



 **SILMET**

ProFil Line

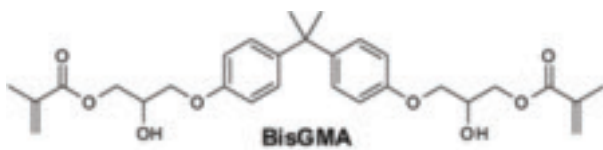
Pioneering Resin Technology



The Pioneering Technology Behind Silmet's Resin Experience

Background

Modifications to the basic components of today's composites have always been proposed. All for reasons of eliminating BPA, stress reduction and improving volumetric shrinkage. There remains a real need to create a flexible oriented monomer backbone that can easily be complied into niche products that address limitations particularly mechanical properties.



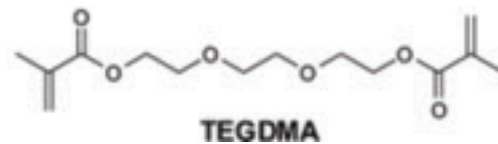
Silmet's Chemistry

The monomers present in all Pro-line Resin Based Materials are the same as those in currently commercial composites, therefore, the same physical properties are expected. Optimization and balancing of compounds is the core foundation in building the Pro-line chemistry backbone.

At Silmet Ltd, we have expanded on an extensive understanding of each component and their role in the end restoration. Our research effort has focused on improving the formulations that use these monomers to increase their clinical service.

This flexibility in design enables us to present a non sticky formulation restorative composite, optimal flow for flowable and superb polishability with high wear as expected with Veneers. BIS-GMA is an extremely viscous material, making inclusion of polymerization initiators very difficult without adding modifiers to change its handling properties. An example of one of these modifiers is BIS-DMA (bisphenol A dimethacrylate), which, when mixed with BIS-GMA, sufficiently reduces viscosity. This allows for the addition of stabilizers and polymerization initiators resulting in a homogeneous mixture that is easily handled. However, materials containing BIS-DMA can release very small quantities of BPA after coming in contact with salivary enzymes (esterases).

This is why with the Pro-line backbone we incorporated TEGDMA (Triethylene glycol dimethacrylate), which is not synthesized from BPA, nor does it decompose to BPA.



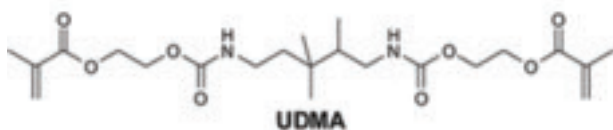
TEGDMA – low molecular weight

Our **Pro-Line** Resins have a high concentration of a low molecular weight component, TEGDMA. This creates a system that offers the following advantages:

- The resultant high number of double bonds per unit of weight on a flexible backbone enables a high conversion of double bonds during polymerization.
- The low viscosity of the resin permits higher filler loading than with BIS-GMA alone.
- The high degree of crosslinking and compact molecule creates a very hard resin matrix. However, the TEGDMA concentration also allows for some opportunities for improvement.
- The relatively low molecular weight of TEGDMA contributes to the aging of an uncured composite especially in capsules where there is a high ratio of surface area to volume of paste. This material is liable enough to migrate into the capsule walls leading to a thickening of the composite.
- The low molecular weight and resultant high number of double bonds per unit of weight creates a high degree of crosslinking creating a very rigid, stiff composite with a relatively high amount of shrinkage.
- TEGDMA is somewhat hydrophilic. The differences in moisture content of the paste can contribute to thickening or softening of the paste in the capsule depending on the ambient moisture content of the surrounding air under extreme climatic conditions.

Polymerization

Polymerization of BIS-GMA containing materials involves free-radical chemical reactions. Oxygen in the air interferes with this process causing incomplete polymerization at the BIS-GMA/ air interface. Thus, any newly placed restoration or sealant will have a thin surface layer of incompletely polymerized material, which is rapidly lost within hours post-placement.



UDMA – high molecular weight

Urethane modified methacrylate restorative resins UDMA (urethane dimethacrylate), not manufactured from BPA, were added.

This high molecular weight material has an impact on the measurable viscosity. A typical batch restorative has a viscosity of 30,000 poise; Pro-Line Resins can expose as much as 350,000 poise. There is considerable variation in resin composite viscosities. This could be used by the dentist as a key parameter in restorative selection for better handling properties.

The higher molecular weight of the resin results in less shrinkage, reduced aging and a slightly softer resin matrix. Additionally these resins impart a greater hydrophobicity and are less sensitive to changes in atmospheric moisture. However their use as a BIS-GMA resin alternative is limited because they do not develop equivalent stiffness and hardness characteristics.

Adding a percentage of Non-silanated nanofill particles & high-density spheres without altering the resin-to-filler ratio allows the resin matrix to flow around them and react without constraint. Nanoclusters of silane treated zirconia/silica are homogeneously distributed to provide cross-link to surrounding resin and allow for high volume-wise filler concentration.

Filler Particle Size Distribution

Optical and Mechanical properties combined

When selecting the material for a dental restoration, esthetic and functional requirements are key considerations depending on the indication in question. Especially for ide-span treatments in the frontal area or where there is constricted

space limited in the ide area, a material with high translucency and high strength as well is required. Fillers play a critical role in enhancing the performance of the dental restoration.

Fillers are classified by material, shape and size. Fillers are irregular or spherical in shape depending on the mode of manufacture. At Silmet Ltd we often use fillers that have spherical particles which are easier to incorporate into a resin mix and fill more space leaving less resin.

Mechanical advantage

Presence of spherically- shaped filler particles affect the microfracture mechanisms of dental resin composites and increase the bonding strength and fracture toughness with a much higher rate for elastic modulus. One size spherical particle occupies a certain space. Adding smaller particles fills the space between the larger particles to take up more space. Less resin remaining will result with less shrinkage on curing the more size particles used in proper distribution. In order to achieve a higher filler loading, a wide distribution of filler particle size must be present.

Optical advantage

The density of the filler determines how strongly the light is scattered within the material. Addition of filler to unfilled resin matrices results in a significantly higher transmittance value.

The filler particles used in our resin system mainly consist of Barium glass and Fumed Silica. The particle size distribution is based on application and features expected Barium aluminosilicate: Average particle size < 1µm Fumed Silica : Average particle size < 0.04µm The inorganic filler material in essence, determines the physical and mechanical properties of the composite in use . The nature of the filler, how it is obtained and how much is added largely decide the mechanical properties of the restoration material. properties of the organic matrix, so incorporating as high a percentage as possible of filler is a fundamental aim.

The filler reduces the thermal expansion coefficient and overall curing shrinkage, provides radio-opacity, improves handling and improves the aesthetic results.



We Can Handle Any Hole...
With ProFil Bulk Now Faster and Easier

PROFil™ Bulk DUAL CURE Bulk Fill Composite



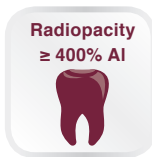
ProFil™ Bulk is a dual cure dental restorative composite designed for direct restorations. It is suitable for bulk fill technique in the posterior region and can be applied in an unlimited layer thickness.

Features

- Unlimited depth of cure - can be administered in arbitrary filling depth
- No need in an additional covering layer
- Dual curing mechanism
- Fast setting
- Compatible with all methacrylate-based dental bonding agents
- Superior compressive strength
- Utilization of intercalated and exfoliated nano-composite technology - Less polymerization shrinkage, better marginal adaptation
- Excellent radiopacity - 400 %AI
- Easy-to-use and apply using an industry standard, auto-mix dispensing system. Saves time and provides a consistent, homogeneous mix

Properties

| | |
|---|---------------|
| Compressive Strength | 250 MPa |
| Linear Shrinkage | 1.2 % |
| Compatible with halogen light | Yes |
| Compatible with Plasma ark light lamp | Yes |
| Compatible with LED | Yes |
| Depth of Cure Irradiation by LED – for 30 sec. | 8.0 mm |
| Depth of Cure Irradiation by Halogen light – for 30 sec | 8.0 mm |
| Working Time | 1.5 - 3.5 min |
| Setting Time | 2.5 - 4.5 min |



FAQ

Does ProFil Bulk act the same way as a regular composite?

ProFil Bulk can be a self-cured or light cured offering the possibility to work with very thick layers and cure 8mm material instead of 2mm. Just fill the entire cavity in one time and cure, the material will do the rest until reaching full curing of the entire restoration. With this material the shrinkage is half of regular composite therefore will last longer.

How does ProFil Bulk compare to SonicFill™ by Kerr?

SonicFill™ is a posterior composite with higher filler content than ProFil. They overcome the dense characteristic by using ultrasound waves in the device, helping the material to flow. Composite materials prior to SonicFill™ had to be applied in few increments and molded and sculpted to mimic the natural tooth topography. Flowable materials are suitable for single layer fillings however they cannot be sculpted at the surface. They need to be overlaid by a conventional composite in order to model cusps and create life-like morphology. SDR® and Filtek™ Bulk Fill are flowable that can have increment thickness of 4mm (while regular flowable will only be used for layering 0.5mm) but must be covered with composite. SonicFill™ is a flowable that be sculptured.

US Denville and Coltene also approached this challenge differently, We at Silmet, introduced a stackable composite that due to its dual cure mechanism and low shrinkage can be used in one thick layer with no flowable as a liner.



2 in 1

Benefit from Strength of Adhesives and Durability of Composites in One Product

ProFil™ Flow SE

Light-Cure Self Adhesive Flowable Composite



ProFil™ Flow SE is a light cure self-etching, self-adhesive, radiopaque, flowable composite. Combining 3 in one ProFil Flow SE features the benefits of adhesive and restorative technology thus simplifying direct restorative procedures. With this flowable dental composite there is no need to bond separately, reducing steps and saving time.

ProFil Flow SE is faster, easier, safer and is the ideal restorative material for pediatric patients.

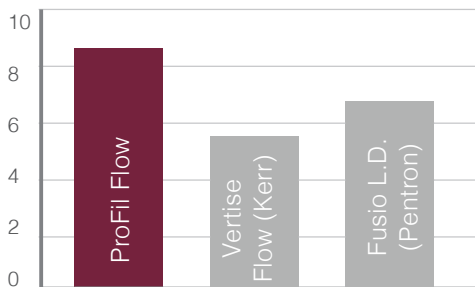
Features

- Ready for use, no need to Etch rinse and dry
- Etching, bonding and filling in one step
- Radiopaque
- Esthetic
- Does not open dentin tubules
- Prevents postoperative sensitivities
- Improves procedure efficiency by reducing the time, steps, & materials needed

Properties

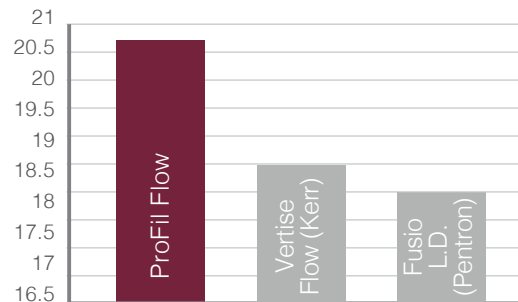
| | |
|--|------------------------|
| Inorganic filler particle size | 0.02 - 2.3µm |
| Volume of inorganic fillers | ≥ 40% |
| Working time (full operating light) | ≥ 01:00 minutes |
| Recommended thickness of layers | ≤ 2 mm |
| Recommended curing time (LED-/ Halogen lamp) | ≥ 20 sec |
| Depth of cure (20s curing time) | ≥ 2 mm |
| Flexural strength (= transverse strength) | ≥ 90 MPa |
| Radiopacity | ≥160% Al |
| Adhesion to enamel | ≥ 3 MPa |
| Compressive strength | ≥ 260 MPa |
| Water solubility | ≤ 3 µg/mm ³ |
| Flexural modulus (= transverse modulus) | ≥ 4 GPa |

Shear bond Strength, enamel not etched (MPa)



*Values taken from manufacturers' IFU or data

Shear bond strength, enamel etched (MPa)



FAQ

Should I still etch with phosphoric acid when using ProFil Flow SE?

You do not need to etch when using ProFil Flow SE unless working with uncut enamel (as in a sealant application). ProFil Flow SE offers high bond strengths to both dentin and enamel without the need for a separate adhesive. For those who want to etch regardless, you should only etch on enamel, which further improves marginal integrity. Etching on dentin, however, opens dentin tubules that, unless sealed properly, can lead to post-op sensitivity. ProFil Flow SE does not open dentin tubules, minimizing the chance of post-op sensitivity.

Should I use a bonding agent with ProFil Flow SE?

You do not need to apply a bonding agent when using ProFil Flow SE, since it is a self-adhering material that has a bonding agent already incorporated. ProFil Flow SE offers high bond strengths to both dentin and enamel without the need for a separate bonding application step.



Improve Performance by Optimal Harmony
Adaptation by Ideal Viscosity

PROFil™ *Flow*

FLOWABLE RESTORATIVE MATERIAL ADVANCED NANO TECHNOLOGY



ProFil™ Flow is a visible-light activated, radiopaque, flowable composite. The excellent flowable consistency characteristics makes ProFil™ Flow an ideal composite for filling cavities. ProFil Flow offers high compressive and tensile strength for optimal wear resistance based on the advanced resin technology of ProFil.

Features

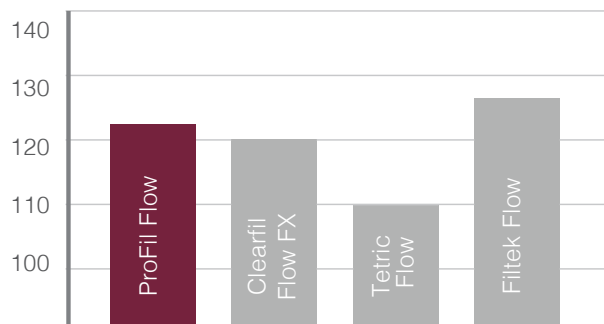
- Low Viscosity
- High polish retention & stable color match
- No oozing or slumping
- Excellent Estetic properties
- Perfect for minimal invasive restorations
- Maximum versatility
- Low shrinkage
- Available in 8 shades

Properties

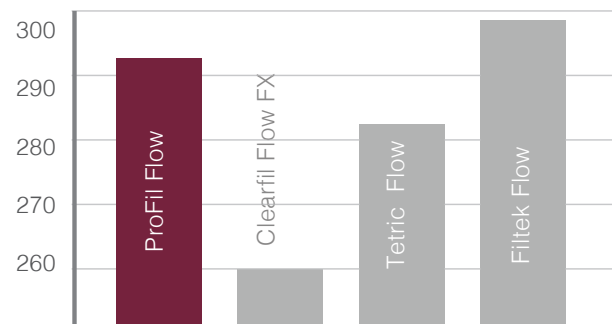
| | |
|----------------------------------|-----------------------------------|
| Sensitivity to ambient light | >60 sec. |
| Weight of total inorganic filler | 60% |
| Depth of cure | > 1.5 mm |
| Compressive strength | > 290 MPa |
| Flexural Strength | > 120MPa |
| Water Sorption | < 40 $\mu\text{g} / \text{mm}^3$ |
| Solubility | < 7.5 $\mu\text{g} / \text{mm}^3$ |



Flexural Strength (MPa)



Compressive Strength (MPa)



*Values taken from manufacturers' IFU or data

Clinical Tips

- Spread thinly on pupal floor.
- Extrude slowly from the syringe.
- Only place the amount needed to minimize the amount of finishing needed.



Dr. Myles L. Sokolof // Marble Dental - Thornwood, NY

"I was using branded products for years, willing to pay a premium price. My local dealer introduced me to the Silmet line. After using the products, I realized there were high quality products available at significantly lower prices. Since then, I am using their full line of restorative products and saving 50% on my purchases without compromising quality."



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With Great Power Comes Great Responsibility
10 Years of Proven Clinical Success

ProFil™

UNIVERSAL MICRO HYBRID COMPOSITE ADVANCED NANO TECHNOLOGY



ProFil™, is a micro hybrid composite material incorporating advanced nano technology, for use in both anterior and posterior restorations. ProFil™ composite resin is the perfect combination of simplicity and exceptional esthetics.

Features

- High polishability
- Non sticky formula
- Optimal balance of physical properties
- Light cured, radiopaque & color stable
- Low polymerization shrinkage
- Fast placement technique, easy to apply & sculpt
- High strength & wear resistance
- Available in 14 shades

Properties

ProFil has outstanding physical properties that provide excellent wear resistance :

| | |
|------------------------------|----------------------------|
| Sensitivity to ambient light | Above 100 sec. |
| Depth of cure | > 1.5 mm |
| Compressive strength | > 230 MPa |
| Flexural Strength | > 120MPa |
| Water Sorption | < 40 µg / mm ³ |
| Solubility | < 7.5 µg / mm ³ |



Dr. Z. Johnson, Houston, Texas. Practicing since 1994 // DENTAL PRODUCTS REPORT, March 2012

“When you invest in products that deliver what they offer and promise, it creates trust, reliability, and comfort for both patients and dentists. Based on my years of personal experience, I can strongly recommend this product because it delivers.”



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| Product | Company | Type | Flexural Strength | Flexural Modulus |
|---|-------------------|--|-------------------|------------------|
| 3M ESPE Filtek Supreme Plus Universal Restorative | 3M ESPE | Nanofill | Very high | High |
| Esthet. X HD High Definition micro matrix restorative | DENTSPLY Caulk | Microhybrid | High | High |
| GC Kalore | GC America | Nanohybrid | High | High |
| GrandiO | VOCO America | Microhybrid | High | Very high |
| Herculite Ultra | Kerr Corporation | Nanohybrid | nt | nt |
| ice | SDI North America | Nanohybrid | High | High |
| ProFil | Silmet Ltd. | Microhybrid (Advanced Nano Technology) | Very high | Very high |
| Tetric EvoCeram | Ivoclar Vivadent | Nanohybrid | High | High |

* From: The Dental Advisor Vol. 26, October 2009



Withstanding the Toughest Conditions
Featuring Highest Wear Resistance

PROFil™ *Posterior*
POSTERIOR COMPOSITE



ProFil™ Posterior composite is a visible-light activated, radiopaque, restorative composite offering a unique balance between Bis-GMA- TEGDMA- UDMA resins specifically designed for use in posterior direct or indirect restorations.

With easy handling and fast placement, you can rely on ProFil Posterior for excellent results.

Features

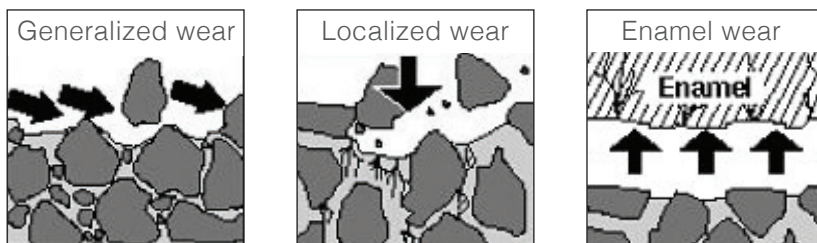
- Outstanding wear resistance and strength
- Excellent handling characteristics
- low polymerization shrinkage
- Excellent marginal adaptation and interproximal contact
- Available in 6 shades
- Long lasting restoration
- Easy to use, does not stick to instruments
- Less stress on the tooth, and less post sensitivity to patient
- Excellent packability

Properties

| | |
|------------------------------|------------------------------------|
| Compressive strength | > 290MPa |
| Flexural Strength (24hr) | > 120MPa |
| Depth of cure | 2mm |
| Light Cure | 20 sec |
| Volumetric shrinkage | 2.4% |
| Water solubility | $\leq 7.5 \mu\text{g}/\text{mm}^3$ |
| Water sorption | $\leq 40 \mu\text{g}/\text{mm}^3$ |
| Radiopacity | > Al. |
| Sensitivity to ambient light | Yes > 60 sec |

Wear Resistance

Composites are subjected to both generalized and localized wear. ProFil Posterior's unique composition and filler particles provide high resistance and durability to wear.



Generalized wear is caused by abrasion from food. When food crosses the composite surface, matrix material is gradually worn away, exposing the remaining filler particles. Loss of filler accelerates further wear of the remaining matrix material.

Localized wear is caused by repeated cuspal contacts. The masticating force is transferred through the filler particles to matrix. The particles act like small wedges generating microcracks and subsequent material loss on the contact area.

ProFil Posterior's filler provides good resistance to localized wear due to its bond to matrix and its resilience that relieves the stress transfer to the matrix.

Antagonistic enamel wear is caused by direct contact of hard filler particles to tooth enamel.



Using the Right Tool for the Job

Composite Restoration Finishing in less than 20 Seconds

ProFil™ *Finishing Kit* Two Step Composite Finishing System



ProFil finishing kit is an esthetic restoration finishing method featuring morphological quality & fast restoration ability. The set is designed to make the tough task of composite finishing significantly simpler, shorter and more efficient while giving excellent clinical results.

With ProFil Finishing Kit, dentists are now able to polish the composite without the need to use disc, paste or polisher. With the benefit of a reusable autoclavable solution that save cost over time.

Features & Benefits

| Feature | Benefit |
|---|---|
| No need to use polishing discs / rubber polishers | Faster and shorter procedure. |
| Cost effective – save up to 75% | Less expenses per restoration. Can be reused for 50-60 cases Due to special ultra-micro diamond deposition. |
| Very durable | Will last for a period of 9-12 months (when handled properly) |

Using the System

2 Step System




STEP 1

Use the **purple** marked bur to regain the anatomical shape of the tooth morphology

STEP 2

Use a bur with the same shape marked **white** to achieve a smooth surface

Using the System

| Shape | Picture | Suitable For |
|--------|---|---------------------|
| Flame |  | Buccal, cervical |
| Barrel |  | Occlusal - Class O |
| Egg |  | Palatal - Class III |

SECURAFIL™

DENTAL COMPOSITE CAPSULE DISPENSER



SecuraFil provides a quick and easy delivery of ProFil™ composite material packaged in capsules. Featuring a unique ergonomic design, SecuraFil is easy to use and capsule is securely snapped into position. It can be used as a complementary product for all composite restorative needs.

Quality Without Compromise

High-tech manufacturing process designed to produce uncompromising quality. A comprehensive quality management system ensures that all process steps are carried out in accordance with EC Directives, ISO 13485, FDA & Health Canada requirements, and that these steps satisfy precisely defined criteria – from chemical composition analysis of the raw material to physical & visual inspection. The technologies used range from the Powder Testing Center for determining the pressability of the powder to the scanning electron microscope for precise structural examination.

Order Information

ProFil Bulk, Bulk Fill Composite

| | | |
|--------|----------------------|----|
| 185A02 | Automix Syringe, 5ml | A2 |
| 185A03 | Automix Syringe, 5ml | A3 |

ProFil Flow SE, Self Etch Composite

| | | |
|-----------|-------|------|
| 164A01-SE | 2*2gr | A1 |
| 164A02-SE | 2*2gr | A2 |
| 164A03-SE | 2*2gr | A3 |
| 164A35-SE | 2*2gr | A3.5 |
| 164B01-SE | 2*2gr | B1 |

ProFil Flow, Flowable Composite

Syringes

| | | |
|-----------------|---------|------|
| 161A01 / 163A01 | 1g / 3g | A1 |
| 161A02 / 163A02 | 1g / 3g | A2 |
| 161A03 / 163A03 | 1g / 3g | A3 |
| 161A35 / 163A35 | 1g / 3g | A3.5 |
| 161B01 / 163B01 | 1g / 3g | B1 |
| 161B02 / 163B02 | 1g / 3g | B2 |
| 163B03 / 161B03 | 1g / 3g | B3 |
| 163C02 / 161C02 | 1g / 3g | C2 |

Kits

| | | |
|--------|------|---------------|
| 160001 | 4*1g | A1+A2+A3+A3.5 |
| 160002 | 4*1g | 2*A2+2*A3 |
| 160003 | 4*1g | 4*A1 |
| 160004 | 4*1g | 4*A2 |
| 160005 | 4*1g | 4*A3 |
| 160006 | 4*1g | 4*A3.5 |
| 160007 | 4*1g | 4*B1 |
| 160008 | 4*1g | 4*B2 |
| 160009 | 4*1g | 4*B3 |
| 160010 | 4*1g | 4*C2 |

ProFil, Universal Micro Hybrid Composite

Syringes

| | | |
|-----------------|---------|------|
| 182A01 / 184A01 | 2g / 4g | A1 |
| 182A02 / 184A02 | 2g / 4g | A2 |
| 182A03 / 184A03 | 2g / 4g | A3 |
| 182A35 / 184A35 | 2g / 4g | A3.5 |
| 184A04 | 4g | A4 |
| 184B01 | 4g | B1 |
| 182B02 / 184B02 | 2g / 4g | B2 |
| 182B03 / 184B03 | 2g / 4g | B3 |
| 184C02 | 4g | C2 |
| 184C03 | 4g | C3 |
| 184D03 | 4g | D3 |
| 182OA2 / 184OA2 | 2g / 4g | OA2 |
| 184OA3 | 4g | OA3 |
| 18400P | 4g | P |

Capsules

| | | |
|--------|-----------|------|
| 18UA01 | 20*0.315g | A1 |
| 18UA02 | 20*0.315g | A2 |
| 18UA03 | 20*0.315g | A3 |
| 18UA35 | 20*0.315g | A3.5 |
| 18UA04 | 20*0.315g | A4 |
| 18UB01 | 20*0.315g | B1 |
| 18UB02 | 20*0.315g | B2 |
| 18UB03 | 20*0.315g | B3 |
| 18UC02 | 20*0.315g | C2 |
| 18UC03 | 20*0.315g | C3 |
| 18UD03 | 20*0.315g | D3 |
| 18UOA2 | 20*0.315g | OA2 |
| 18U00P | 20*0.315g | P |
| 18U0BW | 20*0.315g | BW |

Kits

| | |
|--------|------------------------------|
| 180001 | 4*4g+ Bond + Etch |
| 180033 | 8*4g + Bond + Etch |
| 180050 | 7*2g + 1*1g + Bond + Etch |
| 18KT01 | 6*10 capsules +1*3g + 1*Bond |

*Special combinations, including Self Etch bond are available for MOQ of 100 kits

ProFil Posterior, Posterior Composites

| | | |
|----------|----|------|
| 184A01-P | 4g | A1 |
| 184A02-P | 4g | A2 |
| 184A03-P | 4g | A3 |
| 184A35-P | 4g | A3.5 |
| 184B01-P | 4g | B2 |
| 184C02-P | 4g | C2 |

ProFil Finishing Kit

| | |
|--------|--------------------------------|
| 199PFK | 6 finishing burs, Autoclavable |
|--------|--------------------------------|

SecuraFil, Composite Capsule Dispenser

| |
|-------|
| 19971 |
|-------|

