Adhesive Resin Cements

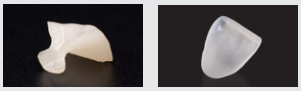
Simplicity is key

GC's adhesive resin cement solutions

G-CEM® Veneer

Light-cured adhesive resin cement

Applications



For indirect restorations with thin thickness (<2mm) that enables the use of a purely light-cured mode.

G-CEM LinkForce®

Dual-cure adhesive resin cement

Applications

One PRIMER, **One** BOND, **Two** CEMENTS

G-Multi PRIMER

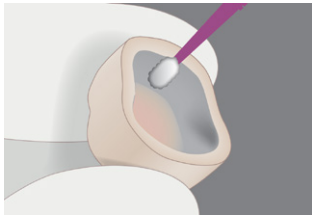
G-Premio BOND

G-CEM LinkForce
G-CEM Veneer

G-Multi PRIMER

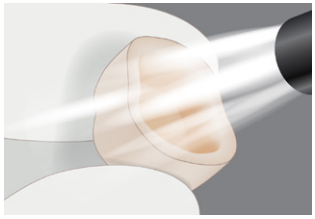
One primer for all substrates

G-Multi Primer uses three different chemical bonding agents to ensure perfect adhesion in all situations to all substrates. By adding silane to the primer (and not to the dentine adhesive), stability of adhesion is assured.[1]



Simple application

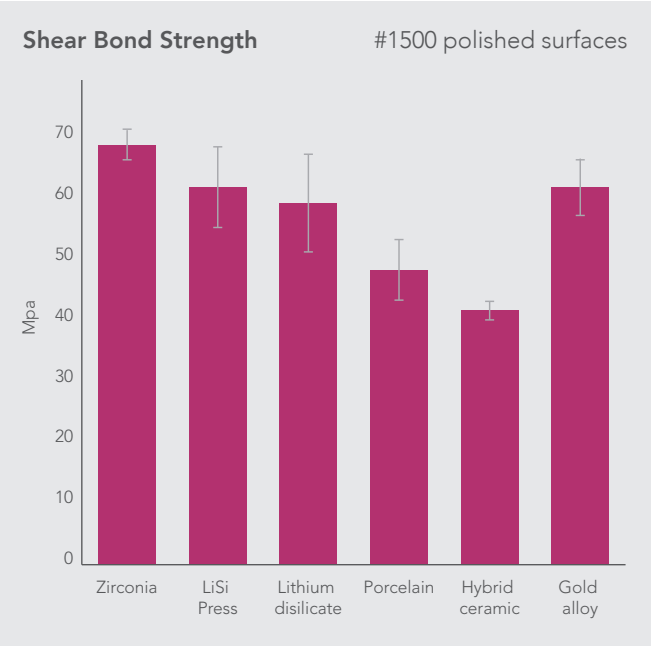
- Apply and air dry, no waiting
- Same procedure for all substrates, no confusion



Stabilised formulation

- No refrigeration
- 2-year shelf life

Strong chemical bonding to all substrates



R&D Dept. GC Corporation. Data on file [ISO 11405: 2003 Bond strength] available from info.australasia@gc.dental.

Measuring chemical bonding capabilities

The chemical bonding capabilities of G-Multi PRIMER are measured by testing adhesion to highly polished substrate surfaces without using mechanical retention. This chemical bonding potential is achieved in addition to the micro-mechanical adhesion provided by prior surface treatment e.g. AlO_2 sandblasting. Adhesion durability is best achieved with a combination of chemical bonding and micro-mechanical retention.

MDP: 10-methacryloyloxydecyl dihydrogen phosphate

MDTP: 10-methacryloyloxydecyl dihydrogen thiophosphate

Case study

CERASMART™ hybrid ceramic bonded with G-CEM LinkForce

LINK 1: G-Multi PRIMER to the prepared indirect restoration

After trial fit, the CERASMART onlay is cleaned.

Pre-treat with 5% HF (Hydrofluoric acid) for 60 secs.

Clean with water and dry.

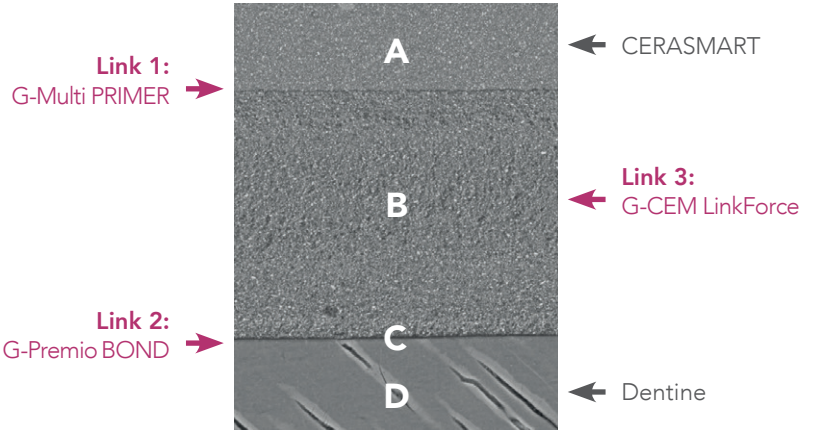
Brush apply a thin layer of G-Multi PRIMER to create a durable chemical bond. Dry with an air syringe.

Clinical images courtesy of Dr Anthony Mak, Australia

Strong, reliable and consistent

G-CEM LinkForce is a universal resin cement solution built on **three strong links** that ensure consistent and reliable adhesion.[2]

This interface is shown in the adjacent SEM picture of CERASMART hybrid ceramic treated with G-Multi PRIMER (A), bonded to dentine (D) using G-Premio BOND (C) and G-CEM LinkForce (B).



R&D Dept. GC Corporation

G-Premio BOND

One universal bonding agent

Featuring three functional monomers in a proven formulation, G-Premio BOND delivers a no-compromise adhesive performance to all prepared tooth surfaces including liners and composite or metal cores.

Convenient application

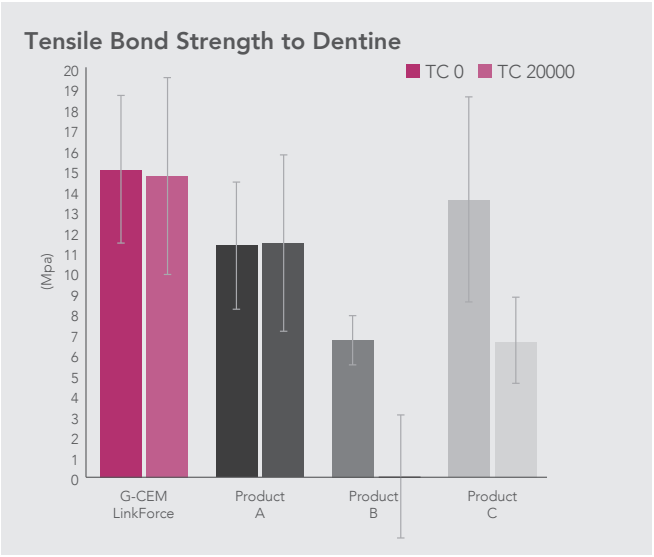
- Suitable for all etching techniques[3]
- Visible when applied, invisible after curing

Stronger bond layer

- High-density, single- dispersion nanofiller
- HEMA-free to resist breakdown and discolouration[6]
- Low 3µm film thickness

Self Etch | Total Etch | Selective Etch

Strong dentine bonding



R&D Dept. GC Corporation. Data on file [ISO 11405: 2003 Bond strength] available from info.australasia@gc.dental.

Fluid consistency

- Exceptional wetting characteristics
- Rapid chemical bonding
- Quick and easy application

Optional dual-cure mode

- When selecting dual-cure mode, mix DCA (Dual Cure Activator) with G-Premio BOND in a 1:1 ratio

Stabilised formulation

- No refrigeration
- 2-year shelf life

Case study

CERASMART hybrid ceramic bonded with G-CEM LinkForce

LINK 2: G-Premio BOND applied to the prepared tooth

Selective etch of enamel, rinse and dry.

G-Premio Bond was applied to the prepared enamel, dentine and composite liner and left for 10 secs.

The surface was then dried with maximum air pressure for 5 secs to remove all water from the bond layer and light-cured for 10 secs.

Clinical images courtesy of Dr Anthony Mak, Australia

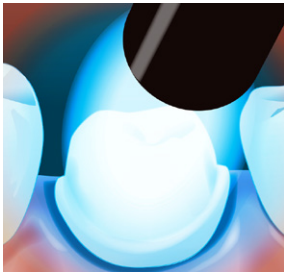
Light-cure mode

A quick and convenient option is to simply apply G-Premio BOND and light-cure.

This immediately seals the dentine, and the low film thickness of just 3µm ensures that there is no risk of the bond thickness compromising fit.

Apply G-Premio BOND, wait for 10 secs.

Dry with MAXIMUM AIR PRESSURE for 5 secs.

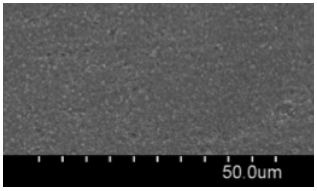


Light-cure for 10 secs.

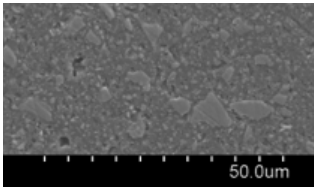
G-CEM LinkForce dual-cure adhesive resin cement

Strength and aesthetics

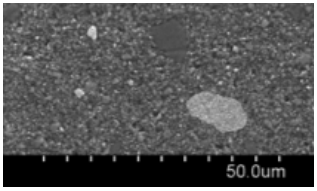
G-CEM LinkForce provides durable retention and long term margin aesthetics through enhanced dual-cure polymerisation systems and incorporation of high-density, single-dispersion glass filler technology.[4]



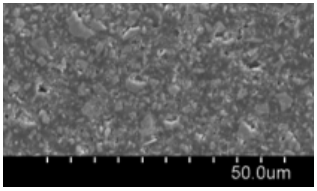
G-CEM LinkForce



Product A



Product B



Product C

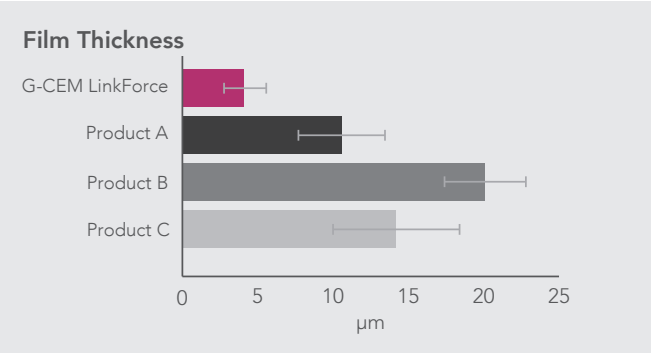
Consistent handling and clean up

The extruded excess G-CEM LinkForce has minimal slump, so after 1-2 secs tack-curing, excess cement is simple to remove, breaking cleanly from the margins.

Clinical image courtesy of
Dr Yoshikazu Kawamoto, Japan

Very low film thickness

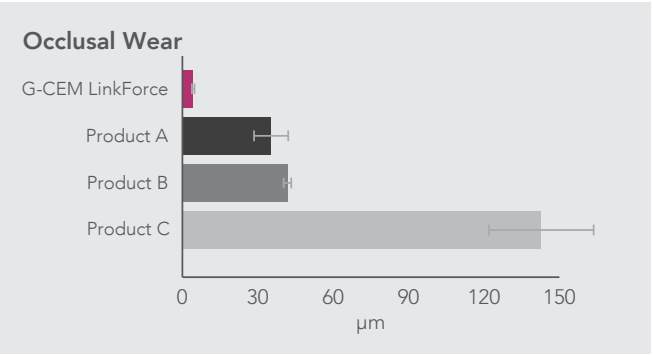
- Just 4µm
- Excellent adaptation



R&D Dept. GC Corporation. Data on file [ISO 4049:2000 Film thickness] available from info.australasia@gc.dental.

High strength and wear resistance[4]

- High-density, single-dispersion glass fillers
- Excellent polish
- Less chance of plaque retention



R&D Dept. GC Corporation. Data on file [ISO 4049:2000 Occlusal wear] available from info.australasia@gc.dental.

Case study

CERASMART hybrid ceramic bonded with G-CEM LinkForce

LINK 3: G-CEM LinkForce

G-CEM LinkForce is applied to the internal surface of the CERASMART onlay.

After seating, light-cure for 1–2 secs. Excess is removed.

Apply air barrier (optional) and light-cure all surfaces.

CERASMART onlay bonded with G-CEM LinkForce.

Clinical images courtesy of Dr Anthony Mak, Australia

Consistency in aesthetics

Available in a range of 4 shades, with tooth-like fluorescence, convenient automix delivery and matching Try-In Pastes. When bonding veneers, or for more aesthetically demanding applications, there is a clear path to follow for shade checking and achieving predictable aesthetic outcomes.

Translucent
(clear translucent)

Perfect for very thin restorations to preserve the original shade.

A2
(A2 translucent)

The standard for luting most of your prostheses.

Opaque
(universal opaque)

Used to mask discoloured substrates when needed.

Bleach
(bleach opaque)

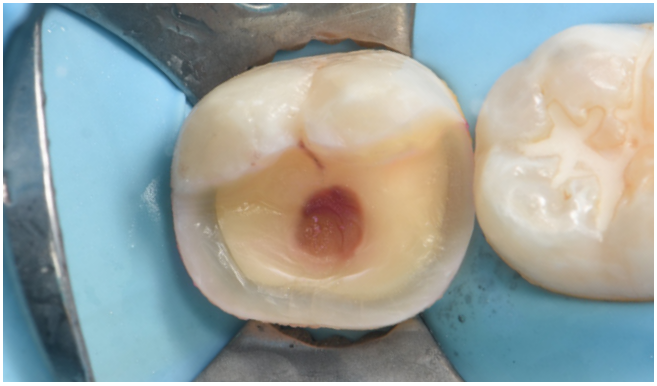
Adapted for ultra-white restorations to increase opacity and value.

G-CEM LinkForce – simple application steps

1. Before

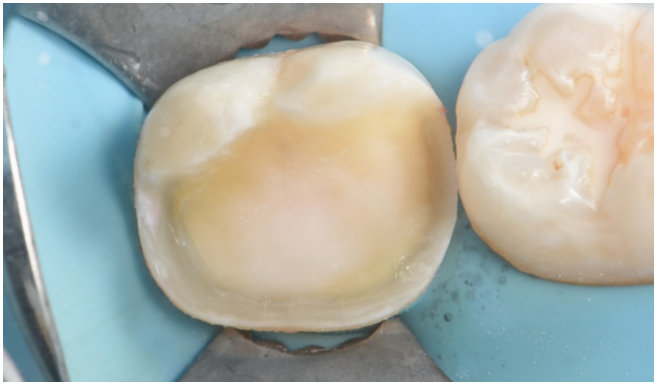
Defective occlusal filling and cracked tooth exhibiting symptoms of pain on biting.

2. Tooth preparation



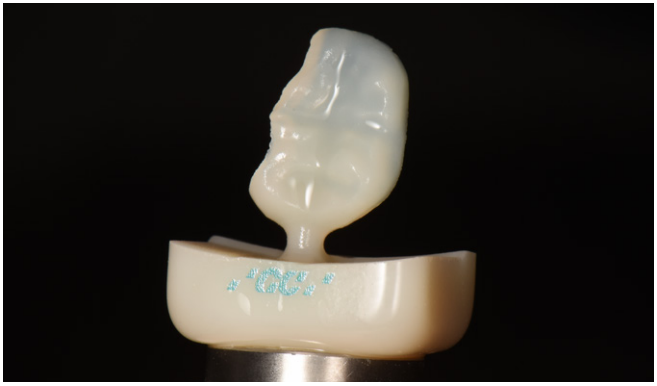
Secondary caries and crack removal with conservation of buccal cusps.

3. Immediate dentine sealing



Immediate dentine sealing and resin coat with GC G-ænial Universal Injectable.

4. Fabrication of the partial coverage crown

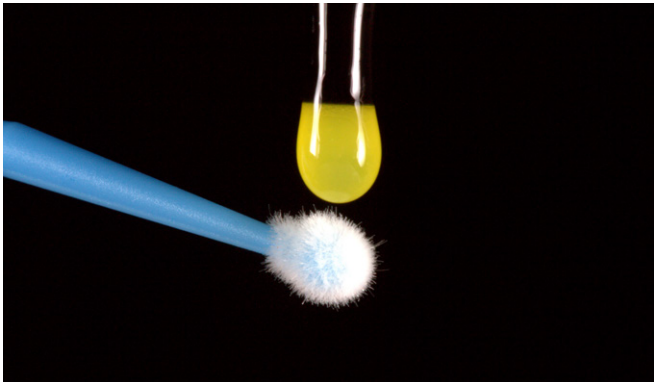


Milled partial coverage GC Initial LiSi Block.

5. Pre-treatment

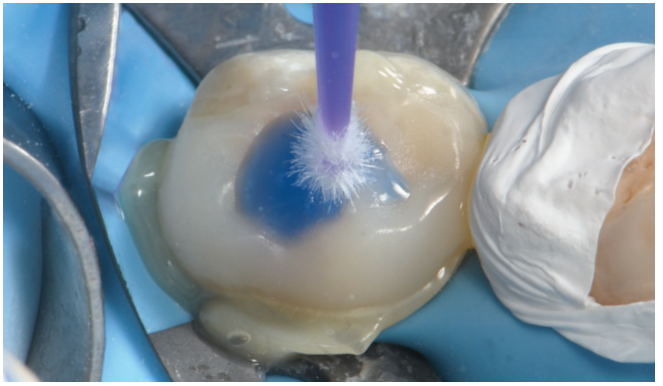
Surface treated with hydrofluoric acid etch and G-Multi PRIMER.

6. Apply G-Premio BOND



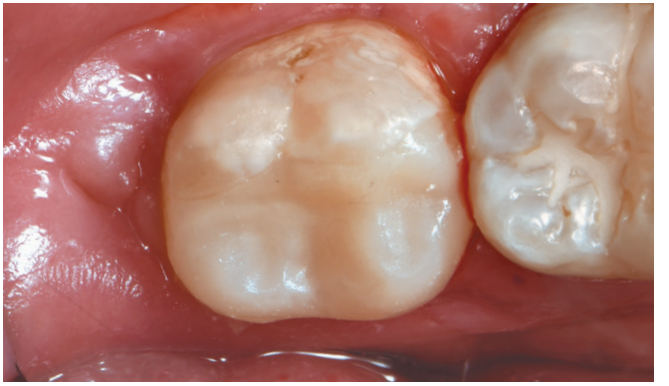
Tooth treated with air abrasion, selective enamel etch and G-Premio BOND.

7. Cementation



G-CEM LinkForce applied to intaglio surface of restoration and seated.

8. Final



GC Initial LiSi partial coverage restoration adhesively bonded.

Clinical images courtesy of Dr Reina Yang, Australia

G-CEM Veneer light-cured adhesive resin cement

G-CEM Veneer: predictable aesthetics, high mechanical properties and unique flow.*

G-CEM Veneer has all the ingredients to deliver a stunning result for a confident smile. The secret is in its optimally balanced formula with **Full-coverage Silane Coating (FSC) technology**. This innovative filler treatment allows a high filler rate to be achieved with homogeneous repartition of fillers in the matrix. The result: **unique handling and excellent physical properties**.*

Excellent polymerisation*

G-CEM Veneer can be efficiently light-cured through restorations <2 mm with sufficient translucency. Indicated for composite and ceramic veneers, inlays and onlays.

Extremely wear-resistant*

The smooth and glossy surface is maintained over time due to high wear resistance, preventing marginal gap formation, and withstanding discolouration. The FSC technology and improved matrix prevent particle loss ensuring a homogeneous distribution of the fillers.

Low film thickness

The benefit of combining strength with the perfect flow: a high-quality fit, without the need for preheating!

* Data on file [ISO 4049:2000 Depth of cure, 3-body wear, Flexural strength] available from info.australasia@gc.dental.

Advantages of thixotropy

- G-CEM Veneer stays in place when untouched, but is fluid when put under pressure.
- G-CEM Veneer covers the entire surface of a restoration uniformly without voids, while the film thickness is kept to a minimum.
- G-CEM Veneer is not sticky; it is easy to apply with high precision and it allows easy excess removal.
- G-CEM Veneer's unique consistency allows for an optimally balanced flow, without the need for preheating.
- G-CEM Veneer is well suited for the cementation of aesthetic restorations and offers high colour stability.

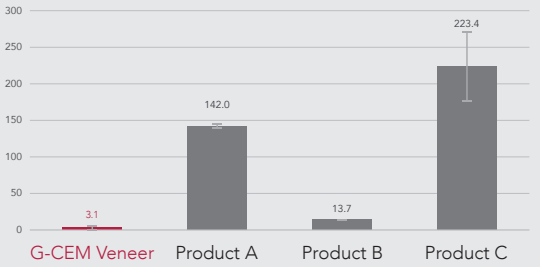
G-CEM Veneer

Competitor

Bond strength to enamel (MPa) before and after thermocycling (20 000 cycles)

Source: GC R&D, Japan. Data on file [ISO 4049:2000 Bond strength] available from info.australasia@gc.dental.

Three-body wear (µm)

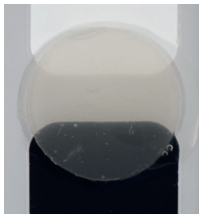


Source: GC R&D, Japan. Data on file [ISO 4049:2000 3-body wear] available from info.australasia@gc.dental.

G-CEM Try-in Paste

The shades of G-CEM Try-in Paste perfectly match the four shades of G-CEM Veneer and G-CEM LinkForce. They are water-based for easy removal after application.

A2
The standard for luting most of your prosthetic pieces.



Translucent
Designed for very thin restorations to preserve the natural shade.

Opaque
Used to mask discoloured substrates when needed

Bleach
Used to increase opacity and brightness when pearly white teeth are desired.

G-CEM Veneer – simple application steps

1. Before

Four aesthetic shades

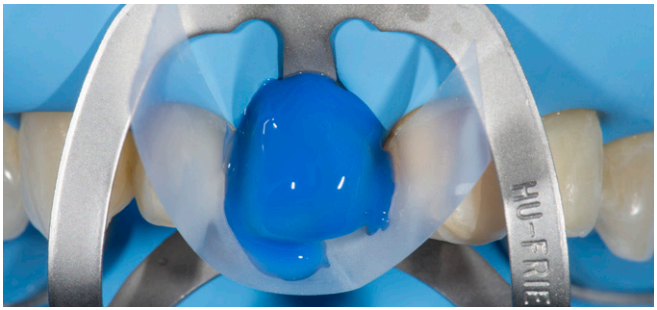
G-CEM Veneer comes in four different shades. They were carefully selected to cover all aesthetic needs.

2. Restoration try-in

Predictable shade integration

With the use of G-CEM Try-in Paste, you can easily predict the final colour match. It helps in selecting the correct shade and opacity.

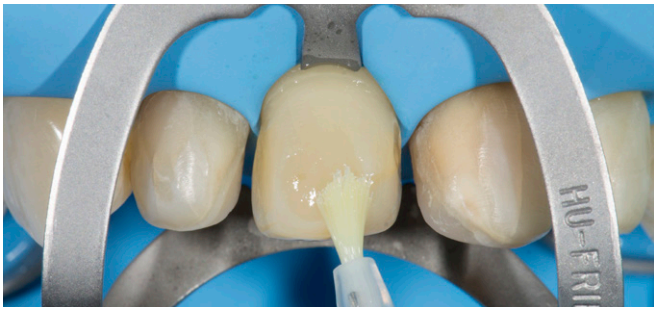
3. Preparation etching



Choose your etching mode

Etch the enamel margins or use a total-etch approach for minimal preparations that are localised mainly in the enamel.

4. Apply G-Premio BOND



Bonding to all substrates

G-Premio BOND is purposely designed to bond to all substrates.[5] It is separately cured with a very low 3µm film thickness and it does not interfere with the seating of the restoration.

5. Apply G-Multi PRIMER

Bonding to all restorations

After correct pre-treatment (etching or sandblasting), G-Multi PRIMER ensures stable adhesion* to all aesthetic restoratives.

6. Cementation

Precise application

Thixotropy and long working time allow for precise application.

7. Excess removal

Easy clean-up

Tack-curing for 1-2 seconds before removal is optional. After the final light curing, margins can be easily finished and polished to a high gloss to minimise plaque retention.

8. Final

Durable outcome

High colour stability combined with excellent mechanical properties: a high-quality, durable and aesthetic fit.*

* GC R&D. Data on file [ISO 11405: 2003 Bond strength] available from info.australasia@gc.dental.

Clinical images courtesy of Dr. J Tapia Guadix, Spain

Q&A

Do GC make their own MDP?

Yes we do. We are on our 3rd generation of MDP as we constantly improve and refine our functional monomers.

How does the silane in G-Multi PRIMER remain stable and active for 2 years without requiring refrigeration?

The wide functionality and overall stability of G-Multi PRIMER is a key development from our R&D team. Unfortunately this formulation detail is proprietary and is not able to be disclosed.

Will G-Premio BOND adhere to any core substrate?

Yes it will. Whether glass ionomer cement, composite or metal. This is due to the effectiveness of the three functional monomers; 4MET, MDP and MDTP.

Can we use G-Premio BOND with the Immediate Dentine Sealing technique?

Yes. Whilst we don't specifically endorse this technique, our laboratory testing of Immediate Dentine Sealing procedures with G-Premio BOND and G-CEM LinkForce showed effective adhesion and no reduction in bond strengths.

What is the working time of mixed G-Premio BOND (GPB) + Dual Cure Activator (DCA)?

Working time is 2-3 mins after mixing.

Why is application time (20 secs) longer for mixed GPB+DCA compared to application time (10 secs) for G-Premio BOND when used alone?

Application time is longer because, when mixed with DCA, there is dilution of the acid level, thus the strength of etching effect is reduced and application needs to be longer.

How many cement applications are available from a syringe of G-CEM LinkForce?

Up to 20 applications.

What are the storage recommendations for G-CEM LinkForce?

The G-CEM LinkForce cement should be stored in the refrigerator. G-Multi PRIMER, G-Premio BOND, Dual Cure Activator and Try-In Pastes can be stored at room temperature or refrigerated.

When is G-CEM Veneer not indicated?

G-CEM Veneer is not indicated for restorations with a thickness above 2mm or opaque restorations, preventing light to be transmitted and complete light-curing.

What are the advantages of G-CEM Veneer compared to other flowable composites and pre-heated composites?

G-CEM Veneer benefits from clear advantages versus other composites, mainly pre-heated ones:

There is no need for heater, no risk of change of physical properties due to non-controlled and repeated temperature increase.

The thixotropy enables removal of the excess in an easy way, without flowing around the preparation. The placement is also easier: easier to place restorations without risk of breaking thin ceramic pieces, no need for ultrasonic device to ensure adaptation and no risk of non-flowing material and over-occlusion.

The high physical properties such as flexural strength & wear resistance, higher than most conventional composites. Wear resistance ensures long lasting margins, even on occlusal surfaces.[5]

A guide to pre-treatment technique

Substrate	Pre-treatment at lab or chairside	Step 1	Step 2	Step 3	Step 4	Step 5 In case contamination with saliva/ blood before primer application	Step 6 Primer Application	Remark
Feldspathic ceramics, Leucite-reinforced ceramics	Etching at chairside	Try-in	Rinse thoroughly & dry	Etch inner surface for 60 secs with 5% HF acid	Rinse & dry	Clean with alcohol & dry	G-Multi PRIMER Apply & dry	Adhesion of G-Multi PRIMER through silane
Lithium disilicate	Etching at chairside	Try-in	Rinse thoroughly & dry	Etch inner surface for 20 secs with 5% HF acid	Rinse & dry	Clean with alcohol & dry	G-Multi PRIMER Apply & dry	
Zirconia Alumina	Sandblasting at chairside	Try-in	Rinse thoroughly & dry	Sandblast	Rinse & dry	New sandblasting or clean with Ivoclean*	G-Multi PRIMER Apply & dry	Do not clean the Zr oxide surfaces with phosphoric acid. Adhesion of G-Multi PRIMER through MDP
	Already sandblasted by lab	Try-in	Rinse thoroughly & dry			New sandblasting or clean with Ivoclean*	G-Multi PRIMER Apply & dry	
Metal Composite Hybrid Ceramics	Sandblasting at chairside	Try-in	Rinse thoroughly & dry	Sandblast**	Rinse & dry	Clean with alcohol & dry	G-Multi PRIMER Apply & dry	Adhesion of G-Multi PRIMER through silane (to glass fillers), MDP (for non-precious metal, resins) and MDTP (for precious metal)
	Already sandblasted by lab	Try-in	Rinse thoroughly & dry			Clean with alcohol & dry	G-Multi PRIMER Apply & dry	
Fibre Post	At chairside	Try-in	Rinse thoroughly & dry			Clean with alcohol & dry	G-Multi PRIMER Apply & dry	

* Ivoclean is not a trademark of GC Corporation

** in case of Hybrid Ceramics, acid etching with HF acid for 60 secs can also be used

HF: Hydrofluoric acid

When to cement?

E.g. Fuji PLUS and FujiCEM

A glass ionomer cement has the preferred characteristics for an ideal cementation material.
The following clinical aspects will define your choice for the optimal CEMENTATION procedure:

Retentive preparation

Isolation not possible

Moderate aesthetics needed

Extra protection needed

When to bond?

E.g. G-CEM LinkForce and G-CEM Veneer

Bond with a resin cement when aesthetics are of the utmost importance or when extra adhesion is required.

Preparation is not retentive

Isolation possible

High aesthetics needed

Extra adhesion needed

A guide to cement selection

		Glass Ionomers		Resins			
		Self-cure		Dual-cure			Light-cured
		Conventional	Resin Modified	Self-adhesive	Universal Self-adhesive	Adhesive	Adhesive
		GC Fuji I	GC Fuji PLUS & FujiCEM	G-CEM CAPSULE	G-CEM ONE	G-CEM Link Force	G-CEM Veneer
Crowns & bridges	Metal	●					
	Zirconia		●				
	Lithium disilicate (e.g. Initial LiSi Block, Initial LiSi Press)			●	●	●	
	Composite						
	Feldspathic & Leucite reinforced ceramics						
	Hybrid ceramics (e.g. CERASMART270)						
Inlays & onlays	Metal	●					
	Zirconia		●				
	Lithium disilicate (e.g. Initial LiSi Block, Initial LiSi Press)			●	●	●	
	Composite						●†
	Feldspathic & Leucite reinforced ceramic		(inlays)				
	Hybrid ceramics (e.g. CERASMART270)						
Veneers	Lithium Disilicate (e.g. Initial LiSi Block, Initial LiSi Press)						
	Composite				●	●	●†
	Feldspathic & Leucite reinforced ceramics						
	Hybrid Ceramics (e.g. CERASMART270)						
Posts & inlay cores	Metal	●					
	Zirconia		●	●	●	●	
	Fibre reinforced						

† For indirect restorations with thin thickness (< 2mm) that enables the use of a purely light-cured mode.

Scientific References

1. Yoshihara K, Nagaoka N, Sonoda A, et al. Effectiveness and stability of silane coupling agent incorporated in 'universal' adhesives. Dent Mater. 2016;32(10):1218-1225. doi:10.1016/j.dental.2016.07.002. https://pubmed.ncbi.nlm.nih.gov/27461880/

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G-CEM LinkForce System Kit

1 x G-CEM LinkForce A2 8.7g (5mL)
1 x G-CEM LinkForce Translucent 8.7g (5mL)
30 x GC Automix Tip Regular
5 x GC Automix Tip Endo
1 x G-Multi PRIMER (5mL)
1 x G-Premio BOND (5mL)
1 x G-Premio BOND DCA (3mL)
1 x GC ETCHANT 4.8g (3.6mL)
1 x G-CEM LinkForce Try-In Paste A2 1.5g (1.2mL)
1 x G-CEM LinkForce Try-In Paste Translucent 1.5g (1.2mL)
20 x Disposable dispensing dish
50 x Disposable applicator (fine)

G-CEM LinkForce Starter Kit

1 x G-CEM LinkForce A2 OR Translucent 8.7g (5mL)
20 x GC Automix Tip Regular
1 x G-Multi PRIMER (5mL)
1 x G-Premio BOND (5mL)

Refills

G-CEM LinkForce 8.7g (5mL)
(Translucent / A2 / Opaque / Bleach)

G-Premio BOND, 5mL

G-Premio BOND DCA, 3mL

G-Multi-Primer, 5mL

G-CEM Veneer Starter Kit

2 x G-CEM Veneer Refill A2 & TR
2 x Try-in Paste Refill A2 & TR
1x G-Multi PRIMER
1 x G-Premio BOND
45 x needle tips

G-CEM Veneer Refill 1 ml (1.7g) + 10 dispensing tips

1 x G-CEM Veneer A2
1 x G-CEM Veneer Translucent (TR)
1 x G-CEM Veneer Opaque (OP)
1 x G-CEM Veneer Bleach (BL)

G-CEM Try-in paste 1.2 ml (1.5g)

1 x G-CEM Try-in Paste A2
1 x G-CEM Try-in Paste Translucent
1 x G-CEM Try-in Paste Opaque
1 x G-CEM Try-in Paste Bleach

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GC dispensing tips long needle (30 pcs.)

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