

Master all your challenges

initial[™] Zirconia Disk Multilayer Elite



Technical Manual

NOVEMBER 2024

EN





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Introduction & Intended Use

Thank you for choosing **GC Initial Zirconia Disk Multilayer Elite**, your top choice for the highest standards in dental zirconia prosthetics.

GC Initial Zirconia Disk Multilayer Elite are pre-sintered milling blanks made of zirconium dioxide for use in CNC milling machines for the manufacture of crowns, bridges, inlays, onlays, veneers and zirconium dioxide assemblies for two-piece abutments or hybrid abutments for dental prostheses.

Latest version of the e-IFU can be downloaded from <http://ifu.gc.dental> or via QR code.



GC's Zirconia Solutions

The GC Initial Zirconia Disk Multilayer Elite is part of GC's zirconia solutions, an intuitive workflow with maximized productivity without compromising on quality.

SCAN & DESIGN with Aadvia Lab Scan 3

Gesture-controlled scanner with high precision and smart scan features



2D INNER STAIN with Initial Zirconia Coloring Liquid

Refine with effect colours for the ultimate sophistication.

MICROLAYERING with Initial IQ ONE SQIN

3D PAINT with Initial IQ Lustre Pastes ONE

Colour and fluorescence - either for purely monolithic work or with micro-cutback in combination with IQ SQIN.



FORM & TEXTURE with Initial IQ SQIN

Vitality, natural texture and gloss within a microlayer.



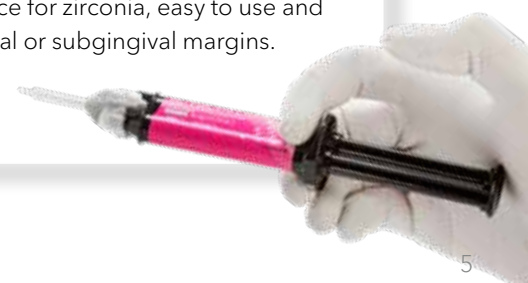
CLASSIC VENEERING with Initial Zr-FS

Unsurpassed optical effects and high stability after multiple firings for frameworks with classic cutback.



CEMENT with FujiCEM Evolve

The preferred choice for zirconia, easy to use and ideal for juxtagingival or subgingival margins.



Indications

Patients with damaged, unaesthetic, dysfunctional tooth areas or missing teeth; Crowns, bridges, inlays, onlays, veneers and zirconium dioxide assemblies for two-piece abutments or hybrid abutments for dental prostheses made from GC Initial Zr Disk Multilayer Elite can in principle be used for all patients receiving dental treatment, without restrictions regarding sex or age.

GC Initial Zirconia Disk Multilayer Elite	
Abutment condition and luting	
Normal tooth colored dies	++++
Discolored dies and metal	++++
Heavily discolored teeth	+
Monolithic restorations	
Inlays, onlays, veneers	++++
Single crowns	++++
3-unit bridge	++++
Full arch	++++
Implant supported C&B	++++
Cut-back, copings and frameworks	
Individual copings	+++
3-unit bridge	+++
Full arch	+++

++++ highly recommended +++ recommended
 ++ slightly recommended + rather not recommended



Contraindications

GC Initial Zirconia Disk Multilayer Elite are not intended for:

- the fabrication of implants
- the fabrication of abutments
- patients with parafunctional habits
- patients with a known intolerance to individual components
- inadequate prepared teeth
- patients with insufficient space in the mouth
- patients with inadequate oral hygiene
- provisional restorations

Features

Top choice for the highest standards!

Engineered to deliver the perfect balance of high strength and exceptional aesthetics, Initial Zirconia Disk Multilayer Elite are the ideal choice for both anterior and posterior restorations.



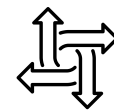
SUPERIOR AESTHETICS

True-to-nature shade and translucency gradient for anterior and posterior restorations.



HIGH STRENGTH

Classified as a Class V according to DIN EN ISO 6872 with a mean value of > 1.100 MPa.



OMNI-FUNCTIONAL

Versatile and suitable for a broad range of clinical indications. Fast sintering or regular sintering.



Natural gradient

Stunningly natural: a seamless gradient from cervical to incisal, in shade as well as translucency, mimicking the natural tooth structure in the best possible way.

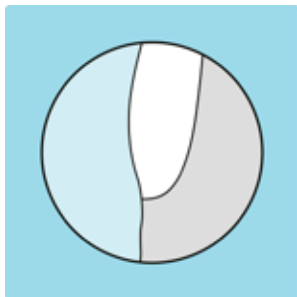
	5Y	INCISAL	20%	Translucency >49% Strength < 800 MPa
	4 - 5Y	INTERLAYER 1	15%	
	4 - 5Y	INTERLAYER 2	15%	
	4 - 5Y	INTERLAYER 2	15%	
	4Y	CERVICAL	35%	Translucency >45% Strength 1.150 MPa

Preparation & framework design

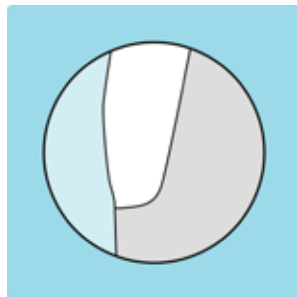
Zirconia is widely used due to its excellent mechanical properties, such as high strength and biocompatibility. However, the preparation and framework design of dental zirconia restorations is crucial for ensuring both durability and aesthetics of the restoration. Careful consideration of the design parameters is essential to prevent fractures, ensure long-term stability and achieve good clinical outcomes.

Preparation design

- Prepare margins with deep chamfer or rounded shoulder.
- Avoid having margins in direct occlusal contact with the opposing tooth.
- Antagonist contacts must be taken into consideration.



Deep chamfer

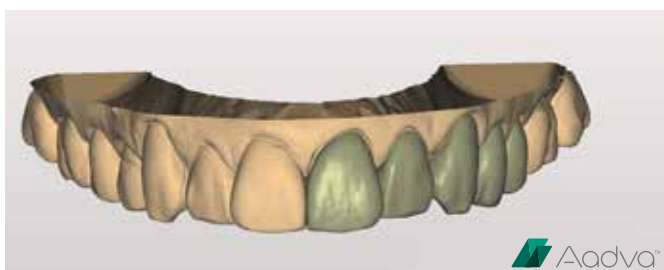


Rounded shoulder

Framework design

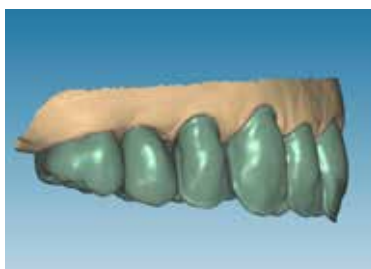
Framework design for monolithic restorations

The framework design for monolithic zirconia restorations should closely mimic the natural tooth structure to evenly distribute occlusal forces and ensure long-term success.



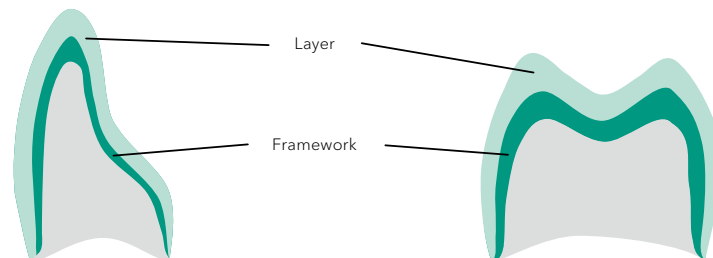
Framework design for micro-layering with IQ ONE SQIN

The monolithic framework should be designed for micro-layering with a buccal reduction of approx. 0.2 mm to max. 0.6 mm.



Framework design for ceramic veneering

If zirconia is veneered with porcelain, eg. Initial Zr-FS, the framework should support the ceramic layer evenly to avoid chipping. The framework should have an anatomically reduced shape that supports the veneering ceramic.



In general, below minimum thicknesses should be respected.

PARAMETERS FOR DESIGNING		CROWNS	MARYLAND BRIDGES	BRIDGES
Minimum framework thickness	anterior	0.4 mm	0.4 mm	0.6 mm
	posterior	0.6 mm	0.6 mm	0.6 mm
Connector cross section	anterior	-	6 mm ²	6 mm ²
	posterior	-	9 mm ²	9 mm ²
Framework design		- Anatomical tooth shapes closely mimicking the natural tooth structures - Buccally reduced framework design for the IQ ONE SQIN micro-layering technique - Anatomically reduced tooth design supporting the veneering ceramic		



Nesting recommendations

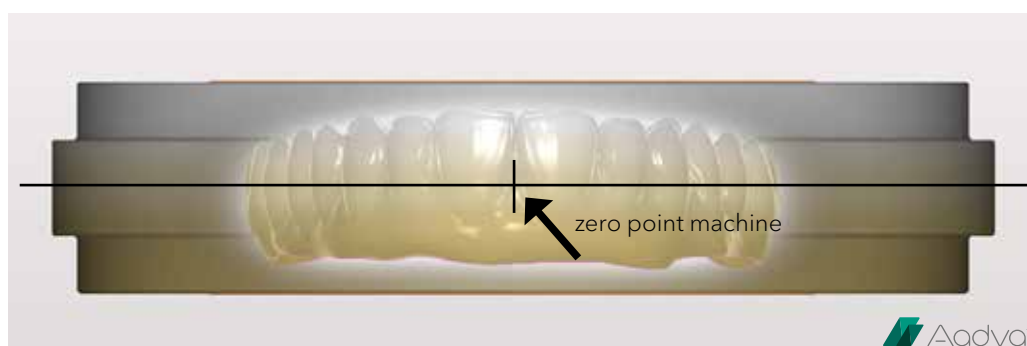
GC Initial Zirconia Disk Multilayer Elite offer a shade and translucency gradient from cervical to incisal, mimicking natural teeth in the best possible way.

A correct positioning in the zirconia blank ensures the more translucent regions are placed in the incisal or occlusal areas for a more lifelike appearance, while more opaque regions should be placed in the cervical area to mimic dentin.

GC Initial Zirconia Disk Multilayer Elite come in 4 thicknesses: 14, 16, 20 and 25 mm.

The below positioning recommendations are intended as guidelines only; restorations can be positioned differently to achieve varying proportions of dentin and incisal areas when required.

The indicated restoration height refers to the final height without shrinkage factor.



GC Initial Zirconia Disk Multilayer Elite - 14 mm

Restoration height	< 9 mm
Anterior restorations	1.5 mm distance from the top surface of the disk
Posterior restorations	2 mm distance from the top surface of the disk
Recommended indications	Veneers, inlays, crowns and bridges with a max. height of < 9 mm.

GC Initial Zirconia Disk Multilayer Elite - 16 mm

Restoration height	9 - 11 mm
Anterior restorations	1.5 mm distance from the top surface of the disk
Posterior restorations	2 mm distance from the top surface of the disk
Recommended indications	Veneers, crowns and bridges with a height of min. 9mm and max. 11 mm.

GC Initial Zirconia Disk Multilayer Elite - 20 mm

Restoration height	11 - 14 mm
Anterior restorations	2 mm distance from the top surface of the disk
Posterior restorations	2.5 mm distance from the top surface of the disk
Recommended indications	Veneers, crowns and bridges with a height of min. 11 mm and max. 14 mm.

GC Initial Zirconia Disk Multilayer Elite - 25 mm

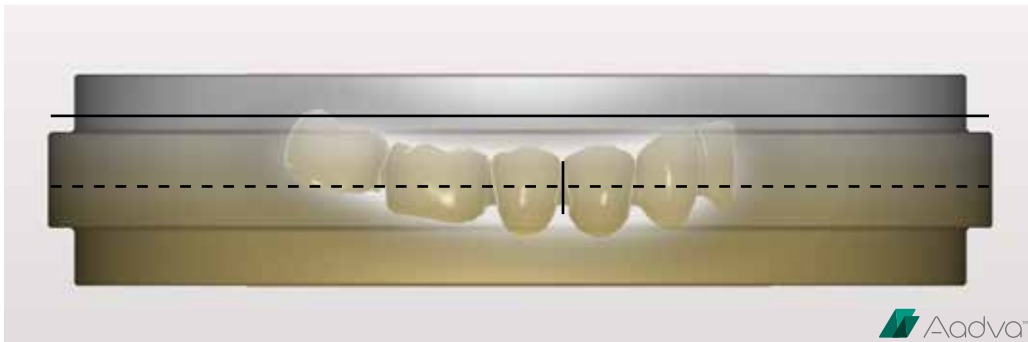
Restoration height	> 14 mm
Anterior restorations	2.5 mm distance from the top surface of the disk
Posterior restorations	3 mm distance from the top surface of the disk
Recommended indications	Veneers, crowns and bridges with a height of min. 14 mm.

Notes

Curve of Spee

To achieve an even color distribution in cases with more defined curves of Spee, it is recommended to position the upper edge of the first and last tooth at approximately the same height.

Shade adjustments after sintering can be done using Initial IQ Lustre Pastes ONE or Initial Spectrum Stains.

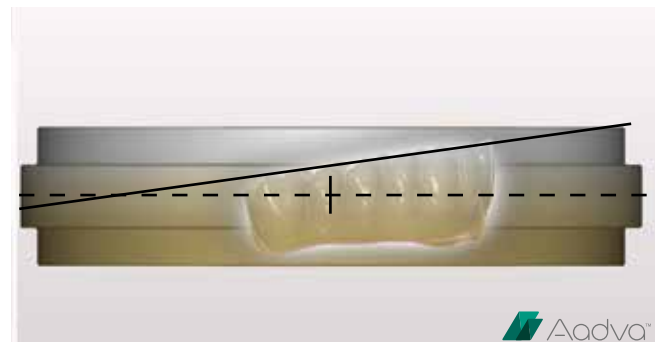
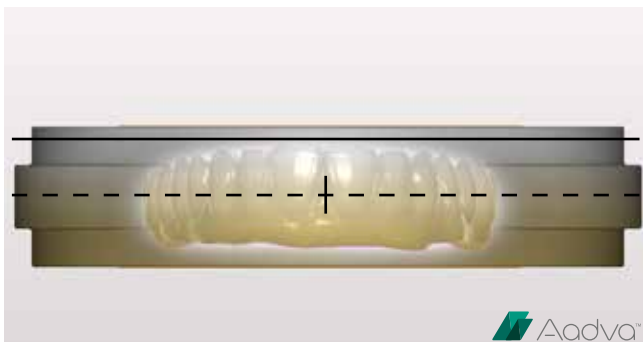


Gingiva

Restorations with a significant amount of gingival reconstruction should be placed with the anterior teeth in optimal position and the posterior teeth slightly lowered.

As a result, the shade of the anterior teeth will be slightly lighter than the posterior teeth.

Shade adjustments after sintering can be done using Initial IQ Lustre Pastes ONE or Initial Spectrum Stains.



Shade selection

The primary goal of any dental restoration is to blend seamlessly with the natural teeth. A well-chosen shade helps the restoration to look like a natural tooth, improving the overall appearance of the patient's smile.

Use the dedicated GC Initial Zirconia Multilayer Elite shade guide for proper shade taking.



Line up

Disk diameter: 98.5 mm

Heights: 14, 16, 20, 25 mm

V-shades: A1, A2, A3, A3.5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3, D4

Bleach shades: OM1, OM2, OM3

Milling preparation

Milling dental zirconia restorations is a precise and delicate process that requires attention to specific parameters to ensure the accuracy, fit and quality of the final restoration.

The milling process is influenced by the properties of the zirconia, the milling machine, and the restoration design. It's crucial to select the appropriate milling strategy according to the material type.

Due to the material's contraction during the sintering process, it is important to take the shrinkage factor into account when milling. Each blank is marked with the specific shrinkage factor.

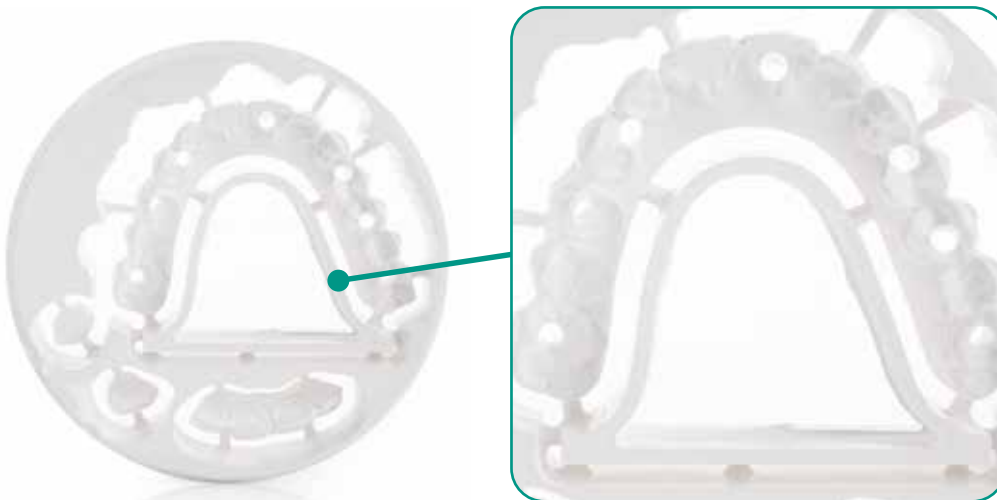


The tooth logo indicates the top surface of the disk: the upward occlusal surface indicates where the highest translucency layer is positioned.

PROCESSING STEP	ROUGH MILLING	REST ROUGHING & FINISHING
Machining tool	Rough milling cutter	Roughing/finishing cutter
Speed	19 000 - 23 000 RPM	23 000 - 27 000 RPM
Feed rate (Vf)	12.00 - 15.00 mm/min	0.800 - 1.200 mm/min

Note:

Dry milling is recommended.



Include sintering aids in the design, if needed. The volume of the sintering aid should be between 90% and 100% of the restoration's volume.

Finishing

Finishing zirconia prior to sintering sets the foundation for the final fit and aesthetics.

Zirconia is significantly softer and more workable before sintering, making it easier to contour and shape. Any major adjustments to the restoration's design, such as refining occlusal anatomy, contacts or margins, should be done at this stage.

Recommendations:

- Always use dedicated instruments such as diamond burs, discs and rubbers.
- Finish as much as possible in the pre-sintered phase.
- Avoid sharp edges.
- Ensure that basal areas and interdental spaces are rounded.
- Remove dust with a clean brush.



<https://www.sirius-ceramics.com/shop/panther-premium-instrumente/panther-green/>

Optional individualization

If small individual aesthetic customizations of the pre-sintered zirconia structure are required, we advise to use the GC Initial Zirconia Coloring Liquid (brush technique).



For more tips and tricks, consult the dedicated GC Initial Zirconia Coloring Liquid Technical Manual.

Calibration & sintering

The sintering process is a crucial step in the production of dental zirconia restorations and has a direct impact on the material's final properties. Proper sintering is essential to ensure the restoration meets the required aesthetical and functional standards.

Calibration

Always make sure the sintering furnace is properly calibrated. We recommend performing a calibration firing on a monthly base using PTC rings and a caliper.



Source: DEKEMA Dental-Keramiköfen GmbH

Sintering

Through controlled sintering, dental zirconia achieves its full density, strength, and translucency, making it suitable for durable and natural-looking restorations. GC Initial Zirconia Disk Multilayer Elite can be sintered using a standard program or by rapid sintering. Rapid sintering is only advised for restorations up to 3-unit bridges.

	STANDARD SINTERING 7 HOURS	RAPID SINTERING 4 HOURS
Heat-up rate	8 - 10 °C / min.	10 °C / min
Final temperature	1 450 °C	1 500 °C
Holding time	120 min.	30 min.
Cooling down rate	8 - 10 °C / min.	40 °C / min.
Limitations	No limitations	Up to 3-unit bridges



Recommendations:

- For larger restorations, a slower heat up rate of 8 °C / min. is recommended.
- Do not open the sintering furnace before 300 °C.
- Allow the restorations to cool down to room temperature before removing.

Note:

Ensure using the appropriate tools and equipment when sintering zirconia restorations. When using sintering aids, place the restoration upright during the sintering.



Finishing & polishing after sintering

Any corrections that need to be made to the hard-sintered restorations must be carried out using water-cooled diamond grinders or grinding and polishing tools that are suitable for use on hard-sintered zirconium oxide. This prevents material damage caused by local overheating as well as excessive force on the surface of the restoration. Never use milling tools, as they will damage the surface of the restoration.

Basic rules for handling sintered materials:

- Only work with tools dedicated for zirconium dioxide, like heatless stones or rubbers.
- Always process at low pressure, if possible use water cooling.
- Avoid sharp edges.
- Interdental connectors must not be touched.
- The restoration should be polished prior to clinical use in order to reduce the amount of abrasion on the antagonists.



<https://www.sirius-ceramics.com/shop/panther-premium-instrumente/panther-stone/>
<https://www.sirius-ceramics.com/shop/panther-premium-instrumente/panther-polishing/>

Veneering and staining

All veneering ceramics that are recommended for zirconium dioxide ceramics can be used. For optimal aesthetics, we recommend using GC Initial IQ SQIN, GC Initial IQ Lustre Pastes ONE and/or GC Initial Zr-FS.

Painting and micro-layering with the Initial IQ ONE SQIN concept

GC Initial IQ ONE SQIN is a paintable colour-and-form ceramic concept for the aesthetic realization of monolithic or minimal buccally reduced dental frameworks made of zirconium dioxide or lithium disilicate. It enables you to fast and easily achieve high aesthetic results, comparable to conventionally layered restorations but with a significant time gain, both in the posterior and anterior region.

3D Paint with Initial IQ Lustre Pastes ONE

- The Lustre Pastes ONE are based on a mix of refined glass ceramic particles, ensuring lifelike light dynamics for a natural 3D effect.
- Improved and unique paste medium with a fine thixotropic consistency enabling an easier and more precise application.
- Ready to use. Adaptable to your preferred consistency.
- Optimal fluorescence ensures the look of natural teeth under all light circumstances.
- GC Initial Spectrum Stains (powder stains) can be used to increase individualization possibilities.
- Perfect combination with Initial IQ SQIN for the full ceramic micro-layering technique.
- Used as color & individualization layer assuring a perfect connection firing before application of the SQIN ceramics in the micro-layering technique.

Form & texture with IQ SQIN

- The SQIN ceramic are a refined mixture of feldspar-based glasses dedicated to the IQ ONE SQIN (micro-layering) technique.
- Offers unique application and modelling properties.
- Aesthetic contour type of ceramic with self-glazing properties after ceramic firing. Easy form and texture properties.
- 3D aesthetics.

Initial Spectrum Stains for extra individual effects

- A wide spectrum of colors.
GC Initial Spectrum Stains are powder stains available in a variety of 20 colors empowering the aesthetics of your restorations.
- Perfect combination with Initial IQ SQIN / Lustre Pastes ONE for the full ceramic micro-layering technique.
- Wide spectrum of use.

Classic Veneering with Initial Zr-FS

Initial Zr-FS is an improved feldspar-based zirconium oxide veneering ceramic for use with high strength zirconium frameworks. The unequalled natural optical effects and increased stability after multiple firings, make it ideal for the fabrication of complex and delicate substructures such as bridges.

The high content of extremely pure, specially selected feldspar ensures superior aesthetics on all types of high tensile strength zirconium frameworks, with a firing temperature of 810 °C and short cooling times, offering excellent wettability, high stability, and smooth surfaces for superior, natural aesthetics on Zr frameworks.



For more tips and tricks, consult the dedicated GC Initial IQ ONE SQIN Technical Manual.



Luting

If the restoration made out GC Initial Zirconia Disk Multilayer Elite have adequate retention and resistance, it can be luted conventionally using glass ionomer cements (i.e. Fuji I) or resin-modified glass ionomer cements (e.g. FujiCEM Evolve). It is important to ensure that there is sufficient surface retention and a minimum stump height of 3 mm.

Luting recommendations



Retentive shape is sufficient



Margins are subgingival
Isolation is difficult



Moderate aesthetics are needed



Preferred when the caries risk is high thanks to ion release

Find the step-by-step for all your cementations on GC Luting Guide:



Download on the App Store



GET IT ON Google Play



FujiCEM Evolve: This easy-to-use and versatile RMGIC is your perfect partner for most of your routine cementation.

- **Strong bonding** to tooth and restoration, especially to Zirconia
- **Quick and easy:** no need for etching and bonding of the tooth
- **Excellent marginal seal** thanks to chemical adhesion to tooth structure
- **Moisture-tolerant:** a "must-have" when moisture control cannot be guaranteed
- **Rubbery consistency** for easy removal of excess, with tack-cure option

Alternatively, G-CEM ONE, a Universal self-adhesive cement can be used.



Pre-treatment step-by-step



1. Clean, rinse and dry the preparation.



2. Check the fit & occlusion.



3. Remove the restoration and sandblast 25-50 μ m alumina 0.15 MPa/1.5 bar.



4. Rinse and dry the restoration.



Note: for optimal adhesion, apply MDP primer such as G-Multi Primer on the restoration (not mandatory for FujiCEM Evolve or G-CEM ONE).



5. Rinse and dry the prepared tooth.

Luting step-by-step with FujiCEM Evolve



6. Bleed the syringe before use to ensure even extrusion of the pastes.



7A. Apply FujiCEM Evolve directly into the restoration using a mixing tip.

OR



7B. Mix the pastes for 10 sec. Apply the mixed FujiCEM Evolve directly into the restoration.



8. Immediately seat onto the preparation. Maintain moderate pressure.



Optionally for FujiCEM Evolve, excess can be tack-cured for 3 sec.



9. When the cement feels rubbery, remove the excess while maintaining moderate pressure.



10. Proceed with occlusion check and finishing 4'30 after seating the restoration.

TIPS & TRICKS

- For temporization, use TEMPSMART DC for beautiful results and easy polishing.
- Sandblasting of the tooth surface before luting is highly recommended.
- Use of MDP primer on the zirconia restoration is optional for G-CEM ONE and FujiCEM Evolve.
- In case of non-retentive shape of preparation, G-CEM ONE in combination with G-CEM ONE Adhesive Enhancing Primer or G-Premio BOND can be used to increase the adhesion.

Alternatively, if the restoration does not have adequate retention and resistance or requires extra adhesion and can be isolated from moist contamination, adhesive luting can be used (e.g. G-CEM ONE or G-CEM LinkForce)

Physical properties

- Flexural strength: typical mean value ≥ 1100 MPa
- CTE: $(10.5 \pm 0.5) \cdot 10^{-6} \cdot K^{-1}$
- Chemical composition:
 - Dental zirconium dioxide (4Y and 5Y-TZP)
 - Zirconium dioxide (ZrO_2/HfO_2): 89.89 - 92.65%
 - Yttrium oxide (Y_2O_3): 6.65 - 10.11%
 - Aluminium oxide (Al_2O_3): $< 0.2\%$
 - Other oxides: $< 0.7\%$

The share of individual components that make up the total component quantity may vary within the ranges specified above; the total component quantity does not however exceed 100% in each individual blank.

- Classification in accordance with DIN EN ISO 6872:2019
- Dental ceramic, type II, Class 5



Medical Device Regulation Requirement

REPORTING OBLIGATION

Serious incidents (i.e. the death or temporary or permanent serious deterioration of a patient's, user's or other person's state of health or a serious public health threat) that occur or that could have occurred in connection with GC Initial Zirconia Disk Multilayer Elite must be reported by the user or patient to manufacturer and to the responsible authority of the member state in which the user/patient resides.

Manufacturer: pritidenta® GmbH, Meisenweg 37, 70771 Leinfelden-Echterdingen, Germany

Related products



GC Initial Zirconia Disk ST, HT, UHT



GC Initial Zr-FS



GC Initial IQ ONE SQIN



GC Initial Zirconia Coloring Liquid



Aadva Lab Scanner 3



Distributor:
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