The FIRST direct posterior composite to achieve less than 1% shrinkage*. 

Filtek™ Silorane

Low Shrink Posterior Restorative

* < 1% volumetric shrinkage tested with the “Bonded Disc Method” (Watts et al, Dental Materials 281, 1991). Further information from 3M ESPE.
Finally, a posterior composite that shrinks less than 1%

Setting a new standard for the future of composites

Since 1950, the main strategy to reduce shrinkage has been to increase filler load. However, shrinkage is an intrinsic property of the resin matrix. To date, no methacrylate-based chemistry has been developed to solve the shrinkage problem. Now, by changing the resin matrix, 3M ESPE has solved the problem with an innovative new ring-opening chemistry called “silorane”.

50 years ago, 3M Dental was the first company to create a methacrylate based composite. Now 3M ESPE is the first to create a non-methacrylate based composite that combines lowest volumetric shrinkage with biocompatibility.

Why attaining an excellent margin is so important

To illustrate why this product chemistry breakthrough is so important, we need to examine the clinical symptoms associated with volumetric shrinkage, polymerisation stress and marginal gaps. Then we’ll show how 3M™ ESPE™ Filtek™ Silorane Posterior Restorative, along with the dedicated 3M™ ESPE™ Silorane System Adhesive Self-Etch Primer and Bond, work together to alleviate the problems.

Low shrink will reduce the following problems

- Microleakage
- Adaptation
- Enamel micro-cracks
- Secondary caries
- Marginal staining
- Post-operative sensitivity

IMPORTANT. The silorane-based composite works with a dedicated self-etch adhesive and must not be used with any other adhesive.

You’ll like the way it handles and you’ll like the way it looks:

<table>
<thead>
<tr>
<th>Product advantages</th>
<th>Benefits to you and your patients</th>
</tr>
</thead>
</table>
| The first direct posterior composite to achieve less than 1% shrinkage* | • Reduces the risk of post-operative sensitivity  
• Reduces the risk of enamel fracture  
• Improves marginal integrity & therefore decreases the risk of microleakage  
• No need for a sophisticated layering technique, saving time  
• Reduces the risk of secondary caries  
• Reduces cusp deflection |
| Excellent ambient light stability | Can be handled under surgery lights for up to 9 minutes without beginning to set |
| Hydrophobic material | Reduced water uptake making the restoration less likely to stain and attract bacteria |

![Diagram showing low shrink problems: microleakage, adaptation, enamel micro-cracks, secondary caries, marginal staining, post-operative sensitivity.](image)
Finally, a posterior composite that shrinks less than 1%*

When a composite is closer to “no shrink” than “low shrink” … it deserves to be called a breakthrough!

Lowest shrinkage to minimise polymerisation stress.

Polymerisation shrinkage builds up forces that challenge the composite/adhesive interface and may deform the tooth. Lowering this polymerisation stress:

- reduces cusp displacement
- helps to reduce the risk of enamel fracture
- helps reduce the risk of post-operative sensitivity
- reduces the risk of marginal gap and leakage.

Filtek™ Silorane restorative reduces polymerisation stress by up to 80%

Source: University of Amsterdam (ACTA)

Finite element analysis images show how Filtek Silorane restorative helps to minimise problems caused by polymerisation stress

Note that the silorane restoration shows an absence of “grey” high-stress areas where enamel cracks and leakage in the margin can occur.

Source: University of Minnesota

Reduced tooth deformation is evidence of reduced polymerisation stress

In a study comparing Filtek Silorane restorative to four methacrylate-based composites, Filtek Silorane restorative showed the lowest cusp displacement in an MOD cavity.

Source: University of Geneva

Excellent marginal integrity

Studies show the Filtek™ Silorane Restorative System provides better marginal integrity in mixed MOD restorations before and after chewing simulation as compared to leading methacrylate systems.

Source: 3M ESPE internal data
Filtek™ Silorane Low Shrink Posterior Restorative

Revolutionary “ring-opening” Silorane chemistry has resulted in the FIRST composite to shrink less than 1%!*  
Silorane chemistry is the basis for a new composite category breakthrough: Filtek™ Silorane Low Shrink Posterior Restorative. The illustration (below) demonstrates how the new silorane-based composite works at the molecular level to reduce shrinkage dramatically, compared to methacrylate-based composites.

As silorane-based composite polymerises, “ring-opening” monomers connect by opening, flattening and extending toward each other. The result is significantly less volumetric shrinkage compared to methacrylate-based composites.

As methacrylate-based composites cure, the molecules of these “linear monomers” connect by actually shifting closer together in a linear response. The result is a loss of volume.

IMPORTANT. The silorane-based composite works with a dedicated self-etch adhesive and must not be used with any other adhesive.

The Filtek™ Silorane Restorative System is a key to excellent margins

Silorane System Adhesive Self-Etch Primer and Bond: A dedicated system adhesive for excellent bond strength.

3M™ ESPE™ Silorane System Adhesive Self-Etch Primer and Bond is an easy to use two-vial system that offers excellent bond strength to enamel and dentine, and provides the basis for low risk of post-operative sensitivity you expect from a self-etch system.

Silorane System Adhesive Self-Etch Primer and Bond is a 6th generation two-step self-etching bonding system. It is the one and only adhesive formulated to ensure optimal bonding of the Filtek™ Silorane Low Shrink Posterior Restorative.

NOTE: Silorane Adhesive System is not designed to work with other composites.

The Filtek™ Silorane Restorative System showed significantly higher shear bond strength values after thermocycling as compared to a leading methacrylate system.

Source: University of Zurich

* < 1 % volumetric shrinkage tested by bonded disc method.
Finally, everything you want in a posterior restorative

You’ll like the way it handles.

One thing you’ll notice from the first time you use Filtek™ Silorane Low Shrink Posterior Restorative, is how easy it handles.

- Impressive nonstick qualities
- Very good initial adaptation of restorative to bond film allows for an easy placement of the first increment
- Excellent operatory light stability gives you up to 9 minutes working time for shaping the filling and restoring the tooth to its natural function
- There’s no slumping – the filling holds its shape
- Fast and easy to polish
- Available in the delivery you prefer: capsule or syringe, in shades A2, A3, B2, C2 with a curing time of 20 seconds (LED, intensity 1000-1500mW/cm2). Depth of cure 2.5mm.
- Indicated for Class I and IIs
- The Silorane System can be used in the “sandwich” technique with GIC/RMGIC as a cavity liner or base such as Vitrebond™ Plus liner/base.

A load-bearing posterior composite filling has to be replaced. Marginal loss and leakage have led to secondary caries.

A strong and durable Filtek Silorane restorative filling restored the tooth to its natural function. Natural-looking aesthetics were achieved with an easy single-shade technique.

You’ll like the way it looks

The emphasis today is on not just repairing teeth, but on restoring teeth to their natural beauty. This superb, low-shrinking composite comes in popular shades that easily blend with surrounding teeth.

- Available in 4 popular shades: A2, A3, B2, C2
- Holds its shape so you can create beautifully shaped, natural-looking restorations
- Good polishability
- Exceptional low water uptake and substantially decreased exogenic staining
- Exhibits a lower bacterial adhesion rate compared to many leading composites tested.
- Radiopaque

Source: University of Regensburg

You’ll like the way it lasts

When you select a composite for the posterior region, you want assurance it can stand up to flexural forces during chewing. Filtek Silorane Restorative is strong and durable to protect the filling from fractures, and to stabilise the tooth at the same time.

- Proven to have excellent compressive strength for stress-bearing restorations
- High flexural strength protects the tooth from fractures and stabilises it at the same time
- Wear resistant – ACTA test data on file
- Clinically proven strength and durability

Source: University Mainz
It’s easy to use the Filtek™ Silorane Posterior Restorative System

Here is a step-by-step guide on how to create a Filtek Silorane restoration.

The procedure for using the low-shrinking Filtek Silorane composite and Silorane System Adhesive is much like the one you use with your current composite system. To achieve optimal strength of the Filtek Silorane system, it is important to light cure both the self-etch Primer and the Silorane System Adhesive Bond.

1. A load-bearing posterior composite filling has to be replaced. Marginal loss and leakage have led to secondary caries.
2. Select from four shades: A2, A3, B2, C2. A chameleon effect makes it easy to match composite shade to tooth enamel.
3. Application of Silorane Self-Etch Primer. Agitate primer on cavity surface for 15 sec. IMPORTANT. The silorane-based composite works with a dedicated self-etch adhesive and must not be used with any other adhesive.
4. Light cure for 10 sec after drying with oil-free air.
5. Thixotropic properties allow for a precise application of Silorane Bond.
6. Light cure for 10 sec after dispersing Silorane Bond to a homogeneous film with oil-free air.
7. Very good initial adaptation of Filtek Silorane restorative to bond film allows for an easy placement of the first increment. No need for a sophisticated layering technique due to intrinsically-low polymerisation shrinkage and stress!
8. The non-sticky handling and the excellent ability to hold shape allow you to build strong contact points and create a natural occlusal shape – under full operatory light for up to 9 minutes.
9. Light cure for 20 sec (LED, intensity 1000 – 1500 mW/cm²) or 40 sec (LED intensity 500 – 1000 mW/cm² or halogen 500 – 1400 mW/cm²). Depth-of-cure: 2.5 mm.
10. Surface free of inhibition layer allows for a fast and easy polish.
11. A strong and durable Filtek Silorane restorative filling restored the tooth to its natural function. Natural-looking aesthetics were achieved with an easy single-shade technique.
Filtek™ Silorane Posterior Restorative System

Frequently Asked Questions

- **How can I trust a “new” chemistry like siloranes? Has it been thoroughly tested?**
  Yes, the Filtek Silorane System has been thoroughly tested and evaluated. The data shows that the Filtek Silorane System performs well in both *in vitro* and *in vivo* studies and is biocompatible.

- **Why do I need a dedicated adhesive? Can I use Filtek Silorane restorative with other adhesives than Silorane System adhesive?**
  All adhesives on the market today have been developed for conventional methacrylate- based filling materials. As the Filtek Silorane resin system is based on a completely new chemistry, an adhesive is needed that takes into account the different curing mechanism. Silorane System adhesive is the only adhesive that reliably delivers excellent bond strength with Filtek Silorane restorative. The use of a different adhesive will lead to insufficient bond strength.

- **Why is Filtek Silorane restorative not a 0% shrinkage composite?**
  Filtek Silorane restorative represents a balance of shrinkage versus swelling due to water uptake. Even though the water uptake is very low for Filtek Silorane restorative, a 0% shrinkage material could lead to pressure on the tooth structure caused by hydrolytical expansion.

- **Can the Silorane System Adhesive be used with conventional methacrylate composites?**
  Silorane System Adhesive has been specially developed for the use with Filtek™ Silorane Low Shrink Posterior Restorative. We recommend its use solely with Filtek Silorane restorative.

- **Can I use the Filtek Silorane System in a “sandwich” technique with GIC/RMGIc on the bottom?**
  Yes, Filtek Silorane restorative and Silorane System adhesive may be used together with self-adhesive materials such as glass ionomer cements or resin modified glass ionomer cements as a cavity liner or base.

- **Can I use Filtek Silorane restorative as a base filling and cover it with a methacrylate composite?**
  Yes, conventional adhesives can be used to bond methacrylate composites to cured Filtek Silorane restorative.

- **Can I use a flowable composite as a liner?**
  As of now, flowable composites and compomers may not be used as a liner or base under a Filtek Silorane filling. These materials require usage of an adhesive other than Silorane System self-etch adhesive, which in turn is not compatible with the Filtek Silorane Low Shrink Posterior Restorative. Silorane System Adhesive offers handling properties which allow proper placement without using a flowable as a liner. The stress-relief properties of a flowable liner are not important for a silorane restorations due to the low stress developed by the Filtek Silorane restorative.

### Ordering Information

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Product Information</th>
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</thead>
<tbody>
<tr>
<td>4771I</td>
<td>Filtek Silorane Low Shrink Posterior Restorative Capsule Intro Kit</td>
</tr>
<tr>
<td></td>
<td>20 x 0.2g capsules in shade A2, 20 x 0.2g capsules in shade A3, 20 x 0.2g capsules in shade B2, 20 x 0.2g capsules in shade C2, 1 x 5ml vial primer, 1 x 5ml vial bond, 100 x microbrushes (50 x black, 50 x green), 1 x mixing well, 1 x shade guide</td>
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<tr>
<td>4771TK</td>
<td>Filtek Silorane Low Shrink Posterior Restorative Capsule Trial Kit</td>
</tr>
<tr>
<td></td>
<td>20 x 0.2g capsules in shade A3, 1 x 5ml vial primer, 1 x 5ml vial bond, 100 x microbrushes (50 x black, 50 x green), 1 x mixing well</td>
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<tr>
<td>4771A2</td>
<td>Filtek Silorane Low Shrink Posterior Restorative Capsule Refill A2</td>
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<td>20 x 0.2g capsules</td>
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<td>Filtek Silorane Low Shrink Posterior Restorative Capsule Refill A3</td>
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<td>20 x 0.2g capsules</td>
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<td>Filtek Silorane Low Shrink Posterior Restorative Capsule Refill B2</td>
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<td>20 x 0.2g capsules</td>
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<td>Filtek Silorane Low Shrink Posterior Restorative Capsule Refill C2</td>
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<td>4773</td>
<td>Silorane System Adhesive Self-Etch Primer and Bond</td>
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<td>1 x 5ml vial primer, 1 x 5ml vial bond, 100 x microbrushes (50 x black, 50 x green)</td>
</tr>
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### 3M™ ESPE Filtek™ Silorane Low Shrink Posterior Restorative Capsule Intro Kit (4771I)

<table>
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<tbody>
<tr>
<td>4772I</td>
<td>Filtek Silorane Low Shrink Posterior Restorative Syringe Intro Kit</td>
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<tr>
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<td>4 x 4g syringes in shade A2, 4 x 4g syringes in shade A3, 4 x 4g syringes in shade B2, 4 x 4g syringes in shade C2, 1 x 5ml vial primer, 1 x 5ml vial bond, 100 x microbrushes (50 x black, 50 x green), 1 x mixing well, 1 x shade guide</td>
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<tr>
<td>4772TK</td>
<td>Filtek Silorane Low Shrink Posterior Restorative Syringe Trial Kit</td>
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<td>1 x 4g syringe in shade A3, 1 x 5ml vial primer, 1 x 5ml vial bond, 100 x microbrushes (50 x black, 50 x green), 1 x mixing well</td>
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<tr>
<td>4772A2</td>
<td>Filtek Silorane Low Shrink Posterior Restorative Syringe Refill A2</td>
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<td>1 x 4g syringe</td>
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<tr>
<td>4772A3</td>
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<td>1 x 4g syringe</td>
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<td>1 x vial primer – 5ml</td>
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<tr>
<td>4773B</td>
<td>Silorane System Adhesive Self-Etch Bond Refill</td>
</tr>
<tr>
<td></td>
<td>1 x vial bond – 5ml black, 50 x green</td>
</tr>
</tbody>
</table>

### 3M™ ESPE Dental Products

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3M House
Adelphi Centre
Dun Laoghaire
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For further information please contact 3M ESPE on freephone 00 800 096 13981 (UK) or 01280 3555 (Republic of Ireland) or visit our website at www.3MESPE.com/uk or email us at 3MESPEUK@mmm.com

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