

all ceramic all options™



WIELAND
ZENOSTAR® 
FULL CONTOUR ZIRCONIA



Guidelines for dental technicians

Zenostar® Full Contour Zirconia Restorations

Your best option for high strength

The Zenostar system sets major standards in dental technology. Monolithic restorations have become firmly established in the dental industry and Zenostar is leading the way by presenting an overall system designed to benefit dental technicians, clinicians, and patients alike.

Simple. Beautiful. Strong. That is the Zenostar promise.

Benefits of Zenostar Full Contour Zirconia



- Full contour zirconia crowns and bridges without a ceramic veneer.
- Cost effective and esthetic metal free restorations.
- Biocompatible and durable.
- Suitable for cases where occlusal space is limited.
- Pre-shaded zirconia for staining and glazing.



Strong, Esthetic, Pre-shaded Zirconia Blanks.

Ever since the functional properties of zirconia as a high performance material for dental restorations became fully established, the demands placed on the material by both dental technicians and dental clinicians alike have been continually increasing.

The use of zirconia, as an esthetic framework material for ceramic veneering and for full contour dental restorations, requires a highly translucent and tooth colored base material. In addition to creating the most suitable powder to use as the raw material in the creation of the zirconia blanks, each stage of the process chain must be coordinated and optimized in order to fully exploit the exceptional material properties offered by zirconia and to create the basis of a high quality, durable dental restoration.

Zenostar® zirconia meets these demands with improved flexural strength, greater resistance to breakage, and better anti-aging properties, making the material safe and reliable. The innovative Zenostar material can be used to make natural looking, cost effective monolithic restorations and esthetic frameworks for individual ceramic veneering.

Zenostar® blanks combine the positive physical properties of Wieland's original white zirconia, Zenotec® Zr Bridge, with the positive optical and esthetic properties of their translucent zirconia, Zenotec® Zr Bridge Translucent. In addition, five basic shades have been developed which enable conventional staining techniques to be used in order to reproduce all standard tooth shades.



The Zenostar® Material

This translucent zirconia material combines excellent flexural strength with the esthetics of natural tooth shades. Zenostar is especially suitable for making monolithic restorations but can also be used as an esthetic framework material. With full contour Zenostar restorations, there are two methods of achieving the desired shade; the Zenostar brush infiltration technique or the Zenostar staining technique. Six pre-shaded zirconia blanks, pure, light, medium, intense, sun, and sun chroma, form the basis for reproducing the patient's natural dentition. Due to their warm, reddish nuance, Zenostar Zr Translucent sun & sun chroma are suitable for restorations with individual color characterization and can therefore be used for patients whose natural dentition deviates from the classical tooth shades.

Typical material properties

Shade	white / x-ray opaque and pre-shaded (sun and sun chroma)
Density	> 6.0 g /cm ³
Open porosity	0 %
Vickers hardness	1,300 HV10
Flexural strength	1,200 MPa ± 200
E modulus	210 GPa
Fracture strength	> 5 MPa*m ^{1/2}
CTE	(25 – 500 °C) 10.5*10 ⁻⁶ K ⁻¹
Composition	zirconium dioxide (ZrO ₂ + HfO ₂ + Y ₂ O ₃) > 99.0 %, yttrium oxide (Y ₂ O ₃) > 4.5 – ≤ 6.0 % hafnium oxide (HfO ₂) ≤ 5.0 %, aluminum oxide (Al ₂ O ₃) + other oxides ≤ 1.0 %,



Zenostar Zr Translucent pure, light, medium and intense; each shown here as a quarter blank with a full contour molar crown and a five-unit bridge framework.

Light Transmission and Hydrothermal Aging

Zenostar Zr Translucent offers outstanding esthetics with its extremely high light transmission. It also boasts exceptional physical properties such as above average flexural strength and outstanding resistance to hydrothermal aging. This is achieved by means of an improved raw material formula, optimized manufacturing conditions, and lower sintering temperature.

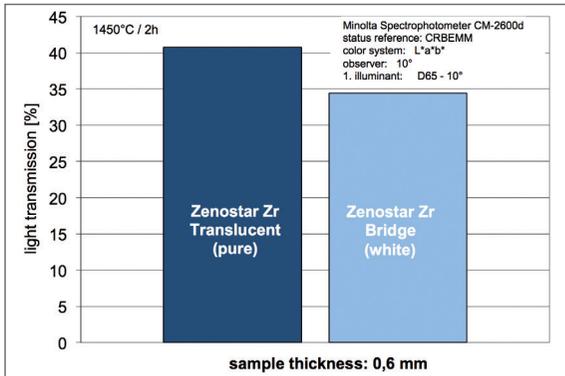


Fig. 1: Comparison of light transmission
Source: Wieland Dental, internal data

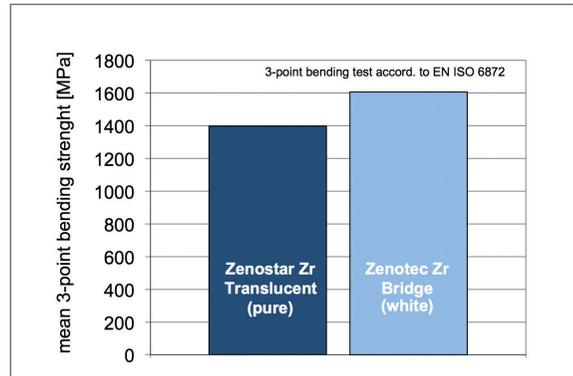


Fig. 2: 3-point test according to EN ISO 6872
Source: Wieland Dental, internal data

The Optical Properties of Zenostar®

In order to set a standard for translucence, the light transmitted through a sample of Zenostar is measured. It is important to bear in mind that the thickness of the sample and the nature of the surface, have a significant effect on the light transmission and therefore on the degree of translucence, as can be observed in Fig. 3. This means that only samples of equal thickness, with identically treated surfaces measured using the same measuring technique, can be compared with one another.

Fig. 4 shows the development of light transmission in Wieland zirconia blanks from 2005 to today. When compared with the white blanks launched in 2005, the light transmission of today's Zenostar Zr Translucent blanks shows an increase of over 60%.

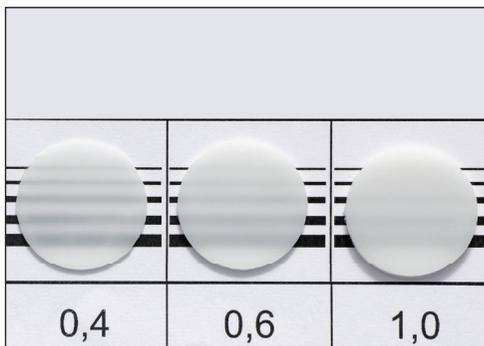


Fig. 3: Translucence of Zenostar Zr Translucent pure shown in relation to the thickness of the sample
Source: Wieland Dental, internal data

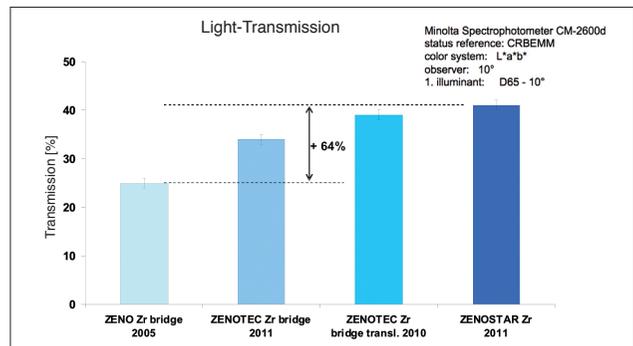


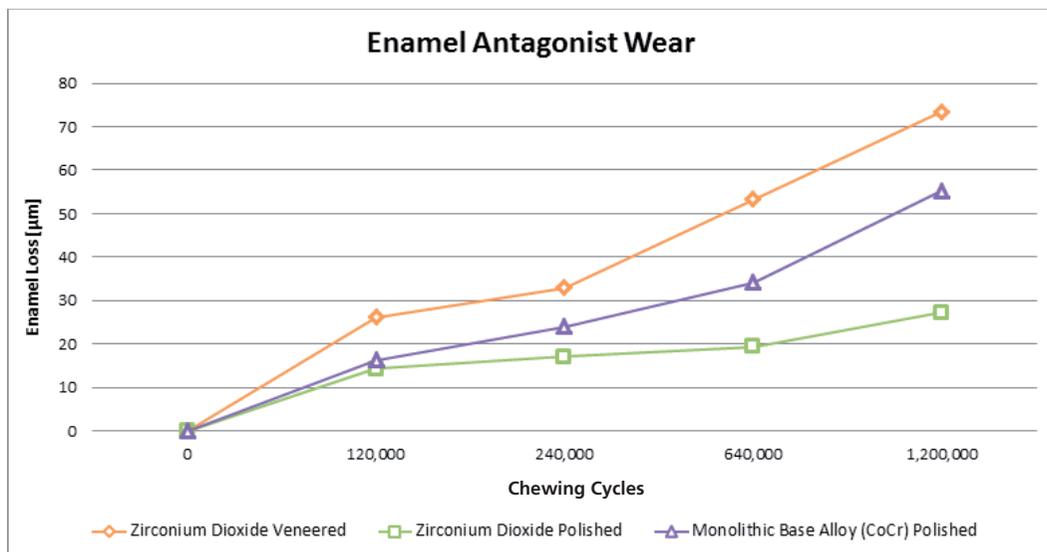
Fig. 4: Light transmission of zirconia blanks from 2005 to today
Source: Wieland Dental, internal data

This light transmission, which is very high for zirconia materials, makes it possible to fabricate full contour restorations with natural esthetics.

Mastication Simulation Study

In a mastication simulation study, conducted at the University of Zurich, Zenostar crowns stood out by virtue of their low susceptibility to abrasion at the ceramic material and at the opposing dentition.

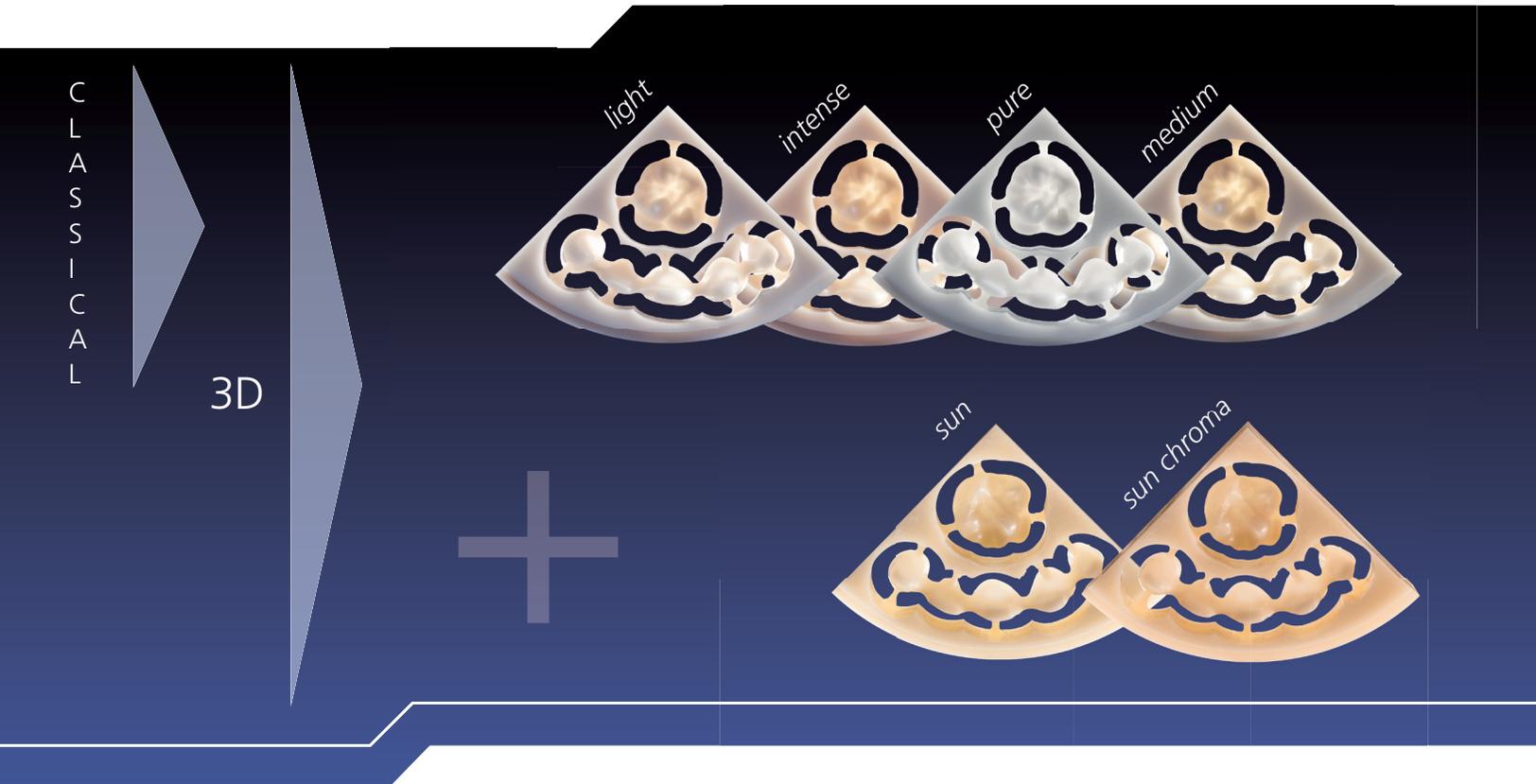
The abrasion properties were compared to those of a non-precious metal restoration and a veneer on zirconia framework. The test was carried out with six test specimens, all of which were subjected to a force of 50 newtons for 1.2 million cycles, in an aqueous environment, while undergoing temperature change. The 1.2 million cycles correspond to five years wear. This simulation showed that the polished Zenostar crown suffered the lowest amount of abrasion and also caused the lowest amount of wear on the opposing teeth. The study also revealed how important polishing is. In the five year mastication simulation the polished Zenostar crown was definitely less abrasive than a CoCr alloy or a veneering ceramic.



*Abrasion behavior of various materials on tooth enamel**

* Stawarczyk, M. Özcan, F. Schmutz, A. Trottmann, M. Roos & C.H. F. Hämmerle; "Two-body wear of monolithic, veneered and glazed zirconia and their corresponding enamel antagonists"; *Acta Odontologica Scandinavica*, 2012.

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ZENOSTAR® 
FULL CONTOUR ZIRCONIA



Zenostar Two-in-One

The Zenostar Two-in-One Concept is easy and predictable.

The Zenostar Zr Translucent shades, pure, light, medium and intense, were developed for reproducing the 16 A-D + 4 bleach shades. The two zirconia blanks, sun and sun chroma, along with the zirconia blanks light, medium and intense, form the basis for reproducing the 26 3D shades. Due to their warm, reddish nuance, sun & sun chroma are suitable for restorations with individual color characterization and can therefore be used for patients whose own natural dentition deviates from the classical tooth shades.

The Zenostar Art 3D stains are available separately as an add-on. The 3D add-on contains seven Zenostar Art 3D stains, which in conjunction with the previous eleven Zenostar Art stains from the Zenostar Art Focus and Complete Modules, open up all the possibilities of 3D dental shades.

The chart on the next page shows the relationship between the various shades.

Zenostar® Shade Chart- for reproducing the 16 A-D + 4 Bleach Shades (staining technique)

A-D Classical	Zenostar Zr Translucent	Zenostar Art Stain	Zenostar Art Incisal Stain
A1	light	A1/A2/A3	*Grey-Violet / Transpa-Blue
A2	light	A1/A2/A3	
A3	medium	A1/A2/A3	
A3.5	intense	A3.5	
A4	intense	A4	
B1	light	B1/B2	
B2	light	B1/B2	
B3	medium	B3/B4	
B4	medium	B3/B4	
C1	light	C1/C2/C3	
C2	medium	C1/C2/C3	
C3	medium	C1/C2/C3	
C4	intense	C4	
D2	medium	D2/D3	
D3	medium	D2/D3	
D4	medium	D4	
BL1	pure	BL1/BL2	
BL2	pure	BL1/BL2	
BL3	pure	BL3/BL4	
BL4	light	BL3/BL4	

Zenostar® Shade Chart** - for reproducing the 26 3D Shades** (staining technique)

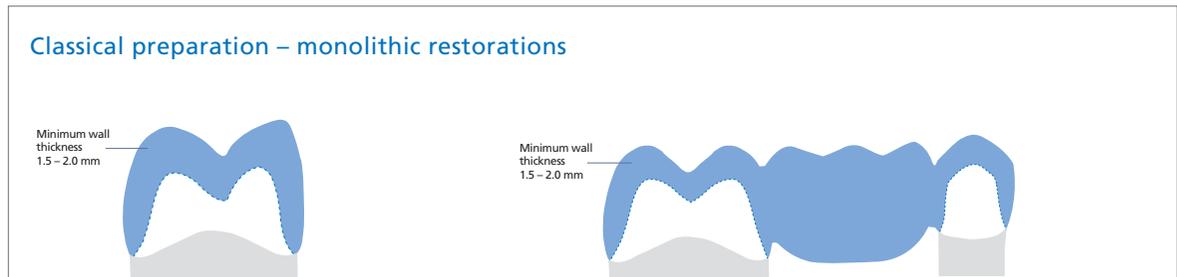
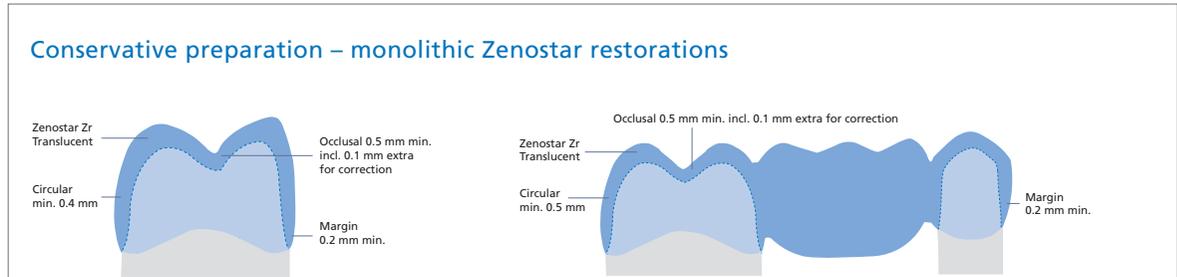
Vita 3D-shade**	Zenostar Zr Translucent	Zenostar Art Stain	Zenostar Art Incisal Stain
1M1	light	A1/A2/A3	*Grey-Violet/Transpa-Blue
1M2	light	A1/A2/A3	
2L1.5	light	B1/B2	
2L2.5	medium	B1/B2	
2M1	sun	3D-1	
2M2	sun	A3.5	
2M3	light	3D-2	
2R1.5	sun	3D-1	
2R2.5	sun	B3/B4	
3L1.5	sun	D4	
3L2.5	sun	B3/B4	
3M1	light	3D-1	
3M2	light	3D-2	
3M3	medium	3D-2	
3R1.5	sun	D2/D3	
3R2.5	sun chroma	A3.5	
4L1.5	sun	C1/C2/C3	
4L2.5	sun	A4	
4M1	medium	3D-3	
4M2	intense	3D-4	
4M3	sun	3D-5	
4R1.5	sun chroma	3D-6	
4R2.5	sun	3D-7	
5M1	sun chroma	3D-3	
5M2	sun chroma	3D-7	
5M3	sun chroma	3D-5	

* The Zenostar Art Incisal Stains (Grey-Violet / Transpa-Blue) are used individually as required depending on the tooth color.

** VITA 3D-Master is a registered trade mark of Vita Zahnfabrik H. Rauter GmbH & Co. KG, 79704 Bad Säckingen.

Preparing Zenostar® Crowns and Bridges

Zenostar allows for conservative tooth preparations. A minimum of 0.5 - 1.0mm should be removed from the occlusal and axial surfaces in order to ensure that the restoration has a long life.



Uniform chamfer



Circumferential shoulder

All preparation sets suitable for zirconia may be used as preparation instruments. The conus angle of the prepared stump should be approximately 4°. This is ideal for scanning in the laboratory scanner and ensures that the crown is sufficiently anchored on the tooth stump. The greatest circumference of the prepared tooth should be clearly visible in the area of the gingival prep margin.

A delicate chamfer is recommended, as it is gentler on the tooth substance and provides no less anchorage for the crown than a more pronounced chamfer.

An anatomical cusp-supported design and a circumferential shoulder, or chamfer preparation, is also the method of choice for monolithic restorations and therefore absolutely essential.

Tangential preparations and prep margins which lie more than 1 mm below the gingival margin, as well as undercut areas and largish cavities, are detrimental to subsequent quality of the Zenostar restoration.

Cleaning, Cementation and Removal of Restorations

Cleaning the Restoration after Try-in

The Zenostar® restoration must be cleaned after intraoral try-in and before cementation. Ivoclean™ is a universal cleaning paste that effectively cleans the bonding surfaces of all types of indirect restorations after intraoral try-in. While phosphoric acid may be used to clean the surface of glass ceramic restorations, its surface-deactivating effect on zirconium-oxide ceramics and base metal alloys inhibits bonding.



Cementation of Restoration

Zenostar restorations can be cemented both conventionally and by means of an adhesive cement such as Multilink® Automix. Multilink Automix is a truly multi-purpose adhesive cement, indicated for cementation of indirect restorations (inlays, onlays, crowns, bridges, and posts) made of all types of restorative materials including zirconia, due to its self-curing with light-curing option. Multilink Automix features patented, hydrolytically stable acidic monomers generating high immediate bond strengths and durable adhesion for long-term security.



Clean Restoration	Prime Restoration	Simplified Bonding with Multilink Automix			
					
<ul style="list-style-type: none"> Rinse restoration with water, then air dry. Cover entire bonding surface with Ivoclean. Allow to react for 20 seconds then rinse and air dry. 	<ul style="list-style-type: none"> Apply Monobond™ Plus to the bonding surface of the restoration. Allow to react for 60 seconds. Air dry. 	<p>Step 1: Prep Dentin/Enamel</p> <ul style="list-style-type: none"> Mix 1:1 ratio of A/B Self-Etching Primer. Cover the complete bonding surface and scrub in the Primer for 30 seconds, beginning with the enamel surface. Air dry 	<p>Step 2: Cement</p> <ul style="list-style-type: none"> Dispense Multilink® Automix luting composite into restoration and seat. Remove excess. Light cure for 20 sec. from each side, or allow to self-cure. 	<p>Step 3: Clean-Up</p> <ul style="list-style-type: none"> After seating, light-cure each quarter surface for 1-3 seconds. The cement will achieve a gel-like consistency for easy clean-up. Light cure buccal and lingual margins for 20 seconds each. 	<p>Step 4: Post-op</p> <ul style="list-style-type: none"> Final post-op view

Removal of Restoration

Zirconia restorations and zirconia crowns can be removed in a few simple steps.

Preparing the Restoration for Removal

If the crown has been veneered then the crown is first made accessible by removing the ceramic on the occlusal surface with a water cooled diamond bur. In the next step the underlying zirconia crown is carefully perforated, keeping a distance of 0.5 mm from the ceramic veneer. This is important in order to prevent chipping or cracking in the ceramic veneer as a result of overheating. In order to seal the access cavity once the endodontic treatment is complete, we recommend filling the trepanation hole with a composite adhesive.

Removing a Zenostar Zirconia Crown

There are two different ways of removing zirconia crown from the tooth stump. We recommend the following method: Use a diamond bur to slit open the axial wall of the zirconia crown in a lingual-labial direction (using plenty of cooling water). Then use a crown remover to lift the crown off without damaging the supporting prepared tooth.

Zenostar® Art Module Focus

For the fast and efficient finishing of restorations, Wieland offers the Zenostar Art Module Focus. This is perfectly coordinated to the base material and consist of stains, glaze, and one-layer ceramics. This enables full contour Zenostar restorations to be stained with ease. Amazing 3D effects can be obtained by applying multiple layers of stains and Magic Glaze. For anteriors, the cut-back or layering technique can be used to quickly and easily meet today's expectations in terms of esthetics.



Zenostar Art Module Focus

Zenostar® Magic Glaze & Magic Glaze Fluorescent (Flu)

Zenostar Magic Glaze / Magic Glaze Flu Spray Glaze can be used respectively or in conjunction with the stains specifically designed for the ceramics concerned. Whereas the conventional Zenostar Magic Glaze possesses no fluorescence of its own, you can perfect your full contour dental restorations by using the Zenostar Magic Glaze Flu Spray. The Flu spray gives the restoration fluorescence similar to rounding off the highly successful Zenostar concept:

- Creates natural fluorescence for full contour Zenostar restorations.
- Zenostar Magic Glaze Flu supports the fluorescent effect of the Zenostar stains (which are also fluorescent).





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