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3M™ Sof-Lex™ Diamond Polishing System

Technical Data Sheet

Product Description

The **3M™ Sof-Lex™ Diamond Polishing System** is a two-step, multi-use polishing system. The spirals use the same mandrel as 3M™ Sof-Lex™ Finishing and Polishing Discs. The spirals are made with either aluminium oxide or diamond particles impregnated in a thermoplastic elastomer.

The universal shape allows for usage on all tooth surfaces^ and reduces the need for different shaped tools (eg. points, cups, discs and brushes), which are designed for specific shapes and contours.

One shape:

- **Adapts to all tooth surfaces**
- **Works from any angle**
- **Effective for anterior and posterior restorations**
- **Helps create natural gloss in two steps**

Indications

The **3M™ Sof-Lex™ Pre-Polishing Spiral** (beige) is indicated to smooth the surface of restorations. The **3M™ Sof-Lex Diamond Polishing Spiral** (pink) is indicated for final high-gloss polishing. Spirals can be used to polish surfaces of^^:

Direct:

- **Composite restorations**
- **Resin-modified glass ionomers**
- **Bisacrylic temporary materials**

Indirect:

- **Composite**
- **3M™ Lava™ Ultimate CAD/CAM Restorative**
- **Precious and semi-precious metal**

Both wheels are used with a slow-speed handpiece operating within 15,000–20,000 rpm. Adding water is recommended during use and will create a more ideal surface quicker than without water.

^3M data on file

^^Please refer to IFU for full indications, precautions and warnings

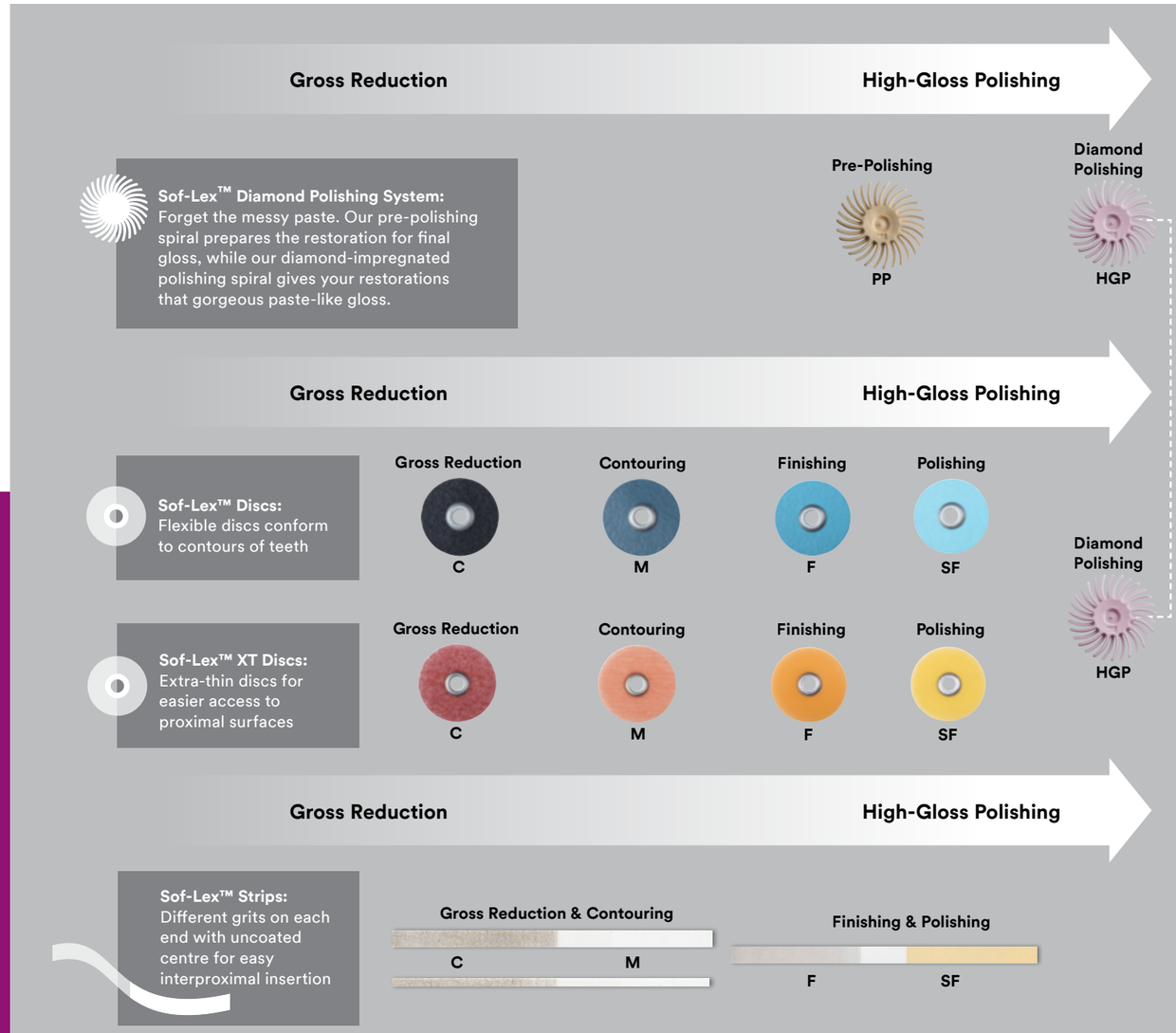
Introduction:

Proper finishing of restorations is desirable not only for aesthetic considerations but also for oral health. The primary goal of finishing is to obtain a restoration which has ideal contour, occlusion, healthy embrasure forms and surface smoothness. Finishing and polishing procedures remove the air-inhibited layer, contour and shape the restoration, create surface characterisation and produce surfaces with high gloss. Tight margins should blend aesthetically into the tooth's natural contours. Healthy embrasure forms and smooth surfaces are less likely to trap food debris and collect plaque. Several factors can affect the final finish of a restoration: the resin matrix and fillers within the restorative material, finishing instruments and preparation design.

General Procedure

A full line of finishing and polishing solutions … from beginning to end.

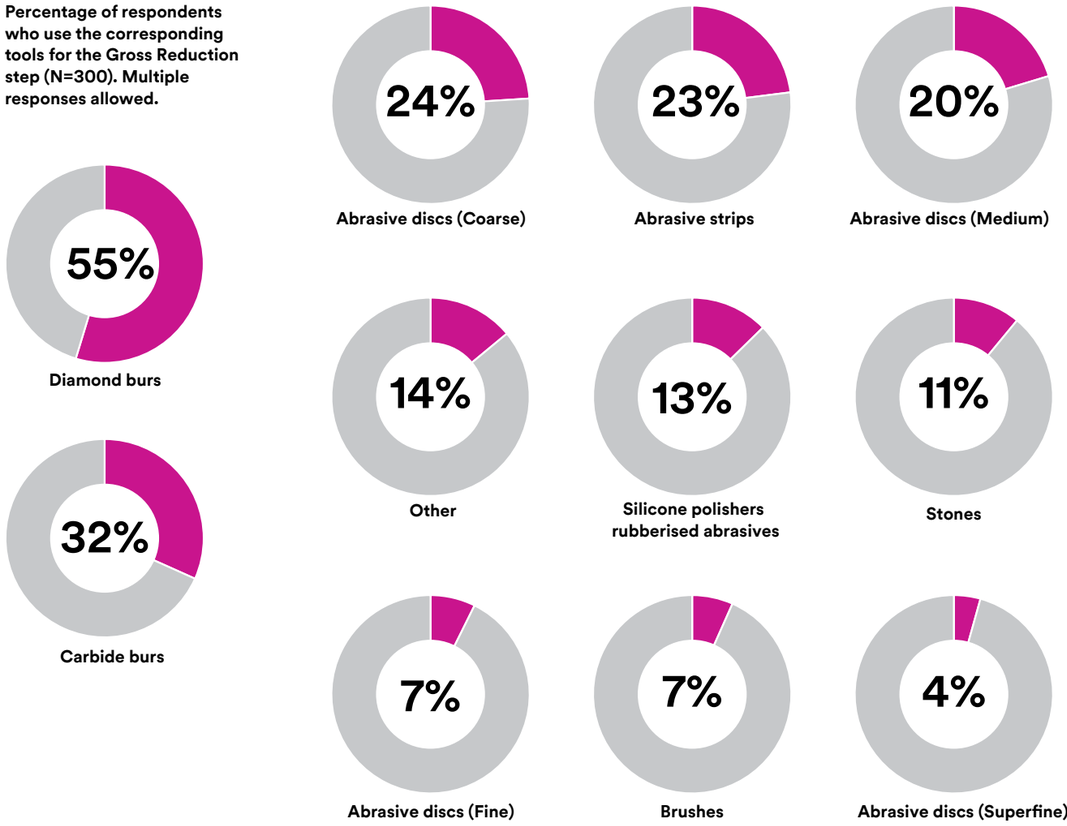
The Sof-Lex system is colour coded from dark (coarse) to light (superfine) for an easily followed step-by-step process. Easy, pop-on mounting lets you quickly change discs or spirals—so you can move efficiently through your finishing and polishing procedure.



Gross Reduction

The purpose of the Gross Reduction step is to remove excess restorative material (including overhangs), to remove the air-inhibited layer and shape anatomy. The tools that are typically used for this process deliver the most aggressive abrasive (e.g. coarse grit) action in this procedure to remove the excess material quickly. The graph below depicts the most popular tools for Gross Reduction. Abrasive strips are also used for proximal areas.

Percentage of respondents who use the corresponding tools for the Gross Reduction step (N=300). Multiple responses allowed.



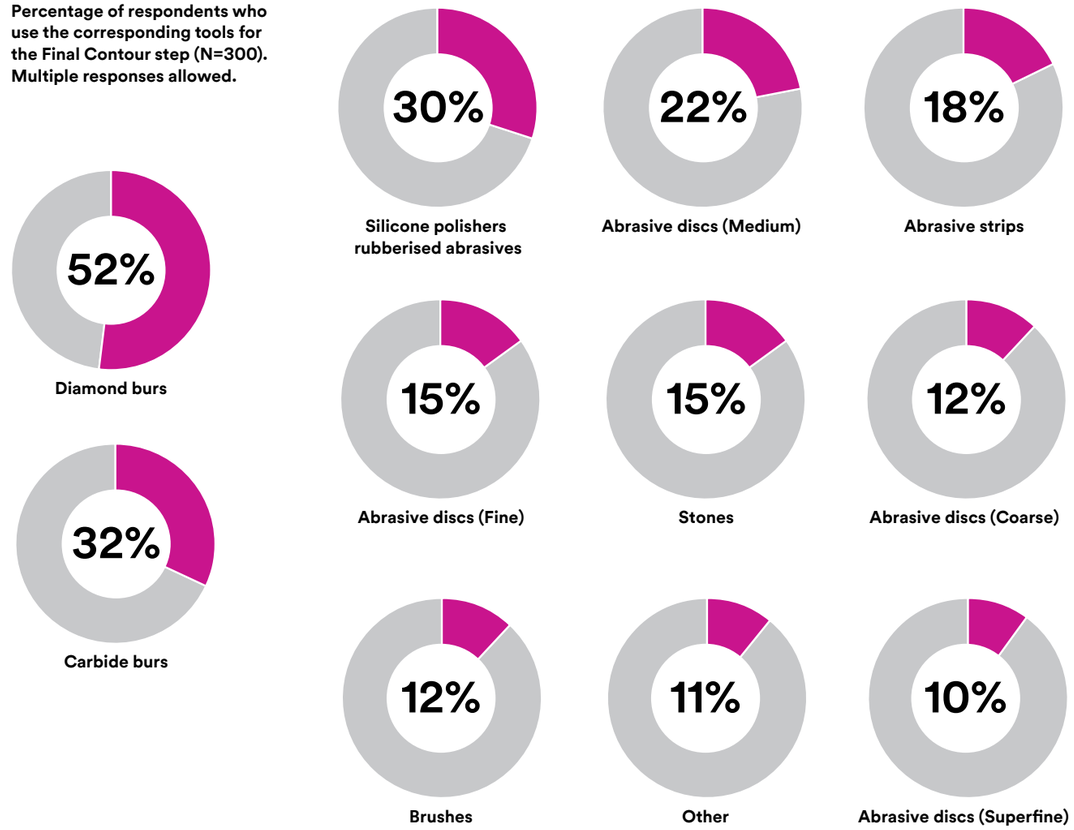
Source: Global Market Research December 2011

Contour:

The purpose of this step is to refine contours (size, shape, grooves, etc.) and margins (generating a smooth transition between tooth and restoration), re-establish contact with adjacent teeth to a normal and functional form and reduce surface roughness. At the end of this step, the restoration should have its desired form and a smooth, clean surface.

The most popular tools used for Final Contour are outlined below. Strips are also used for proximal areas. These tools are not as aggressive as those used for Gross Reduction, e.g., medium grit, because only small amounts of material are being removed from the restoration.

Percentage of respondents who use the corresponding tools for the Final Contour step (N=300). Multiple responses allowed.



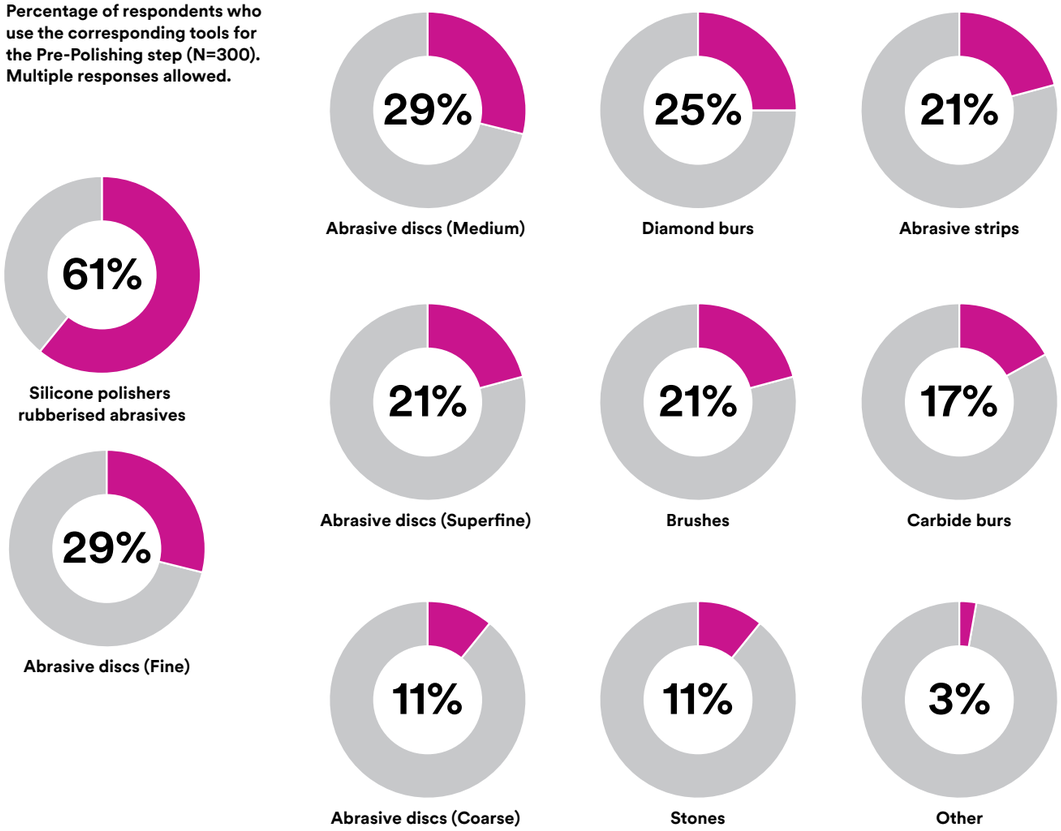
Source: Global Market Research December 2011

Finish: Smooth Surface (scratch removal)

This step reduces the scratch depth and/or removes lighter scratches produced during the Gross Reduction and Final Contour steps by the more aggressive tools. This step should leave the surface smoother and sometimes is considered a pre-polish step. The tools used for finishing (see below) are less aggressive than the previous step (e.g., a fine grit). Abrasive strips are also used for proximal areas. The Sof-Lex™ Pre-Polishing Spiral is designed to remove scratches and smooth the surface of teeth.

Responses from research—which instrument do you use to smooth?

Percentage of respondents who use the corresponding tools for the Pre-Polishing step (N=300). Multiple responses allowed.



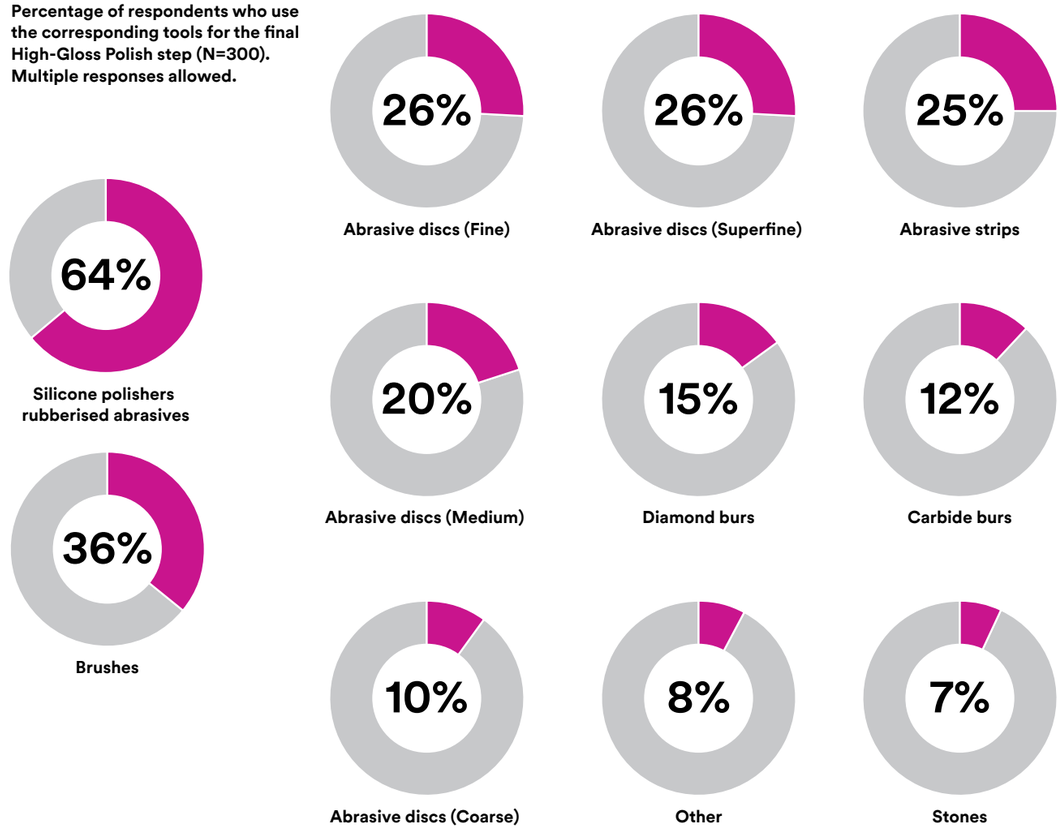
Source: Global Market Research December 2011

High-Gloss Polish

The objective of this step is to further smooth the surface to produce a high-gloss shine on the restoration. The tools used for this step are the least aggressive, e.g., super or ultra-fine grits. Strips are also used for proximal areas. The Sof-Lex Diamond Polishing Spiral produces a high-gloss polish.

Responses from research—which instrument do you use to polish?

Percentage of respondents who use the corresponding tools for the final High-Gloss Polish step (N=300). Multiple responses allowed.



Source: Global Market Research December 2011

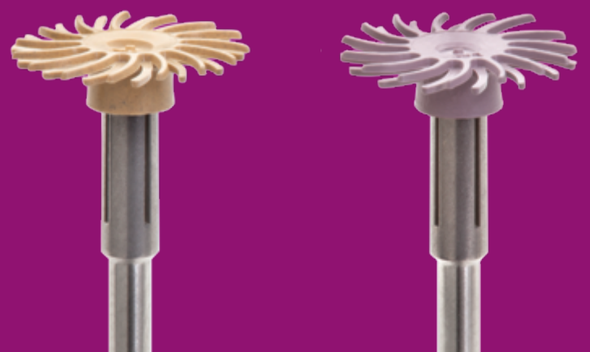
Technology

The unique “bristle” shape is adapted for 3M Oral Care from the patented radial bristle disc design developed by the 3M Abrasives Division. This technology allows for:

- **a continuous supply of mineral to work surfaces**
- **a variety of grits, diameters and thicknesses**
- **a flexible instrument that conforms to varied surfaces**
- **the instrument to generate minimal heat during use**

3M Oral Care optimised this design for dental applications. The two abrasive spirals:

- **Adapt to all tooth surfaces, eliminating the use of multiple tools (shapes) for a single purpose—to fit various contours**
- **Can be used on anterior and posterior restorations**
- **Beige—smoothes and removes scratches**
- **Pink—polishes the restoration to a high diamond paste-like gloss for a natural-looking surface**
- **Utilise the easy-to-use “Pop-On” 3M™ Mandrel**
- **Can be sterilised and reused multiple times**



Performance

Performance for finishing and polishing systems are typically evaluated by measuring surface roughness, gloss measurement and surface appearance.

Surface Roughness

Surface roughness measures the smoothness of a surface. Typically, as a clinician uses a finisher and polisher sequence, the embedded abrasive particles become smaller in size with each step. The finer the abrasive particle, the smoother the surface should appear.

Gloss Measurements

Gloss is the shine or luster on a smooth surface. A smooth, uniform composite surface will reflect the greatest amount of light. A high gloss measurement indicates a shiny, more reflective surface.

Toothbrush abrasion is used as a method to simulate wear on any given composite. This test is used to measure how well a composite will retain polish.

Surface Appearance

Surface appearance is also observed to visualise how the abrasive particles are interacting with a composite surface. Gross reduction and contouring shape a composite restoration, but can cause deeper scratches to appear in the restoration surface. After smoothing and polishing, the surface should appear smooth and uniform in texture. Lack of a smooth surface can cause a restoration to appear dull or lacking in shine or gloss.

Sample Preparation

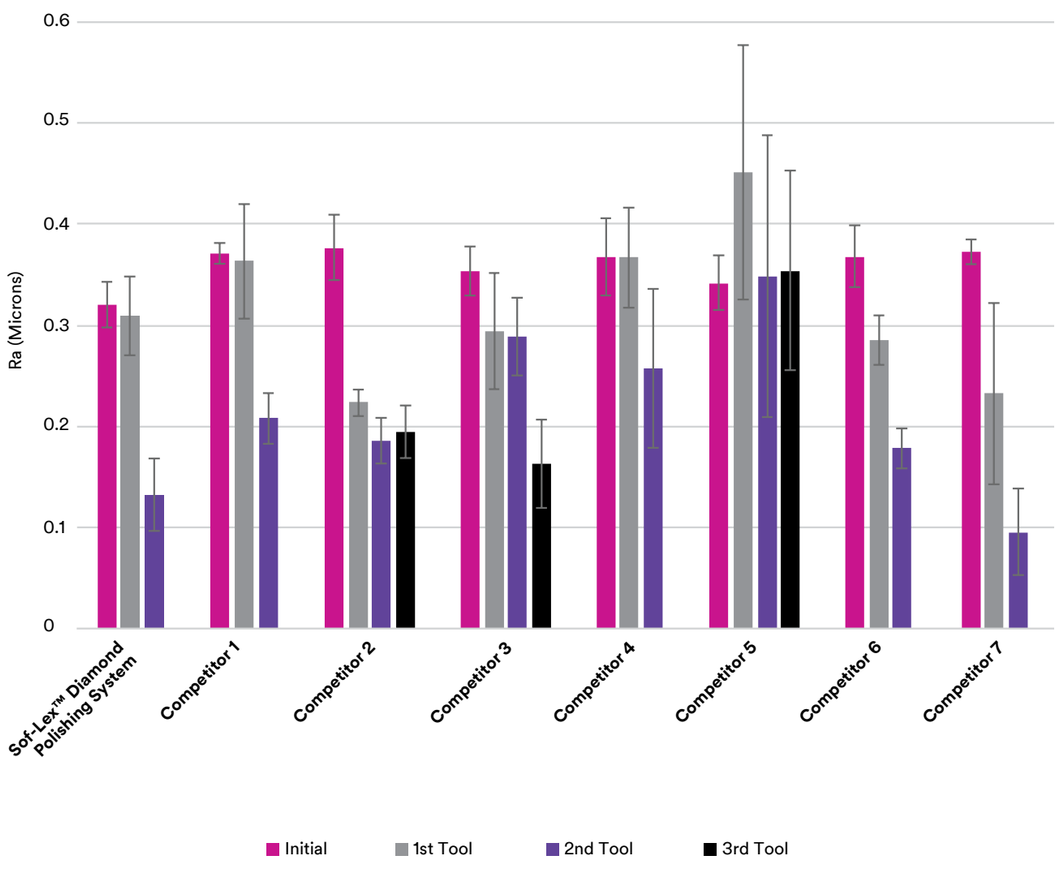
Samples of 3M™ Filtek™ Supreme XTE Universal Composite and other brands of composite were prepared and then polished with 320 grit sandpaper. This uniform surface simulated a typical clinically relevant finished surface prior to polishing. The composite samples were then polished with various systems according to the manufacturer’s instructions. Samples were polished with the 3M™ Sof-Lex™ Diamond Polishing System or the same brand polishing system as the composite tested.

Surface Roughness Measurement

Surface roughness can be quantified using surface profilometers. A profilometer drags a stylus over a composite surface and Ra (average surface roughness) values are recorded. Ra is the average surface roughness expressed in units of height over a set distance. The lower the Ra value, the smoother the surface.

In the chart below, samples of Filtek™ Supreme XTE Universal Restorative were polished with a variety of polishing systems. Each instrument in the polishing system was used for 15 seconds and used according to the manufacturer's instructions.

Surface Roughness (Ra) on Filtek™ Supreme XTE Universal Restorative: Sof-Lex™ Diamond Polishing System vs. Other Polishing Systems



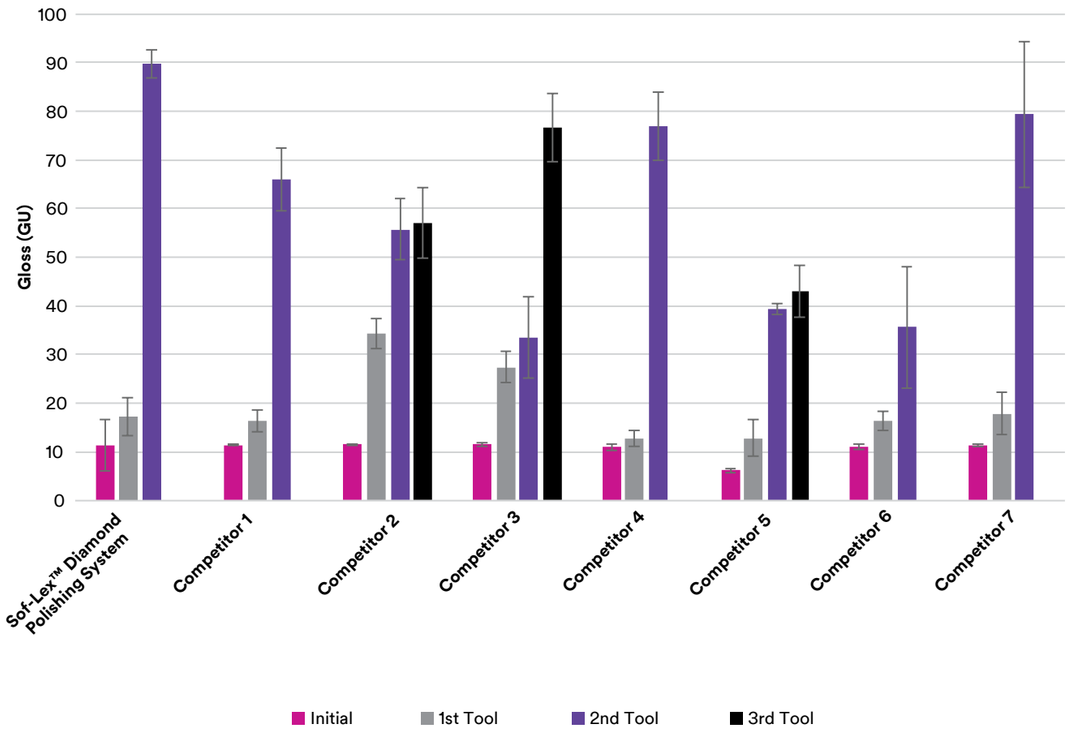
3M data on file

Gloss Measurements

Surface gloss or reflectance indicates how polished or shiny the surface can become after treatment. Gloss is measured using a gloss meter, which projects a beam of light at a fixed intensity and angle and measures the amount of reflected light at an equal but opposite angle.

In the first chart below, samples were prepared as previously described using Filtek™ Supreme XTE Universal Restorative and polished with a variety of finishing and polishing systems. In the second chart, samples were prepared as previously described using a variety of composites and polished with Sof-Lex™ Diamond Polishing System. After final gloss measurements, toothbrush abrasion testing was also conducted to measure the polish retention of the particular composite.

Final Gloss on Filtek™ Supreme XTE Universal Restorative: Sof-Lex™ Diamond Polishing System vs. Other Polishing Systems



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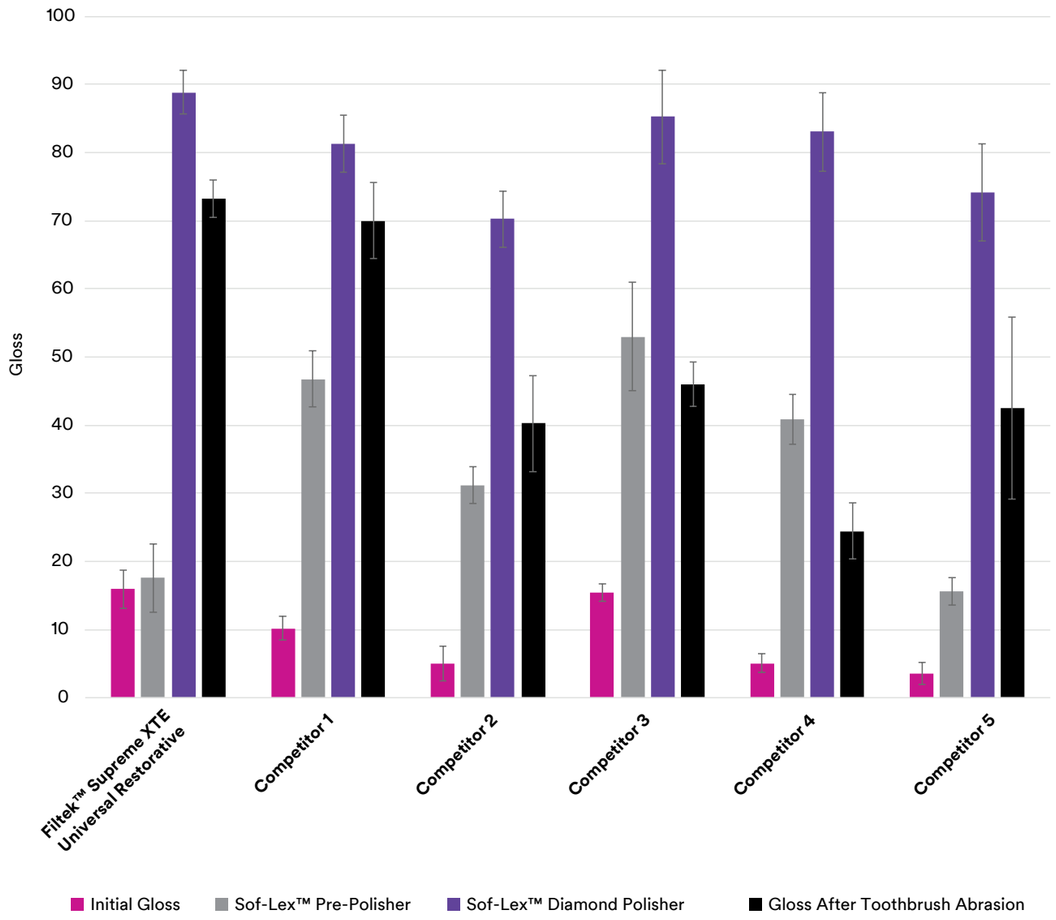
Final Gloss Before & After Toothbrush Abrasion: Sof-Lex™ Diamond Polishing System on Other Composites



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System Final Gloss

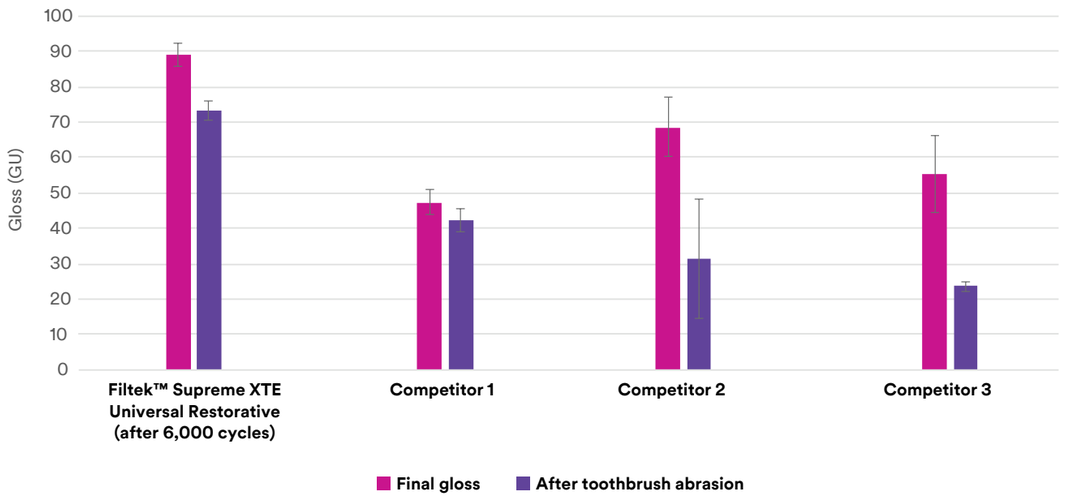
Sof-Lex™ Diamond Polishing System on Filtek™ Supreme XTE Universal Restorative (2 tools, 15 sec. each)

System Gloss Retention

Composite restorations may lose their gloss and show signs of wear over time.

Several composites were prepared using the same protocol as before. Samples were then polished with the corresponding polishing system (same manufacturer). After final polishing, samples received 6,000 cycles of toothbrush abrasion. Final gloss measurements were recorded.

Polish Retention: Samples Polished with the Corresponding Polishing System



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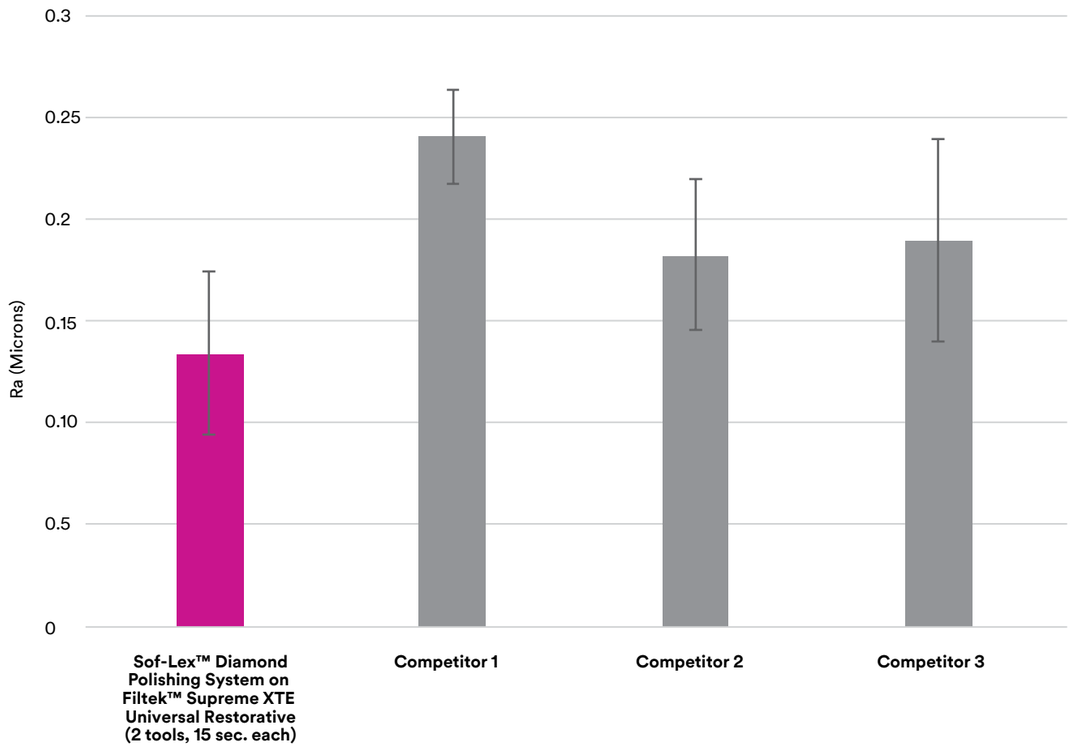
System Surface Roughness

In the chart below, a variety of composite samples were polished with corresponding polishing systems. Each instrument in the polishing system was used for 15 seconds according to the manufacturer's instructions. The graph shows final surface roughness for each system.

Final Surface Roughness:

Composite with Same Brand Finishing & Polishing System



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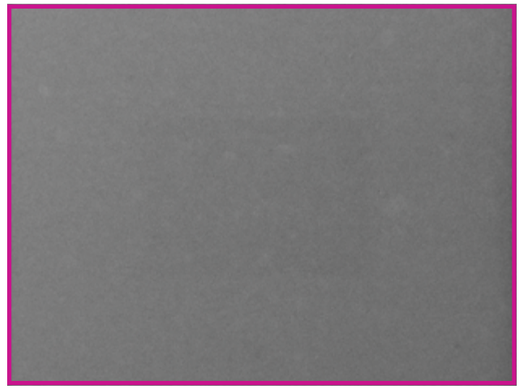
System Surface Visualisation

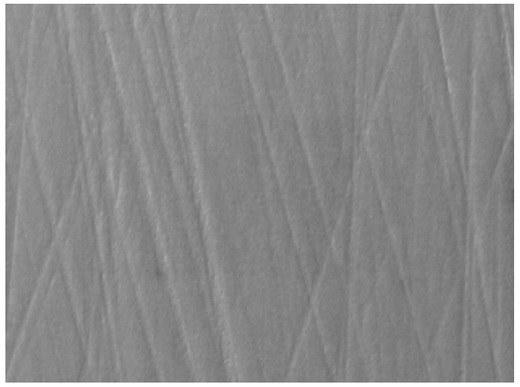
Visual inspection of a composite can reveal how uniform and smooth a surface is after polishing. These polished surfaces are visualised using a scanning electron microscope (SEM). The TOPO setting is ideal for visualising surface tomography is at a magnification of 400X.

Samples of Filtek™ Supreme XTE Universal Restorative and a variety of other composites were prepared.

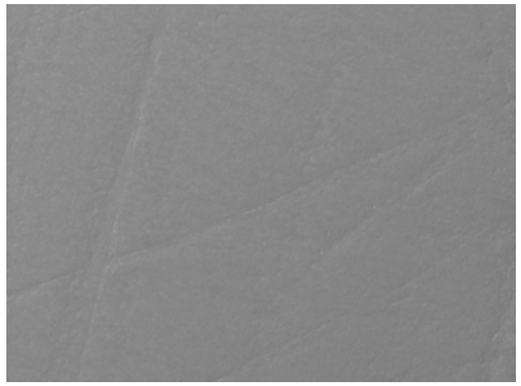
These samples were then polished with corresponding polishing systems following the manufacturer's instructions. SEM photos were captured to help visualise the surface.



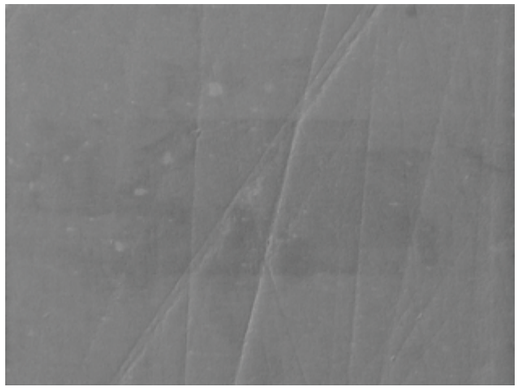
Filtek™ Supreme XTE Universal Restorative polished with Sof-Lex™ Diamond Polishing System



Competitor 1



Competitor 2



Competitor 3

Multi-use

The Sof-Lex Diamond Polishing system can be sterilised and reused multiple times.

The well-known brands of rubberised polishers are single-use and must be disposed of after a single patient.

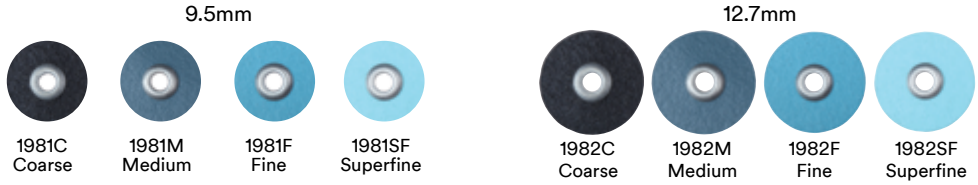
Cleaning and sterilisation were validated and instructions are found in the instructions for use.

Ordering Information

Item #	Product Information
5092-IM	Sof-Lex™ Diamond Polishing System—Introductory Kit Kit includes: 5 Sof-Lex™ Pre-Polishing Spirals (Beige); 5 Sof-Lex™ Diamond Polishing Spirals (Pink); 1 Mandrel; Instructions for Use; Technique Card
5090	Sof-Lex™ Pre-Polishing Spirals—Refill Includes: 15 Sof-Lex™ Pre-Polishing Spirals (Beige)
5091	Sof-Lex™ Diamond Polishing Spirals—Refill Includes: 15 Sof-Lex™ Diamond Polishing Spirals (Pink)

Sof-Lex™ Contouring and Polishing Discs Refills

Each refill contains 85 discs.

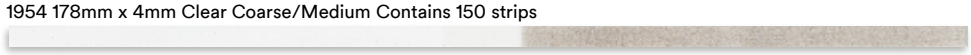


Sof-Lex™ Extra-Thin Contouring and Polishing Discs Refills

Each refill contains 85 discs.

Sof-Lex™ Finishing Strips Refills

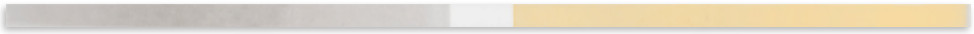
1954 178mm x 4mm Clear Coarse/Medium Contains 150 strips



1954N 178mm x 2mm Clear Coarse/Medium—Narrow Contains 100 strips

Sof-Lex™ Polishing Strip Refills

1956 178mm x 4mm Yellow Fine/Superfine Contains 120 strips



Mandrel Refills

1983RA 3M™ RA Mandrels Refill (3)

3M Oral Care

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