed with and without cavity conditioner. Yassen G. J Dent Child 2009; 76:136-141.

Four-year evaluation of the effect of 10% polyacrylic acid or water rinsing pretreatment on retention of glass polyalkenoate cement. J. W. V. van Dijken. Eur J Oral Sci 1996; 104:64-66.

The effect of dentine conditioning with polyacrylic acid on the clinical performance of glass ionomer cement—3-year results. M. J. Tyas Aust Dent J. 1994; 39:220-221.

Influence of acid etching on shear strength of different glass ionomer cements. C. C. Bortoletto, W. G. Junior Miranda, L. J. Motta, S. K. Bussadori Braz J Oral Sci. 2013; 12: 11-15.

Strong enough for stress-bearing indications

A faster, easier procedure is great—but you want assurance that reducing chair time doesn't mean compromising on performance. Ketac™ Universal restorative saves time by eliminating the need for a coating—yet still delivers compressive strength and surface hardness that are higher than several competitive glass ionomers which require one.

Compressive Strength

Compressive strength is particularly important because of chewing forces. To test this, simultaneous forces are applied to the opposite ends of a rod-shaped sample of material. The sample failure is a result of shear and tensile forces.

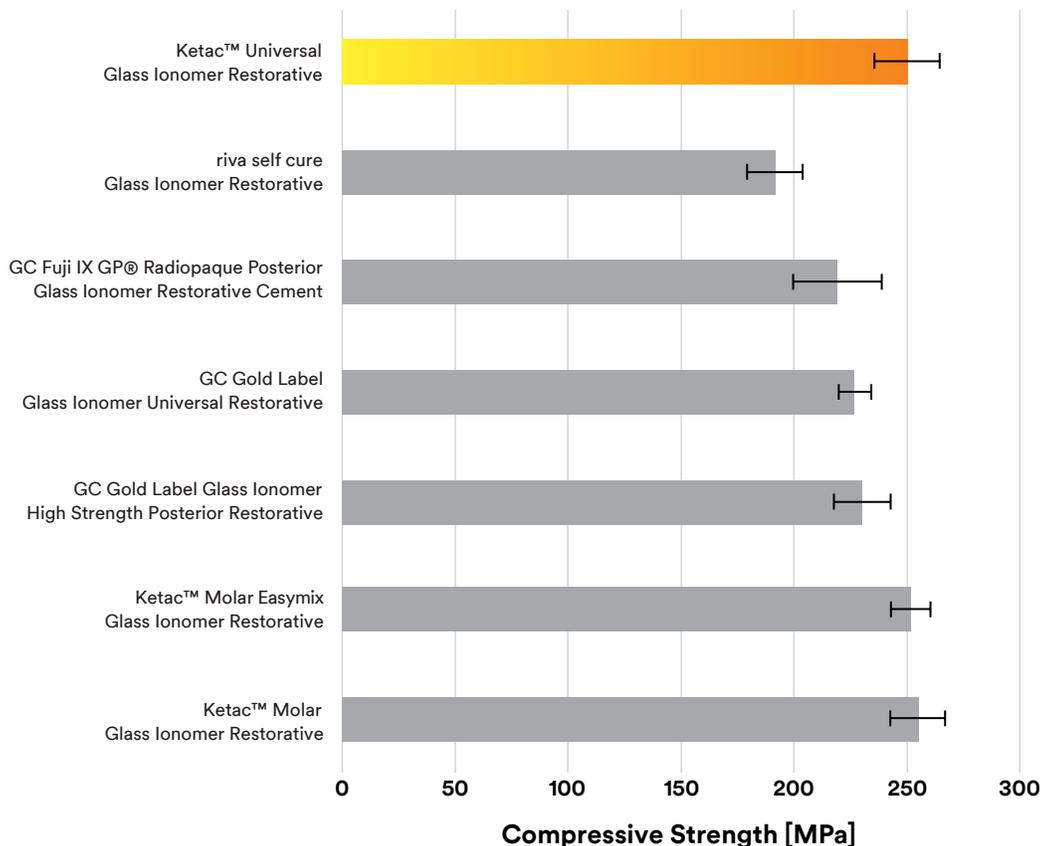
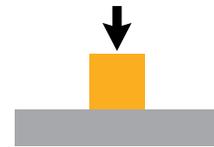


Figure 2: Compressive strength of common glass ionomer restoratives

Source: 3M internal data



The compressive strength of Ketac™ Universal restorative is higher than several competitive glass ionomer restoratives (GC Fuji IX GP, GC Gold Label Universal Restorative, riva self cure Glass Ionomer Restorative) and comparable to GC Gold Label High Strength Posterior Restorative, Ketac™ Molar Glass Ionomer Restorative and Ketac™ Molar Easymix Glass Ionomer Restorative.

Surface Hardness

Surface hardness was measured on disc-shaped specimens (diameter: 6 mm) 24 hours after mixing the restorative. A testing machine with a ball-shaped indenter (diameter: 5 mm) was used. Samples were loaded with a force of 357.9 N for 30 seconds. Thereafter, depth of penetration was measured and the surface hardness calculated.

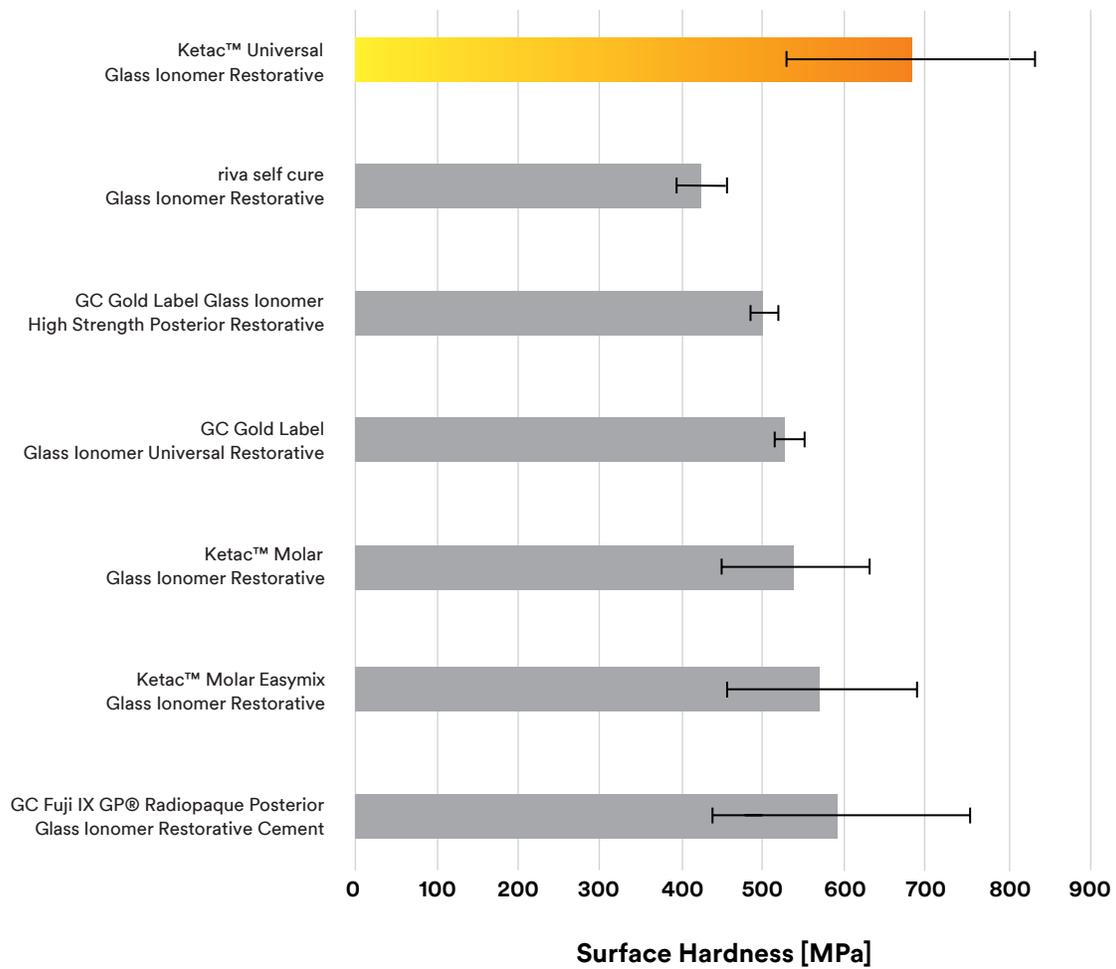
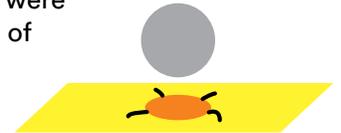


Figure 3: Surface hardness of common glass ionomer restoratives

Source: 3M internal data



The surface hardness of Ketac™ Universal restorative is higher than riva self cure Glass Ionomer Restorative and comparable to all other restorative materials shown in the graph (GC Fuji IX GP, GC Gold Label Universal Restorative, GC Gold Label High Strength Posterior Restorative, Ketac™ Molar Glass Ionomer Restorative and Ketac™ Molar Easymix Glass Ionomer Restorative).

Humidity Tolerance

Powders for glass ionomer restoratives that are mixed by hand are usually stored in glass vials. Depending on the geographic region and individual climate conditions in dental offices, the glass ionomer powder can be exposed to humidity by opening and closing the glass vials. The air in the glass vial is at least partly exchanged with humid air from the surroundings. Water uptake by the powder can have an effect on the mixing and curing properties of the glass ionomer restorative, making it harder to mix and accelerating the curing process of the paste.

To simulate a long-term use in a dental office with high humidity, samples were stored in open glass vials at elevated temperatures (30°C/86°F) and high humidity (relative humidity 80%). Humidity tolerance was determined by measuring the uptake of water relative to the original mass of the powder. The lower the relative uptake of water, the more resistant the glass ionomer powder was to humidity.

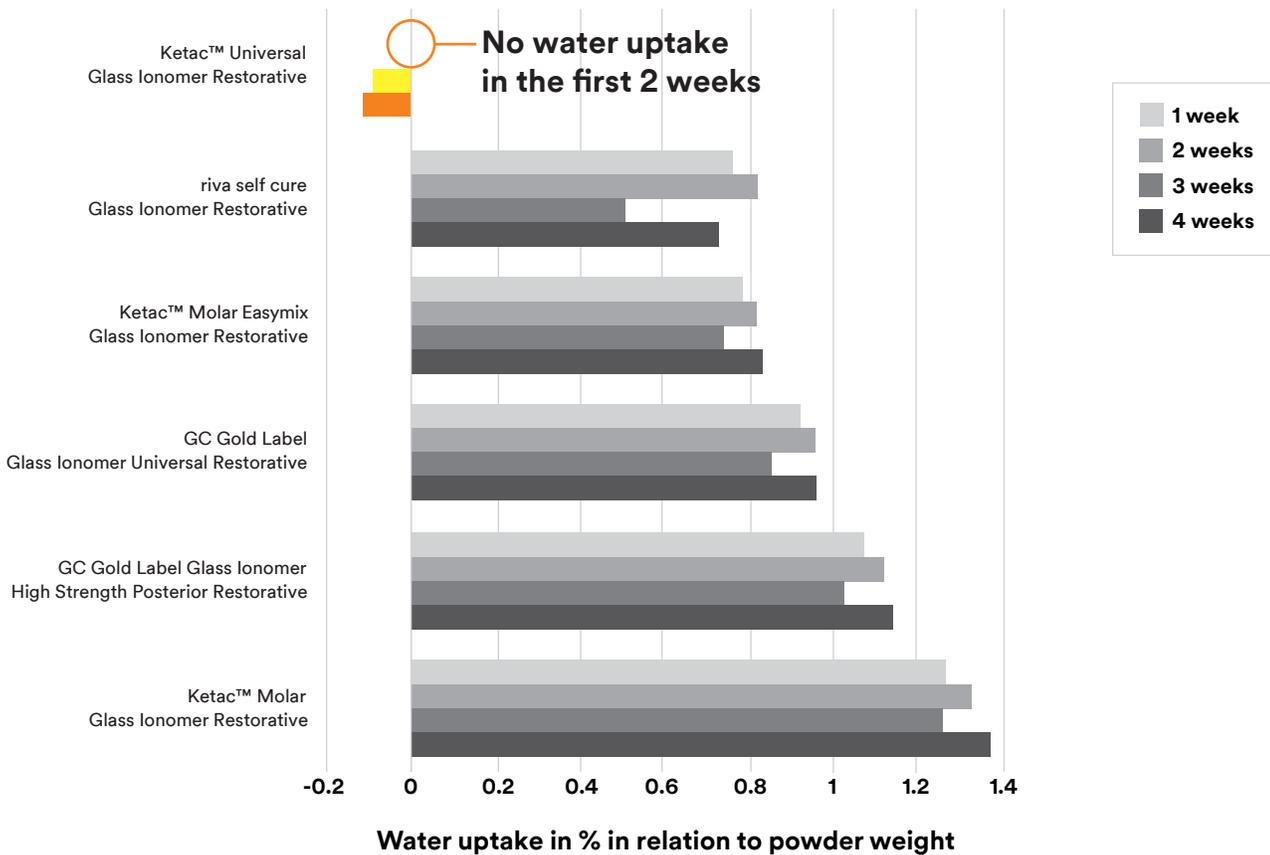


Figure 4: Water uptake by different glass ionomer powders over 1, 2, 3 and 4 weeks

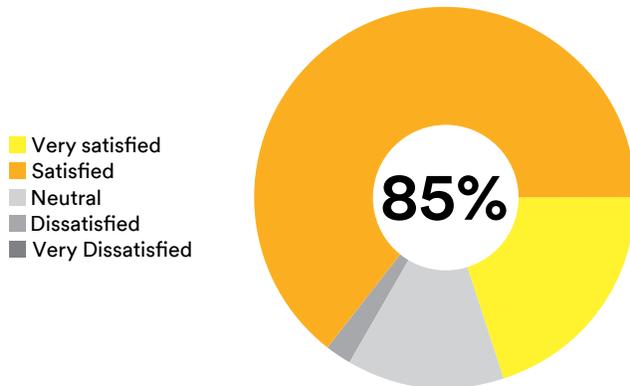
Source: 3M internal data



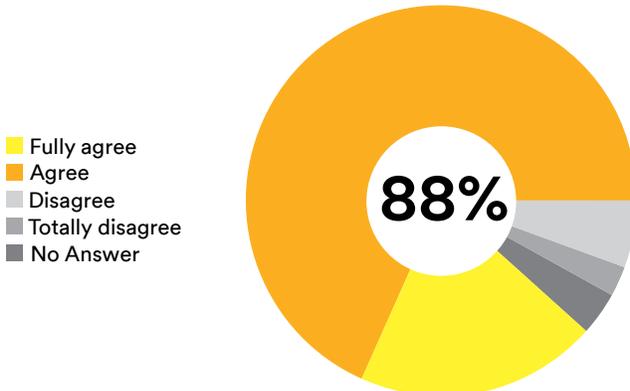
Ketac™ Universal Glass Ionomer Restorative powder is not prone to humidity. As can be seen in the graph above, there is no water uptake by the Ketac Universal restorative powder. The other materials tested show a higher increase in weight, hence an uptake of water.

Handling

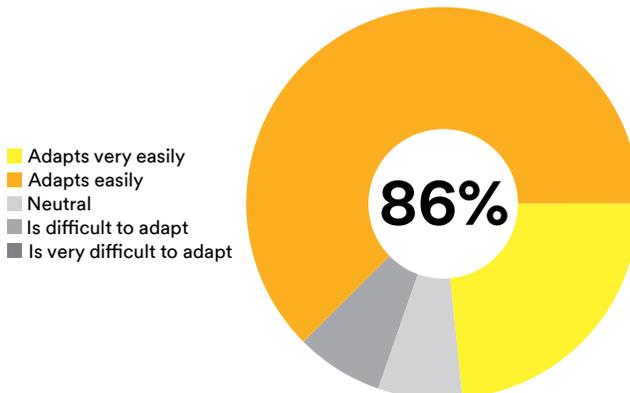
3,510 restorations were placed by 59 dentists from Poland and India using Ketac™ Universal Glass Ionomer Restorative in their offices. The dentists then evaluated the in vivo performance of the material after the trial period of six weeks.



85% of dentists who used Ketac Universal restorative clinically are satisfied with the overall handling of the material.



According to 88% of dentists who evaluated Ketac Universal restorative clinically, Ketac Universal restorative enables an easy one-step bulk placement.



86% of dentists who used Ketac Universal restorative clinically felt that the material easily adapted to the cavity walls.

Source: 3M internal data

www.3M.com



3M Oral Care
2510 Conway Avenue
St. Paul, MN 55144-1000 USA
Phone 1-800-634-2249
Web 3M.com/dental

3M Deutschland GmbH
Location Seefeld
3M ESPE • ESPE Platz
82229 Seefeld • Germany
Info3MESPE@mmm.com
www.3MESPE.com

3M, ESPE and Ketac are trademarks of 3M or 3M Deutschland GmbH. Used under license in Canada. Printed in (Country). © 3M 2016. All rights reserved. All other trademarks are not trademarks of 3M.