
G-CEM LinkForce™
Strong.
Dependable.
Universal.
GC

One universal system,

Introducing G-CEM LinkForce™

Now you can secure all your indirect restorations with one aesthetic resin cement solution.

- **Universal indications**
- **Uncompromising strength and adhesion**
- **Fast and easy application**
- **Aesthetic and durable margins**
- **Consistent quality and performance**

three strong links

LINK 1

G-Multi PRIMER

LINK 2

G-Premio BOND

LINK 3

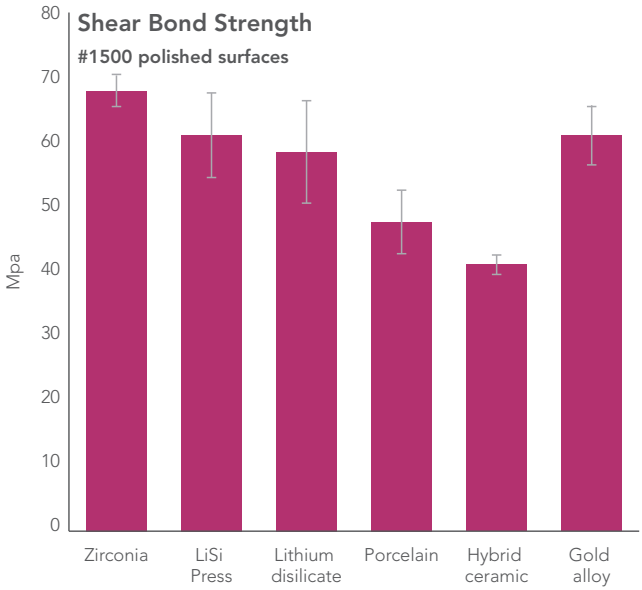
G-CEM LinkForce™

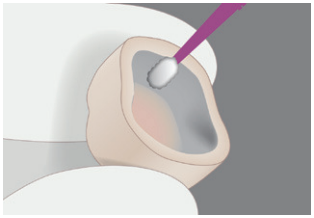
LINK 1: G-Multi PRIMER

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.

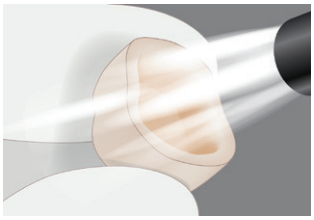
Strong chemical bonding to all substrates





Simple application

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



Stabilised formulation

- No refrigeration
- 2-year shelf life

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™. Dr Anthony Mak.

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

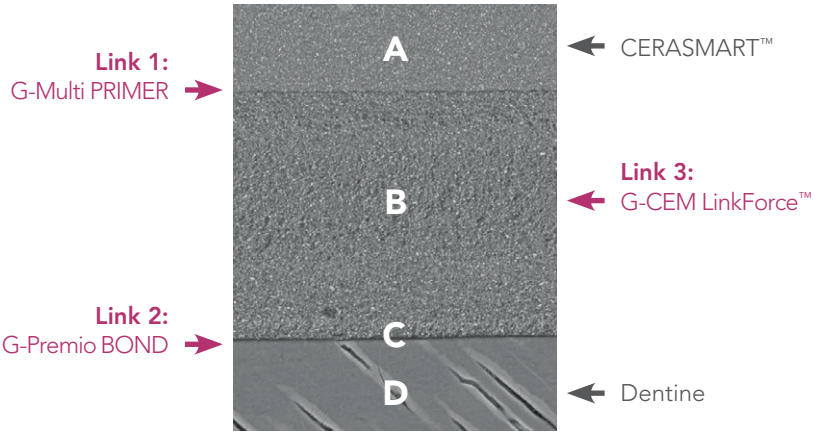
Brush apply a thin layer of G-Multi PRIMER to create a durable chemical bond. Dry with an air syringe

One universal system

Strong, reliable and consistent

G-CEM LinkForce™ is a universal resin cement solution built on **three strong links** that ensure uncompromising, consistent and reliable adhesion.

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).



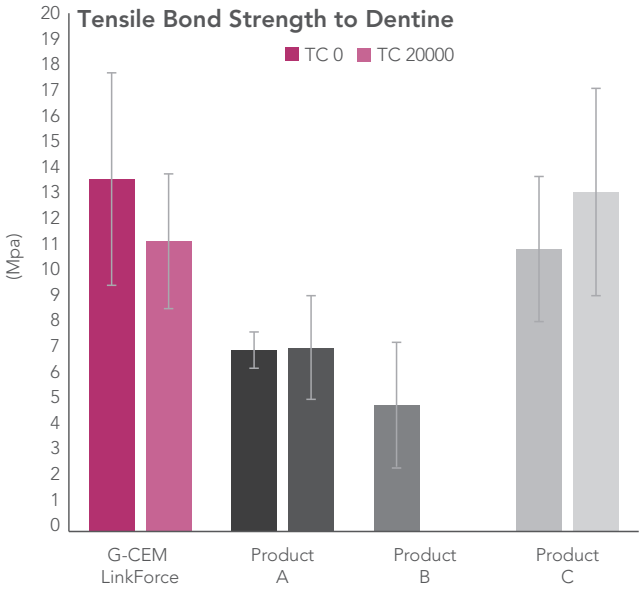
R&D Dept. GC Corporation

LINK 2: G-Premio BOND

A premium chemical bonding formulation

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.

Strong dentine bonding



Convenient application

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

Fluid consistency

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

Stronger bond layer

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

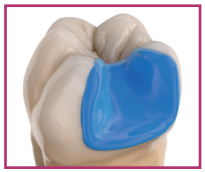
Optional dual-cure mode

- 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


Self Etch


Total Etch


Selective Etch

Case study

CERASMART™ hybrid ceramic bonded with G-CEM LinkForce™. Dr Anthony Mak.

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

Selective etch of enamel, rinse and dry

Dual-cure mode was selected. 1 drop each of G-Premio BOND and Dual Cure Activator were dispensed and mixed

The mixed bond was applied to the prepared enamel, dentine and composite liner and left for 20 secs

The surface was then dried with maximum air pressure for 5 secs to remove all water from the bond layer

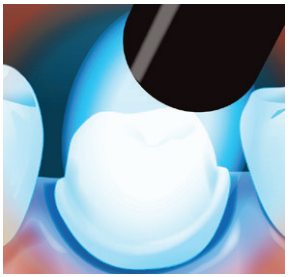
Light-cure mode

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 10 secs

Dry with MAXIMUM AIR PRESSURE for 5 secs

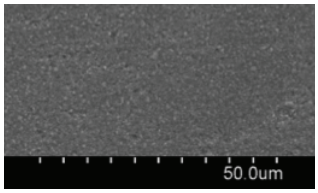


Light-cure for 10 secs

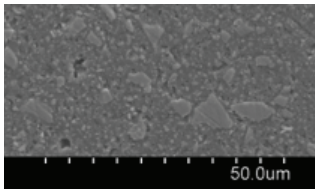
LINK 3: G-CEM LinkForce™

Class-leading strength and aesthetics

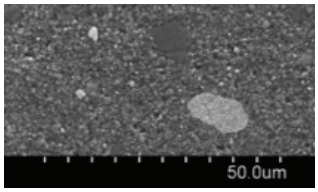
G-CEM LinkForce™ provides durable retention and long term margin aesthetics through enhanced dual-cure polymerisation systems and incorporation of high-density, single-dispersion glass filler technology.



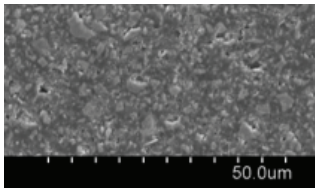
G-CEM LinkForce™



Product A



Product B



Product C

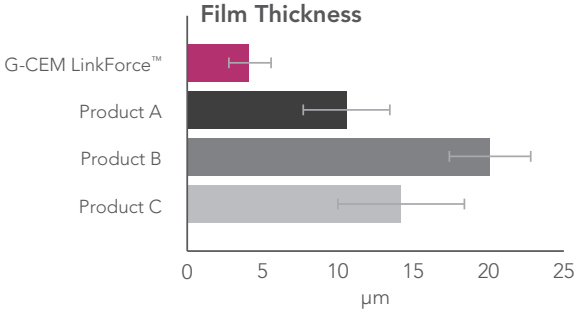
Consistent handling and clean up

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.

Dr Yoshikazu Kawamoto

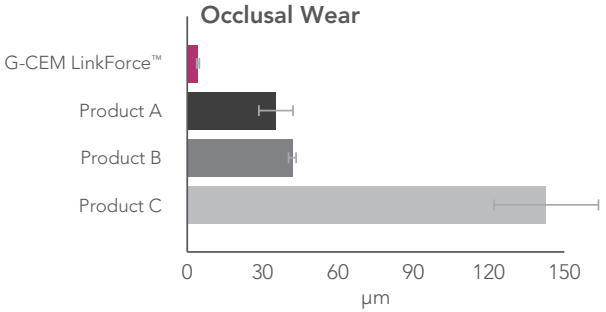
Very low film thickness

- Just 4µm
- Guaranteed adaptation



High strength and wear resistance

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



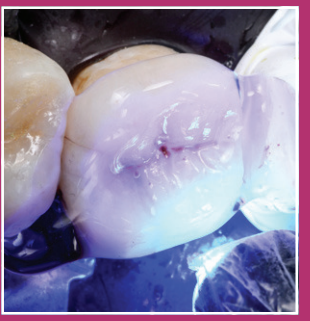
Case study

CERASMART™ hybrid ceramic bonded with G-CEM LinkForce™. Dr Anthony Mak.

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™

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)

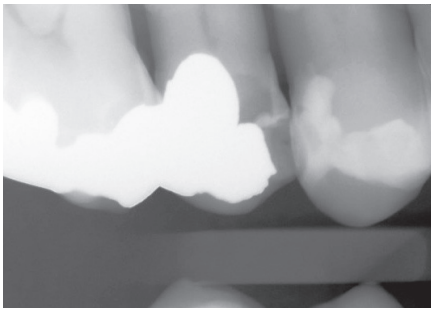
Adapted for ultra-white restorations to increase opacity and value

Clinical case

Lithium disilicate crown bonded with G-CEM LinkForce™. Dr Graeme Milicich.

This is a good clinical case to highlight the effectiveness of G-CEM LinkForce™. When considering preparation design, there would have been difficulty gaining sufficient retention for a ferrule retained, cemented crown due to the loss of the palatal cusp. A more effective alternative is to create a fully-bonded ceramic restoration using a strong resin adhesive cement solution. This means a core does not need to be created because the ceramic is bonded directly to the tooth, instead of bonding a composite core to the dentine.

1. A patient presented with a fractured palatal cusp on tooth 15

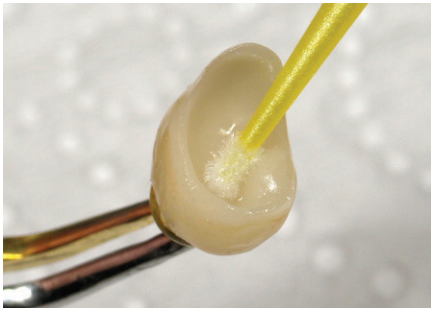


2. An old, very deep amalgam restoration, but the tooth is vital

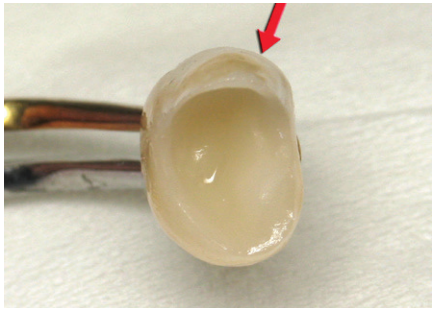
3. Removal of the old amalgam revealed the buccal cusp fracture

4. The underlying dentine was stained, but firm and non-carious

5. A hybrid veneer/onlay preparation was cut, then scanned and milled out of MT lithium disilicate

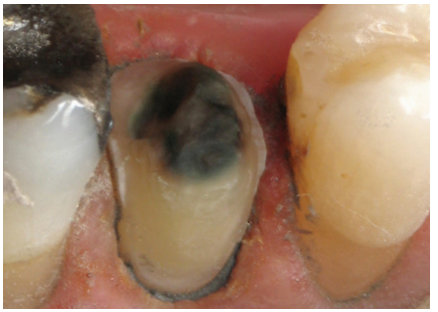


6. After try in, the restoration was cleaned, hydrofluoric acid etched and silane treated with G-Multi PRIMER

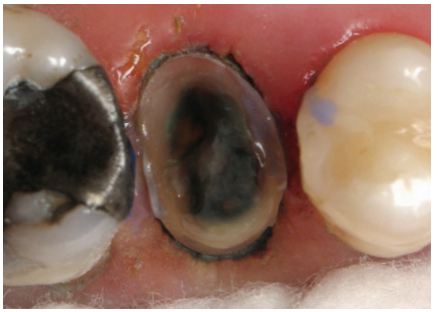


7. The thin buccal veneer type preparation is visible below the plane of the buccal cusp fracture

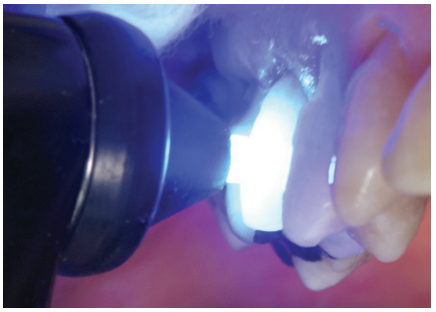
8. Isolation was managed with retraction cord and Isolite®*, prior to air-abrasion to remove all surface smear layer and contaminants



9. Note the clean matt surface following low pressure air abrasion using 27micron powder at 40psi



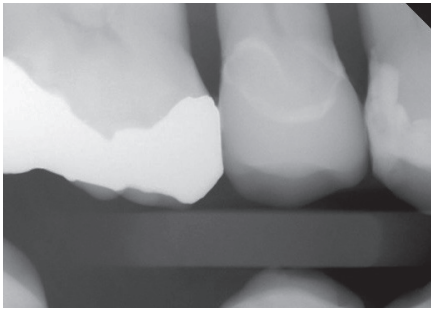
10. Selective enamel etching, followed by application of G-Premio BOND mixed with Dual Cure Activator



11. G-CEM LinkForce™ is applied into the silanated restoration and seated. Excess cement wiped off and the restoration was spot-cured

12. G-CEM LinkForce™ goes through a gel phase that makes initial clean up easy and predictable. This can be accelerated with a 2 secs light exposure

13. The completed adhesively bonded MT lithium disilicate restoration



14. The G-CEM LinkForce™ cement is clearly identifiable in radiographs

15. One week post placement

16. One week post placement

* Isolite is not a trademark of GC Corporation

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™?

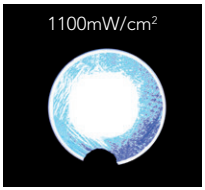
The G-CEM LinkForce™ cement should be stored in the refrigerator. G-Multi PRIMER, G-Premio BOND, Dual Cure Activator and Try-In Pastes can be stored at room temperature or refrigerated.

There is a high focus on ensuring a strong dual-cure setting reaction within the G-CEM LinkForce™ cement. Why is this so important?

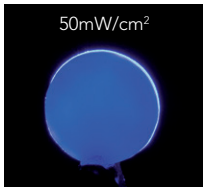
Firstly, this is because we want maximum physical properties for any clinical situation, whether for post cementation, for bonding a Maryland bridge or securing a zirconia crown.

The other key reason comes from research on light penetration through ceramics of 2mm thickness, which clearly identifies the significant reduction in light intensity that reaches the cement.

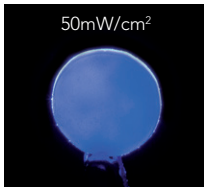
Without a strong dark cure reaction, this lack of light initiation will result in a reduction in cement adhesion and increased wear and discolouration of the cement over time. Hence the strong dark cure reaction of G-CEM LinkForce™ is important.



Transparent disc



Zirconia 0.4mm thick zirconia disc with ceramic layering up to 1.6mm



Ceramic 0.5mm thick ceramic disc with ceramic layering up to 1.5mm

Source: Pereira et al., Sao Paulo University, Brazil

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
Fedspathic 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

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™

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

		Fuji I Conventional glass ionomer cement	Fuji PLUS Resin-modified glass ionomer cement	FujiCEM Resin-modified glass ionomer cement	G-CEM Capsule Self-adhesive resin cement	G-CEM LinkAce Self-adhesive resin cement	G-CEM LinkForce™ Adhesive resin cement	G-ænial Universal Flo Composite Resin
Inlays & onlays	Metal	●	●	●	●	●	●	
	Feldspathic ceramics Leucite-reinforced ceramics		● (inlays)	● (inlays)	●	●	●	●†
	Lithium disilicate Composite		●	●	●	●	●	●†
	Hybrid ceramics						●	●†
Crowns & bridges	Metal Zirconia Alumina	●	●	●	●	●	●	
	Lithium disilicate Composite		●	●	●	●	●	
	Feldspathic ceramics Leucite-reinforced ceramics				●	●	●	
	Hybrid ceramics						●	
Posts & inlay-cores	Metal	●	●	●	●	●	●	
	Zirconia Fibre-reinforced		●	●	●	●	●	
Veneers	Feldspathic ceramics Leucite reinforced ceramics Lithium disilicate Hybrid ceramics Composite						●	●

† If less than 2.0 mm thickness

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-CEM LinkForce™ Try-In Paste 1.5g (1.2mL)
(Translucent / A2 / Opaque / Bleach)
G-Premio BOND, 5mL
G-Premio BOND DCA, 3mL
G-Multi-Primer, 5mL

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