

# GrandioSO

UNIVERSAL NANO-HYBRID RESTORATIVE MATERIAL

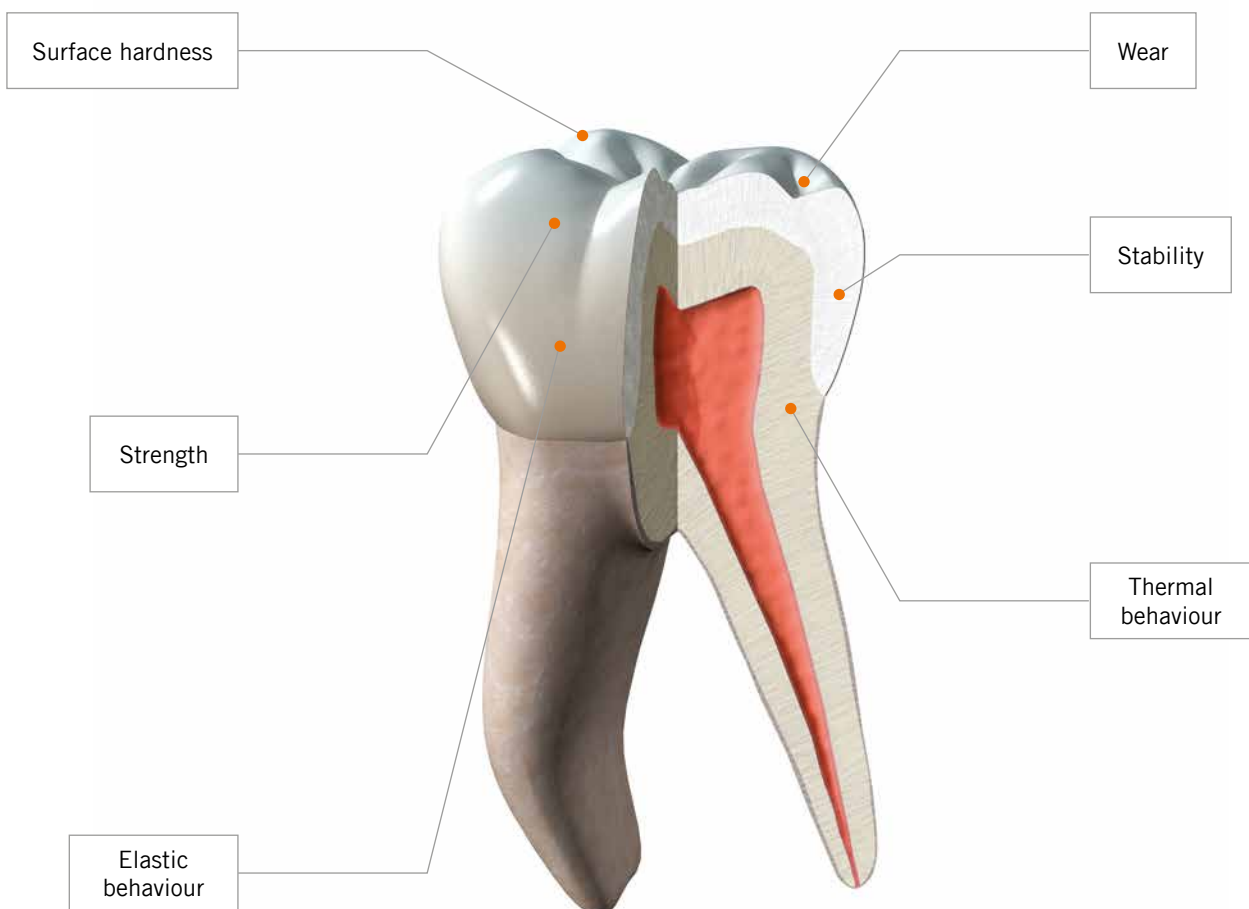


# Grandio®SO

## SO TOOTH LIKE

The perfect filling composite is characterised by a combination of its material properties, to be as similar to the tooth as possible. With the added combination of a high degree of user-friendliness and natural aesthetics. Aside from the shade, it is primarily the combination of a variety of physical parameters that is crucial for the similarity of a composite to the natural tooth. These parameters principally determine the stability and lifespan of a restoration – and thus the continuing satisfaction of your patients.

The following properties are of particular importance here:



Informational video  
[www.voco.dental](http://www.voco.dental)

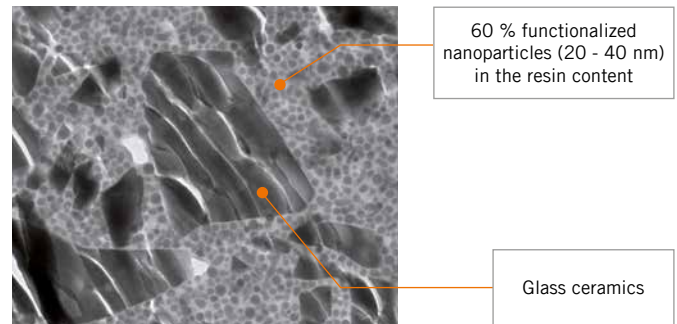
VOCO used these exact natural tooth properties as the model for developing a composite offering physical parameters that, in combination, perfectly mirror the natural tooth. GrandioSO – So tooth like!

# Grandio®SO

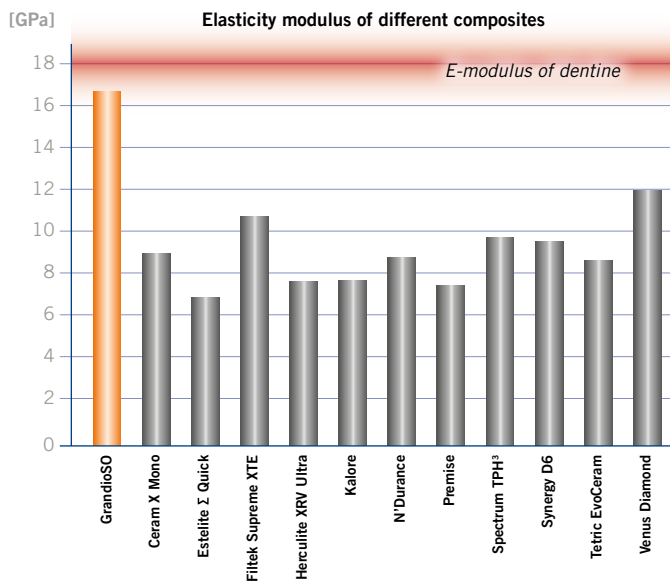
## FOR PERMANENTLY INTACT RESTORATIONS

GrandioSO is the latest universal nano-hybrid restorative from VOCO. The impressive combination of the newest functionalized nanoparticles and special glass ceramics provide an enormously high filler content of 89 % w/w. The resulting low resin percentage additionally contributes to very low polymerisation shrinkage. The occurring shrinkage stress is likewise minimised.

The long-term integrity of a restoration, however, is by far not determined alone by the two aforementioned, uniquely occurring factors. In particular, the dynamic loads such as chewing stress and changes in temperature, to which the restorative is permanently exposed, present a formidable challenge. Only by using a composite that possesses elastic and thermal behaviour matching that of the natural tooth can these recurring factors be counterbalanced.

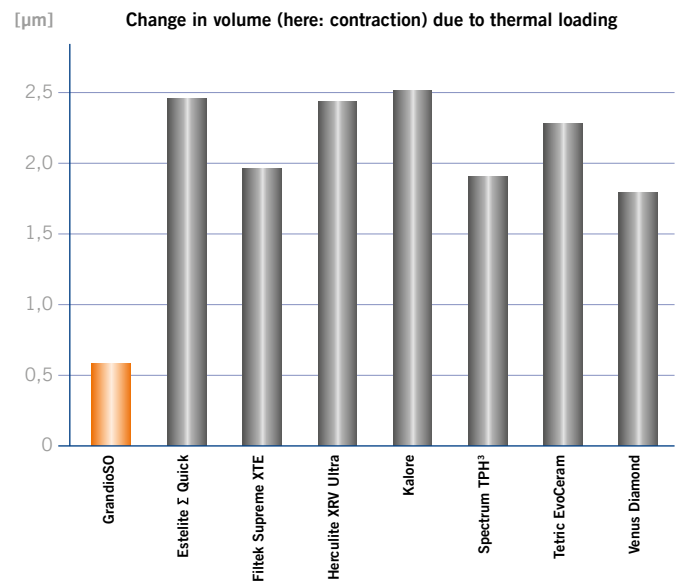


Source: Prof. Dr. D. Behrend, University of Rostock



Source: VOCO GmbH, internal analysis

The E-modulus is a measurement of the resistance that a material, in this case the restorative, offers against deformation. Ideally, a restorative has the same E-modulus as the natural tooth. This ranges from 16.55 to 18.62 GPa for dentine. Out of the analysed composites, GrandioSO demonstrates elasticity behaviour by far closest to that of dentine, with an E-modulus of 16.65 GPa.



Source: VOCO GmbH, model calculation based on measured data of the thermal expansion coefficients  $\alpha$  ( $\varnothing$  cavity = 5 mm,  $\Delta T = 11^\circ C$ )

The figure shows by how many more micrometers than the surrounding enamel the respective restorative contracted. The material, naturally, cannot contract unimpeded, due to the adhesive bond. The considerably smaller change in the volume of GrandioSO, however, leads to significantly lower withdrawal force than is the case with the other analysed materials. These values are indicative of long-lasting, intact filling margins, despite the daily occurring variation in thermal loads.

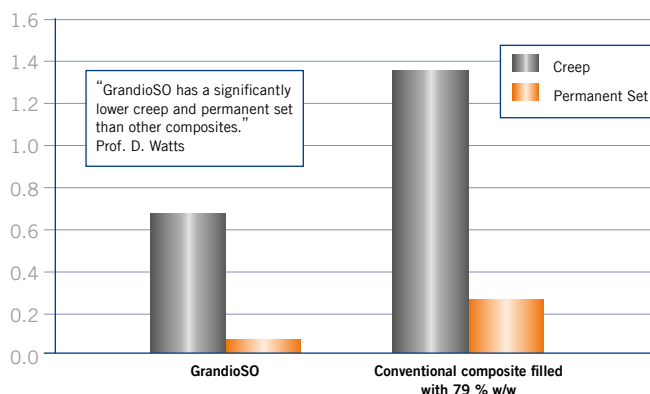
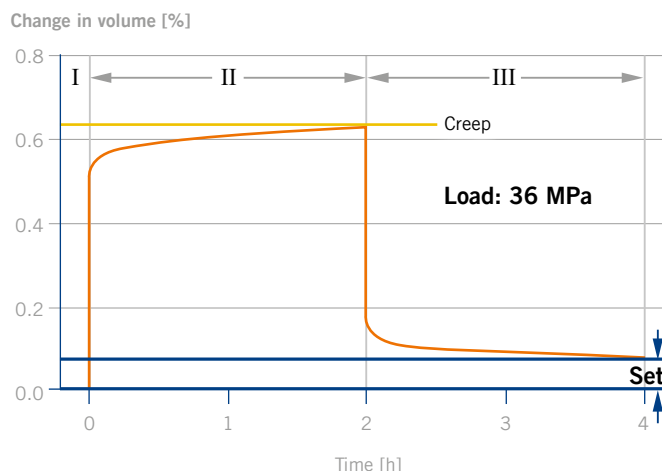
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## FOR HIGHEST RESISTANCE AND STRONGEST HOLD

Exactly like the tooth itself, restoratives are exposed to constantly recurring and extraordinarily high chewing forces. During the development of GrandioSO, special attention was paid to the greatest possible stability and strength of the material, to ensure that it withstands these forces.

Newer research on composites addresses the deformation behaviour of these materials under pressure, the so-called “creep” and “permanent set”. When a force affects a body, then it is initially compressed (Chart below, I). After the initial, quick compression, further, slow compression takes place over the course of the next minutes or hours. This compression following the initial deformation is called creep within the material (II). As soon as the applied force is removed, a reverse process takes place. Within a very short period of time, expansion takes place, leading to a recovery of 80 - 90 %. Even after

the relaxation time, however, the original volume value is not reached again. This difference is called “permanent set” (III). The value describes the inelastic deformation and is of particular importance for posterior restorations: If the material does not stand up to the daily chewing load, deformation of the restoration results over time, and the occlusion is thus affected. Lowest possible “creep” is important for long-term dimensional stability and is a gauge for the quality of a composite.



Source: D.C. Watts, N. Silikas, University of Manchester, 2010

### A comparison of additional physical parameters

	GrandioSO	Ceram X Mono	Estelite $\Sigma$ Quick	Filtek Supreme XTE	Herculite XRV Ultra	Kalore	Venus Diamond	Tetric EvoCeram
Shrinkage [% v/v]	1.61	1.97	2.04	1.92	2.4	1.52	1.6	1.86
Compressive strength [MPa]	439	335	354	315	397	346	411	339
Tensile strength [MPa]	72	48	49	57	57	44	67	52
Transverse strength [MPa]	187	114	93	155	127	130	181	130

Source: VOCO GmbH, internal measurement, 2010

GrandioSO is continuously found in the top group, not only due to its individual values relating to strength and stability, but it also holds an outstanding position in terms of its total sum of properties.

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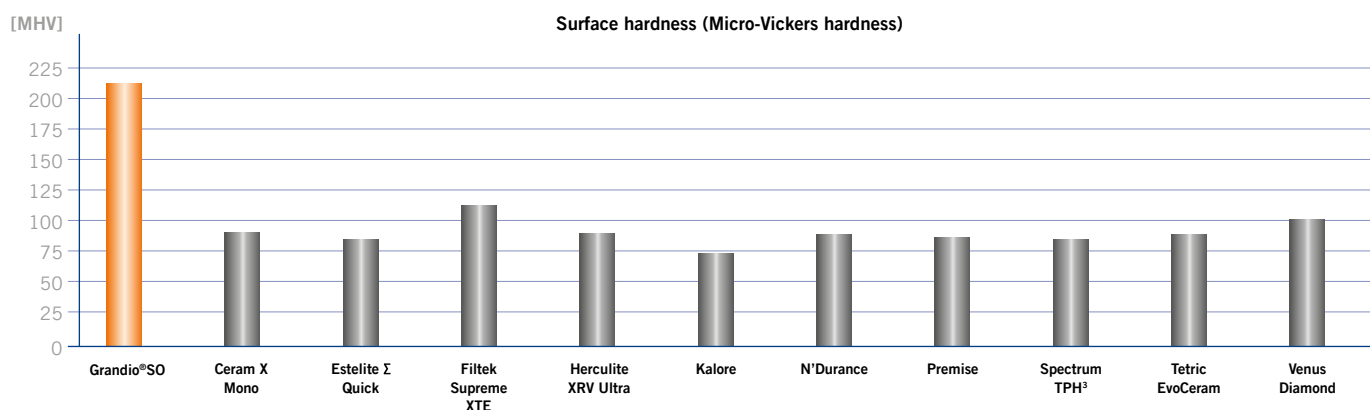
## FOR ENDURINGLY LUSTROUS RESTORATIONS

A restoration that can easily be polished to a high gloss is of great importance to you and your patients. The durability of a restoration, however, is determined by a high surface hardness. The ability to combine these two – fundamentally conflictive – properties together shows the high quality of a composite. GrandioSO sets new standards also in this area.

### Extreme surface hardness

Compared to other composites, GrandioSO exhibits a surface hardness that is twice as high in part and comes closest to the hardness of natural tooth enamel (350 - 450 MHV).

GrandioSO provides long-term abrasion resistance as well as high dimensional stability of your restoration.

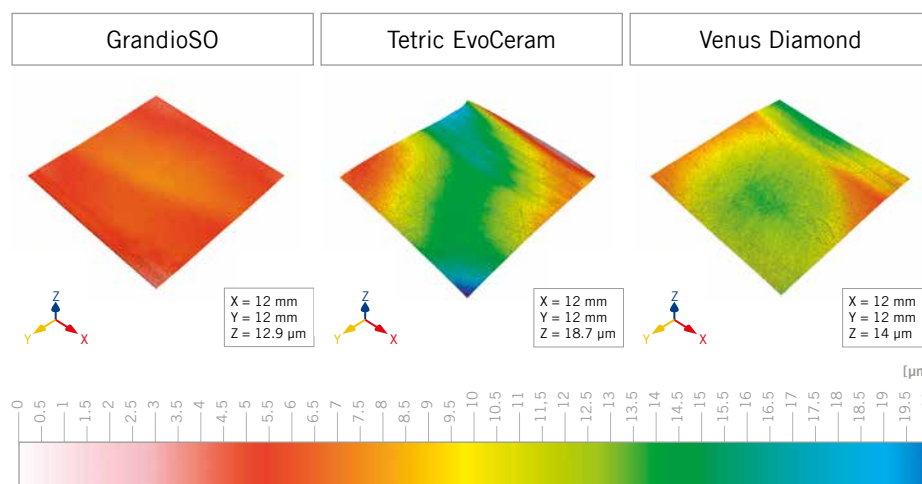


Source: Prof. D. Behrend, University of Rostock, 2010

### Permanently high gloss

The perfect restoration is completed with a high gloss polish. Despite its manifestly very high surface hardness, GrandioSO polishes well and thus yields long-lasting smooth, high gloss restorations. A large number of studies substantiates the high

gloss and low surface roughness of GrandioSO after polishing. The optical analyses below show the smooth GrandioSO surface after polishing.



Source: Dr. G. Fleming, University of Dublin, 2010



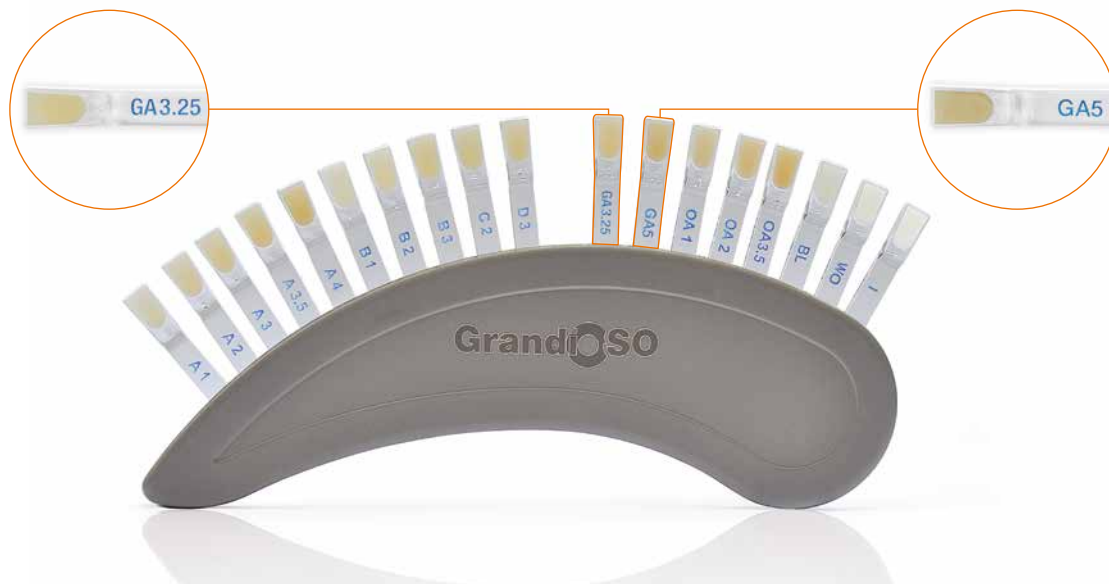
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## FOR HIGHEST USER-FRIENDLINESS

### All-purpose

GrandioSO is a restorative that can be used universally, both because of its physical properties and also for aesthetic aspects. Even in the anterior region, only one shade of GrandioSO is required to produce the best aesthetic results. The opacity and translucency of the material were coordinated in such a way that a restoration in the anterior region is indistinguishable from the surrounding tooth substance. The desire often expressed by dentists for a darker shade, especially for the restoration of Class V cavities, has been taken into account in form of the new shade GA5.

The shade GA3.25 was additionally included to close the shade gap between A3 and A3.5 assuring an optimal shade match. The body of the new GrandioSO shade guide is produced in its grey shade, this greatly reduces the risk of reflectivity. This technique is commonly found in photography. This permits the reproducible assessment of shades in varying light conditions and reduced glare ("white" teeth!) as they exist at the dentist's chair. Aesthetic work is simplified in particular by the new GrandioSO shades that make sense for everyday use in the surgery, and by its special shade guide.

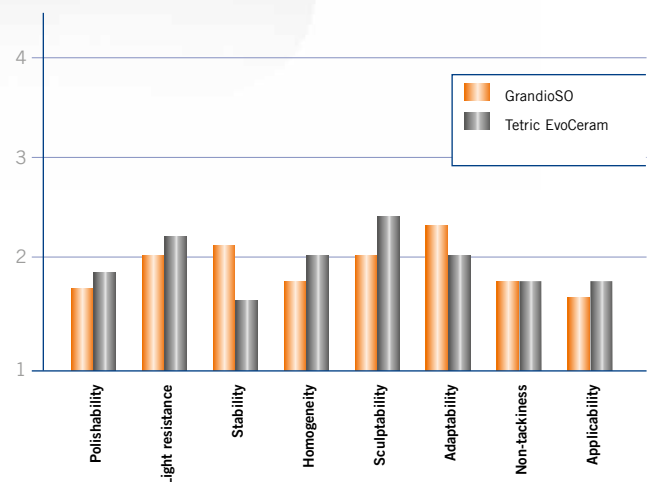


### Best application properties

Quick work is aided by the handling of a material, e.g., non-sticky, smooth consistency and good packable sculptability. Multiple properties that affect handling were rated in a blind test by test dentists within the scope of a study by Frankenberger et al. (2010). GrandioSO was compared with Tetric EvoCeram in the evaluation and performed extremely well.

- Outstanding polishability
- Excellent modelling thanks to smooth consistency
- Light resistance of 4 min 30 sec, i. e., working without time pressure
- Reduced light-curing times of only 10 sec. for shades A1, A2, A3, B1 and BL

Handling properties according to academic grades



Source: Prof. Dr. R. Frankenberger, University of Marburg, 2010

Grandio®SO

CLINICAL APPLICATION

Case 1



Fillings in 14, 15 in need of replacement due to secondary caries



Excavated teeth



15 with the distal marginal ridge modeling complete



Completed restoration

Source: Dr. Walter Denner, Fulda / Germany

Case 2



Insufficient composite fillings of teeth 11 and 21



Completed palatal wall with GrandioSO BL



Application of increments using GrandioSO A3.5



Completed restoration

Source: Dr. Sanzio Marques, Passos / Brazil

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## FOR TOOTHLIKE RESTORATIONS

### Indications

- Fillings of class I to V cavities
- Reconstruction of traumatically damaged anteriors
- Facetting of discoloured anteriors
- Correction of shape and shade for improved aesthetic appearance
- Locking, splinting of loosened teeth
- Repairing veneers
- Restoration of deciduous teeth
- Core build-up under crowns
- Composite inlays

### Advantages

- Toothlike restorative for reliable restorations
- Very high filler content of 89 % w/w
- All-purpose for the highest demands in both the anterior and posterior tooth regions
- Excellent light resistance
- Optimal coordination of opacity and translucency for results that mirror the natural tooth using only one shade
- Smooth consistency, non-sticky, best sculptability
- Easily polishes to a high gloss – lasting, smooth surface
- Compatible with all conventional bonds

### Presentation

#### Sets

- |          |  |          |                  |
|----------|--|----------|------------------|
| REF 2600 | Set syringe 5 × 4 g (A2, A3, A3.5, GA3.25, GA5), shade guide             | REF 2607 | Shade guide      |
| REF 2640 | Set Caps 80 × 0.25 g (16 each of A2, A3, A3.5, GA3.25, GA5), shade guide | REF 9301 | Dispenser – Caps |



#### Individual shades

Shade	Syringe 4 g	Caps 16 × 0.25 g	Shade	Syringe 4 g	Caps 16 × 0.25 g	Shade	Syringe 4 g	Caps 16 × 0.25 g
A1	REF 2610	REF 2650	B2	REF 2620	REF 2660	OA2	REF 2631	REF 2671
A2	REF 2611	REF 2651	B3	REF 2621	REF 2661	OA3.5	REF 2633	REF 2673
A3	REF 2612	REF 2652	C2	REF 2624	REF 2664	BL	REF 2635	REF 2675
A3.5	REF 2614	REF 2654	D3	REF 2627	REF 2667	GA3.25	REF 2613	REF 2653
A4	REF 2615	REF 2655	Incisal	REF 2629	REF 2669	GA5	REF 2616	REF 2656
B1	REF 2619	REF 2659	OA1	REF 2630	REF 2670			

Ceram X Mono, Estelite ̳ Quick, Filtek Supreme XTE, Herculite XRV Ultra, Kalore, N'Durance, Premise, Spectrum TPH<sup>3</sup>, Synergy D6, Tetric EvoCeram and Venus Diamond are not registered trademarks of VOCO GmbH.

VOCO GmbH  
Anton-Flettner-Straße 1-3  
27472 Cuxhaven  
Germany

Freecall: 00 800 44 444 555  
Fax: +49 (0) 4721-719-140

info@voco.com  
www.voco.dental

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