GrandioSO: Built to Last

OVER 10 YEARS OF PROVEN PERFORMANCE, ESTHETICS AND SUPERIOR HANDLING BUILT ON TOOTH-LIKE PHYSICAL PROPERTIES

GrandioSO

89% FILLED UNIVERSAL NANO-HYBRID COMPOSITE WITH THE COMBINATION OF HANDLING, ESTHETICS AND TOOTHLIKE PERFORMANCE

EDITORS' CHOICE DENTAL ADVISOR

Dental PRODUCT SHOPPER BEST PRODUCT

REALITY Four Star Award

nanohybrid technology

VOCO THE DENTALISTS

GrandioSO

OVER 10 YEARS OF TOOTHLIKE PHYSICAL PROPERTIES

The modern ideal for a composite restorative is characterized by its material properties, user-friendliness and natural esthetics. Critical to its overall performance are the various physical properties that will determine the composite restorative's behavior as it compares to the natural tooth structure that surrounds it, especially at the point that the two mediums meet: the margin. Thus the restorative's ability to behave like natural tooth structure goes a long way in determining the stability and longevity of the overall restoration, and ultimately the long-term satisfaction of the patient.

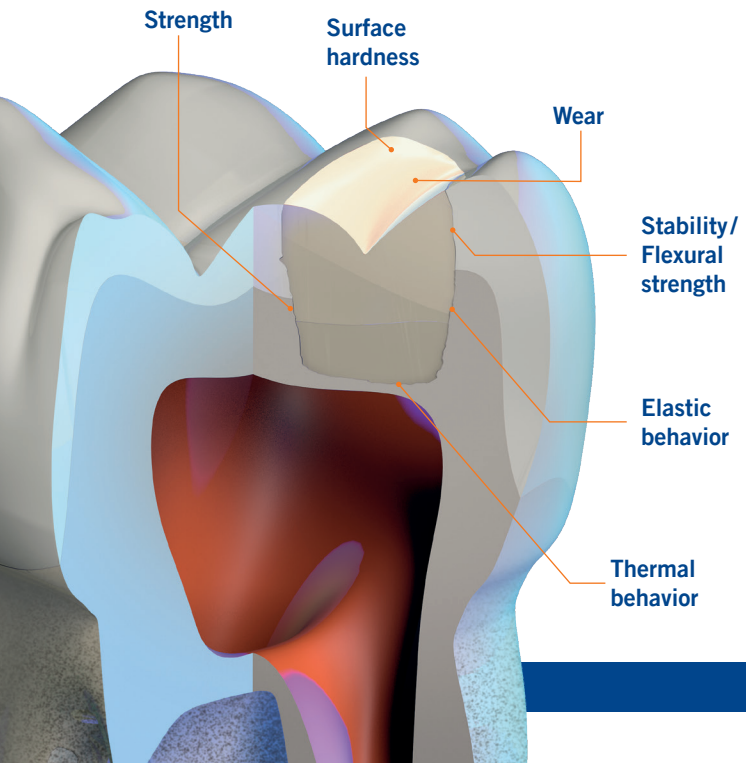
With a continuous focus on innovation andan emphasis on the critical importance of preserving the integrity of the margin, VOCO scientists took on the task of designing a restorative material that closely mirrored the physical properties and behavior of natural tooth structure. This enabled dentists to create restorations that move and react with the surrounding dentition, minimize the stress transferred to the margin, and reducing the risk of incipient decay and failure. The result was GrandioSO, a universal, highly-filled, nano-hybrid composite that became the most toothlike composite on the market. Today, with just over a decade of success and proven practitioner and patient satisfaction, GrandioSO has maintained its status as **the most toothlike composite on the market**.

Many physical properties combine to make GrandioSO so toothlike, including:

- **Modulus of elasticity** – allows GrandioSO to flex under a given load and return to its original shape at the same rate as natural tooth structure.
- **Thermo-cycling** – allows GrandioSO's reaction to temperature changes within the mouth to align very closely with that of natural tooth structure.
- **Flexural strength** – allows GrandioSO to flex under a load very similar to that of natural tooth structure.

It of course does not stop there. Compressive strength, edge strength, creep and many more physical properties work together to support GrandioSO's performance and longevity as a universal restorative where it matters most: at the margin.

Important toothlike properties around the margin include:



GrandioSO

ISO-PAK INFECTION & HUMIDITY CONTROL

ISO-pak for Infection & Humidity Control

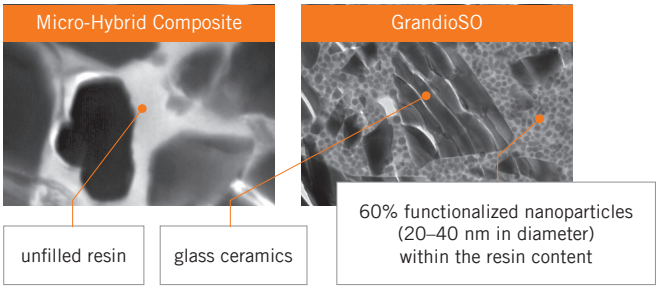
The airtight ISO-pak maximizes product quality by reducing the risk of cross-contamination while eliminating the outside effects of various humidity levels, whether it is used in the dry winter air of Canada and the Arctic Circle, or the moist humid air in the tropics of Florida.

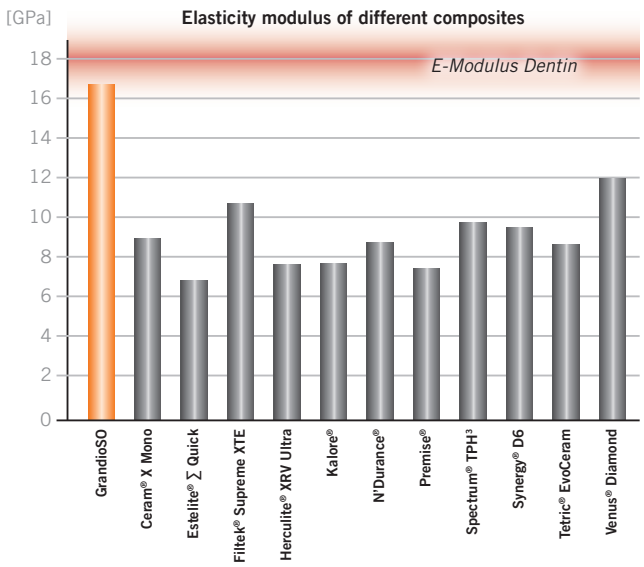
GrandioSO

FOR PERMANENTLY INTACT RESTORATIONS

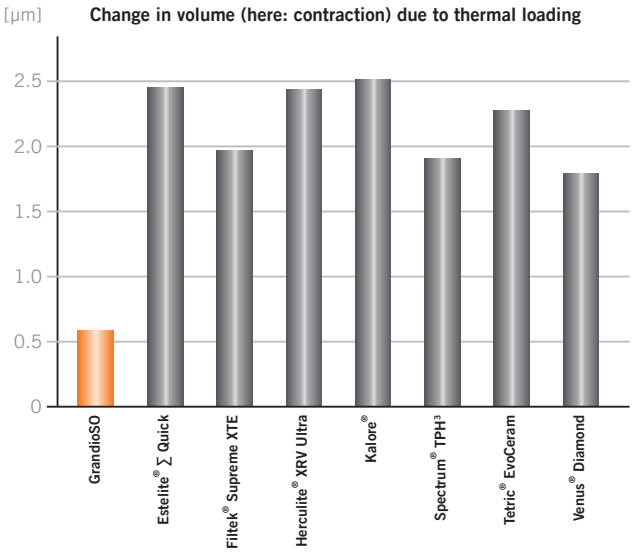
A decade worth of competitive success and GrandioSO remains one of the most successful and widely-used nano-hybrid composites. The impressive combination of the newest functionalized nanoparticles and special glass ceramics provide an exceptionally high filler content of 89% w/w. The resulting low resin percentage additionally contributes to very low polymerization shrinkage, which also minimizes shrinkage stress.

Furthermore, 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 behavior matching that of the natural tooth can these recurring factors be counterbalanced.





Source: VOCO GmbH, internal analysis



Source: VOCO GmbH, model calculation based on measured data of the thermal expansion coefficients α (ø cavity = 5mm, ΔT = 11°C)

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 dentin. Out of the analyzed composites, GrandioSO demonstrates elasticity behavior by far closest to that of dentin, with an E-modulus of 16.65 GPa.

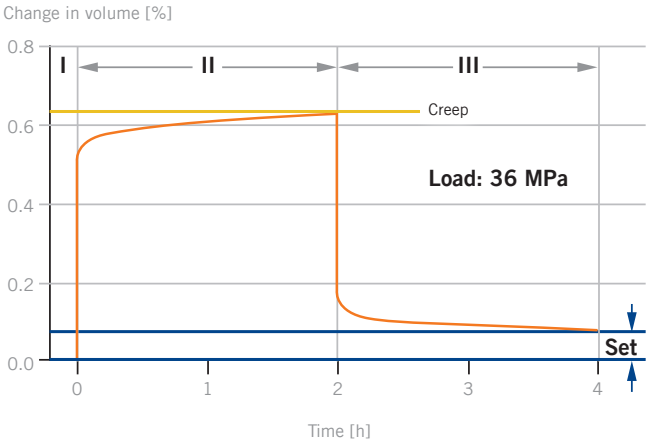
The figure shows by how many more micrometers than the surrounding enamel the respective restorative contracted. The material, naturally, cannot contract unimpeded, due to the adhesive bond. The considerably smaller change in the volume of GrandioSO, however, leads to significantly lower withdrawal force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

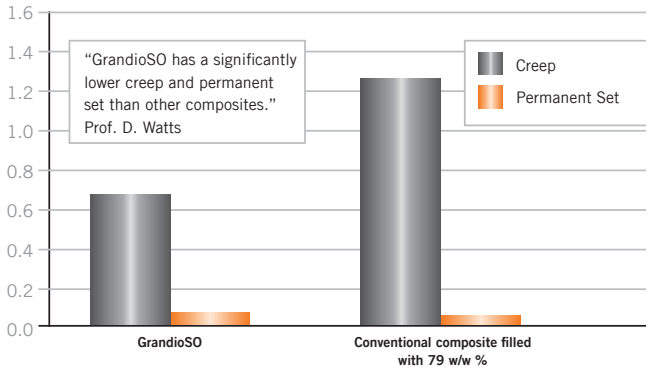
GrandioSO

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.

Several studies on composites address the deformation behavior 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® ∑ Quick	Filtek® Supreme XTE	Herculite® XRV Ultra	Kalore®	Venus® Diamond	Tetric® EvoCeram
Shrinkage [vol. %]	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.

*Source: Prof Dr. Watts, University of Manchester, England, 2002

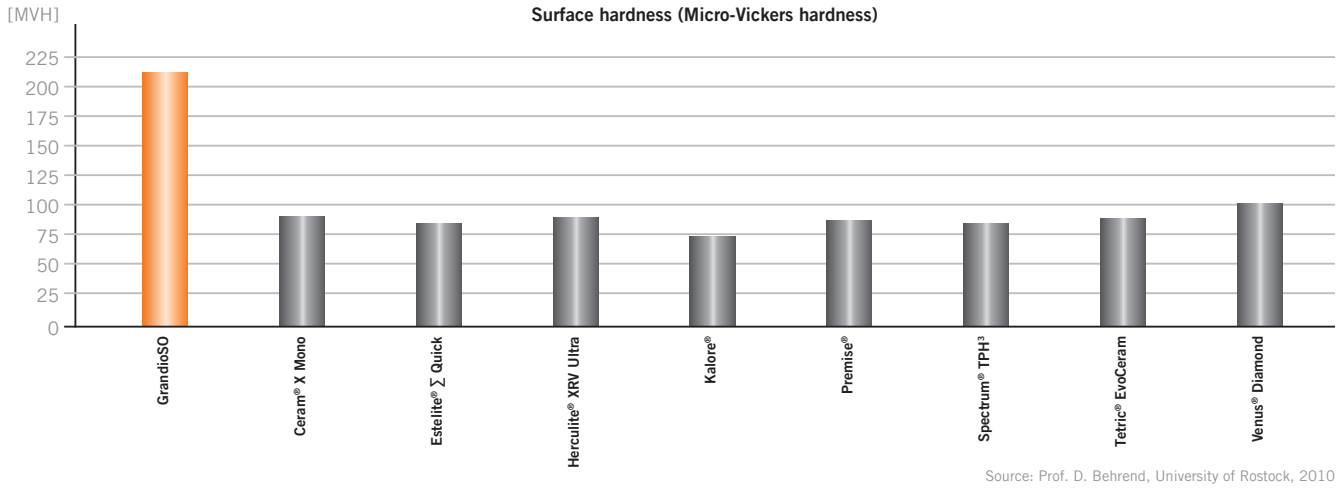
GrandioSO

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 in this area.

Extreme surface hardness

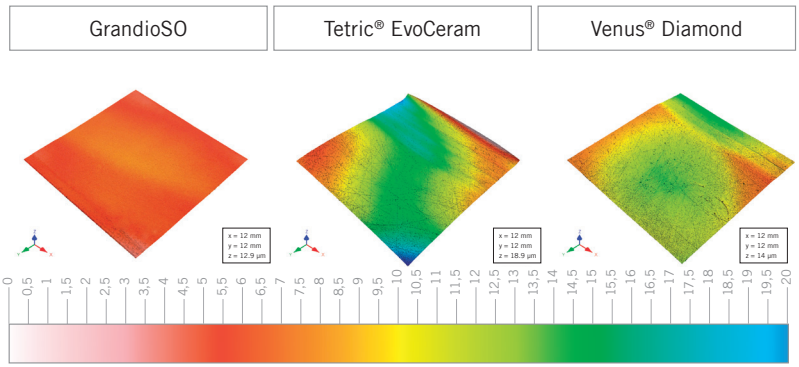
Compared to other composites, GrandioSO exhibits a surface hardness that is twice as high and comes closest to the hardness of natural tooth enamel (350–450 MHV). GrandioSO provides long-term abrasion resistance as well as high dimensional stability of your restoration.



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

Permanently high gloss

The perfect restoration is completed with a high gloss polish. Despite its very high surface hardness, GrandioSO polishes well and yields a long-lasting smooth, high gloss restoration. A large number of studies substantiate the high gloss and low surface roughness of GrandioSO after polishing.The optical analysis below show the smooth GrandioSO surface after polishing.



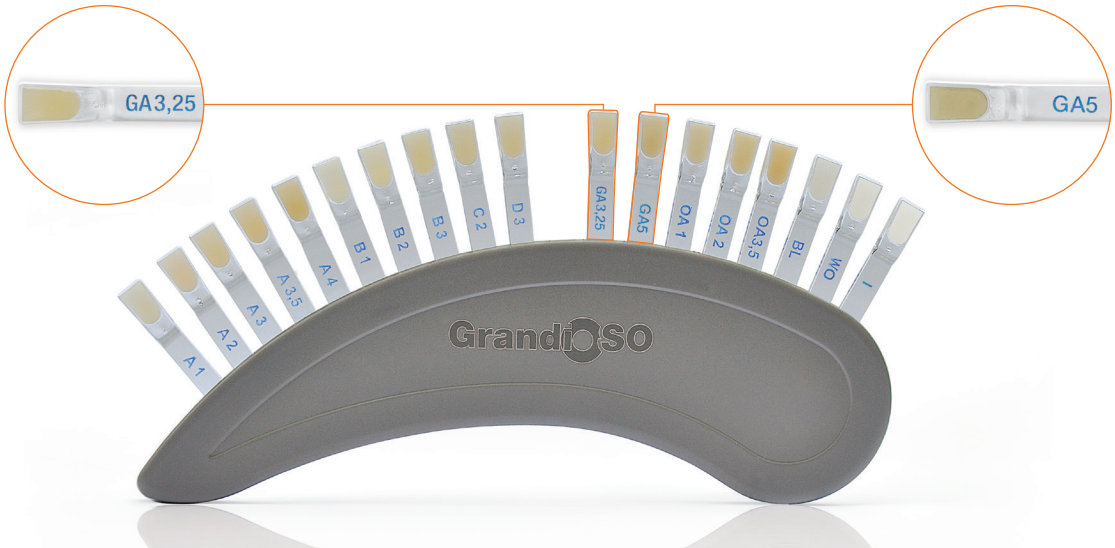
Source: Dr. G. Fleming, University of Dublin, 2010

GrandioSO

FOR THE ULTIMATE IN USER-FRIENDLINESS

All-purpose

GrandioSO is a restorative that can be used universally, both because of its physical properties and also for esthetic aspects. Even in the anterior region, only one shade of GrandioSO is required to produce the best esthetic 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 the form of the 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 a grey shade, this greatly reduces the risk of reflectivity, a technique commonly used 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. Esthetic work is simplified in particular by the new GrandioSO shades that make sense for everyday in office use.

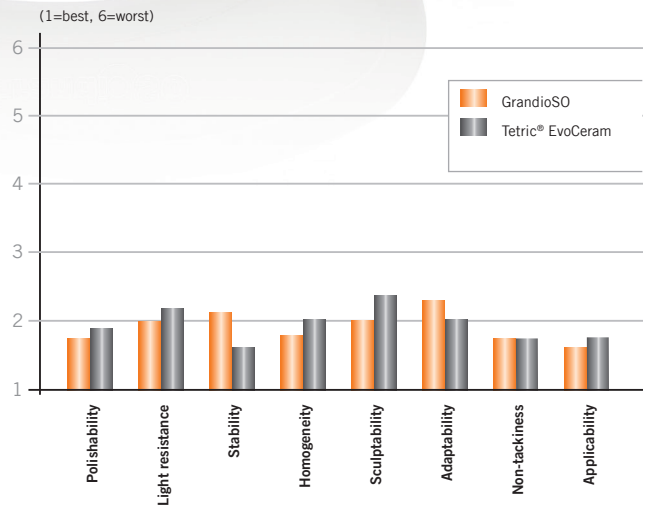


Best application properties

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 modeling 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

GrandioSO

CLINICAL APPLICATION

Case 1

Fillings in 4, 5 in need of renovation due to secondary caries

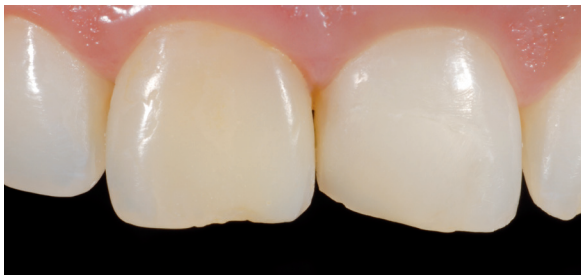
Excavated teeth

4 with the distal marginal ridge modeling complete

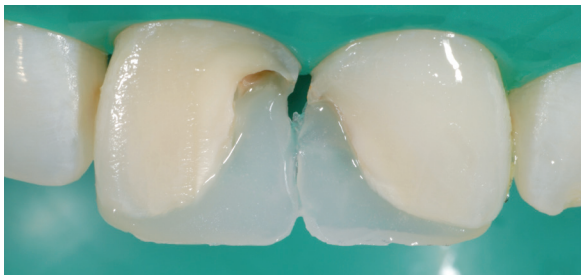
Finished restorations that cannot be distinguished from the natural tooth

Source: Dr. Walter Denner – Fulda, Germany

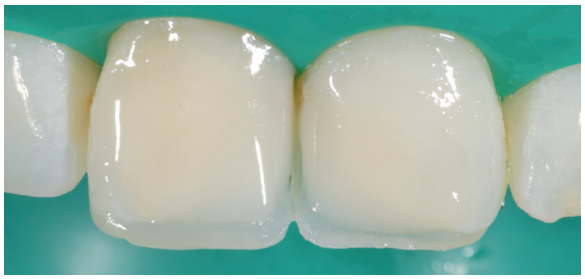
Case 2



Insufficient composite fillings of teeth 8 and 9



Completed palatal wall with GrandioSO BL



Application of increments using GrandioSO A2

Final restoration polished with Dimanto

Source: Dr. Sanzio Marques – Passos, Brazil

GrandioSO

FOR TOOTH-LIKE RESTORATIONS

Advantages

89% fillers by weight:

- Outstanding wear resistance
- Enhanced color stability

30–50% less resin compared to classic hybrid and pseudo nano composites:

- Low shrinkage of only 1.6 vol.%
- Non-sticky
- Prolonged working time under ambient light

Designer Nano particles:

- Excellent polishability and polish retention
- Tooth-like modulus of elasticity
- Tooth-like thermal expansion and flexural strength

VOCO presents its ISO-pak individual Infection & Humidity Control packaging for capsules

Presentation

Kits

REF 2600	Kit syringes 5 × 4 g (A1, A2, A3, B1, GA3.25), shade guide
REF 2640	Kit Caps 80 × 0.25 g (16 each of A1, A2, A3, B1, GA3.25), shade guide
REF 2607	Shade guide

Individual shades

Shade	1 syringe, 4 g	16 × 0.25g caps	Shade	1 syringe, 4 g	16 × 0.25 g caps
A1	REF 2610	REF 2650	D3	REF 2627	REF 2667
A2	REF 2611	REF 2651	Incisal	REF 2629	REF 2669
A3	REF 2612	REF 2652	OA1	REF 2630	REF 2670
A3.5	REF 2614	REF 2654	OA2	REF 2631	REF 2671
A4	REF 2615	REF 2655	OA3.5	REF 2633	REF 2673
B1	REF 2619	REF 2659	BL	REF 2635	REF 2675
B2	REF 2620	REF 2660	GA3.25	REF 2613	REF 2653
B3	REF 2621	REF 2661	GA5	REF 2616	REF 2656
C2	REF 2624	REF 2664			

VOCO America Inc.
1285 Rosemont Drive
Indian Land · SC 29707

www.vocoamerica.com
infousa@voco.com

Toll-free phone: 1-888-658-2584
Fax: 1-888-849-3989

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