Technical Bulletin

Herculite Ultra

The Evolution of Composite Technology

Over the years, the composite market has evolved into a dynamic, competitive category.

1960s – First Conventional Composite
Contraindicated for use in posterior restorations.

1970s – Microfills
Poor physical properties resulted in bulk fractures. This motivated the current multilayer technique.

Late 1970s – Hybrids
Restorations were not easily polishable and failed to retain long term clinical gloss.

1980s – Microhybrids
In 1984, Herculite became the world's first posterior composite that offered good strength, polishability, and wear resistance, and has since become the gold standard of composite technology.

2000s – Nanohybrids
The millenium marks the rise of nanotechnology, which brought ease of polish to composites containing nanoparticles. However, gloss retention continues to be the Achilles heel of composites, as restorations appear dull soon after initial placement. Kerr provided the solution with Point 4 and Premise, both contain the proprietary Point 4 filler (at 0.4 micron in size) that enables long-lasting polish.

Today
Kerr introduces Herculite® Ultra, a universal nanohybrid composite with high polishability and gloss retention, while retaining the superior physical properties known to microhybrids. Herculite Ultra combines Kerr's resin expertise and 25 years of clinically proven Herculite technology combined with the latest in nanotechnology. The result is superior handling and esthetics for long-lasting results.

"Great for anterior and posterior use because it sculpts well, adapts to margins and interior cavity walls, stays in the cavity, and is non-sticky and thixotropic."

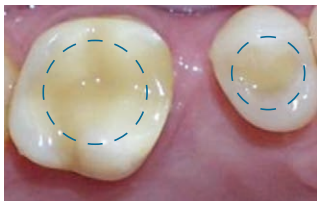
Dr. Arne Lund
Bergen, Norway

Your practice is *our* inspiration.™

Making History

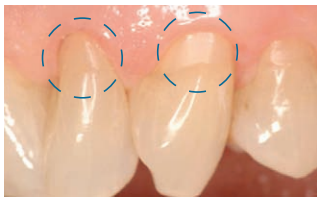
Herculite was the first composite durable enough to use in posterior restorations, making it the world's first truly universal restorative material. Now, Kerr has incorporated all of its expertise gained over the years as the resin technology leader into the making of Herculite Ultra, a material that is truly universal—strong and durable for posterior restorations, and polishable and esthetic for anterior restorations. Herculite technology is also associated with ideal Vita®-shade matching, the best in the industry—so no shade guide is necessary when using a Herculite composite. This clinical excellence *and* ease of use are the reason Herculite technology is taught around the world in dental institutions. To date, some 250 million teeth have been filled with Herculite.*

Exemplary cases showing the longevity of Herculite in the mouth.

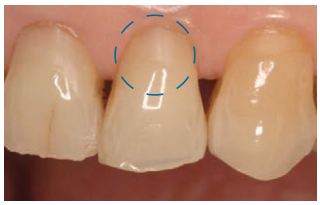


Herculite restorations after 19 years
Case courtesy of Dr. Bruce LeBlanc

Herculite restoration after 13 years
Case courtesy of A. A. Boghosian, J.L. Drummond and E. P. Lautenschlager—Study conducted by Northwestern University



Herculite restorations after 13 years
Case courtesy of A. A. Boghosian, J.L. Drummond and E. P. Lautenschlager—Study conducted by Northwestern University



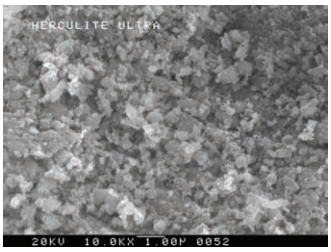
Herculite restoration after 13 years
Case courtesy of A. A. Boghosian, J.L. Drummond and E. P. Lautenschlager—Study conducted by Northwestern University

* Based on internal sales data.

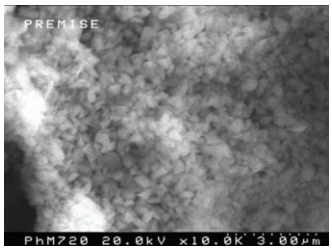
SEM Analyses

SEMs at 10,000 magnification of various filler systems. All resin is "burned off" to reveal the true particle size of each composite.

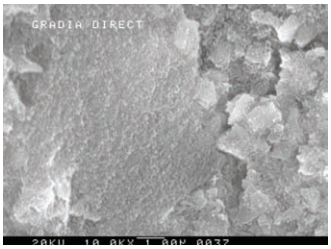
NANOPARTICLE COMPOSITES



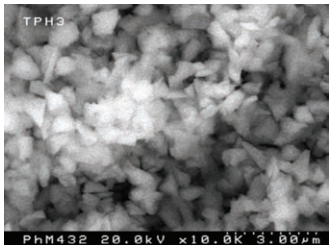
Herculite Ultra
Average Filler Size 0.4 µm



Premise
Average Filler Size 0.4µm

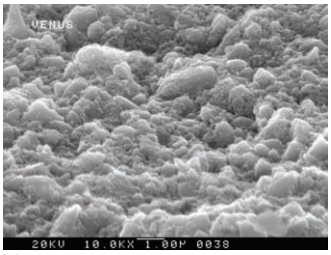


Gradia Direct
Average Filler Size 0.85 µm



TPH3
Average Filler Size 0.7 µm

MICROHYBRID COMPOSITES



Venus
Average Filler Size 0.7 µm

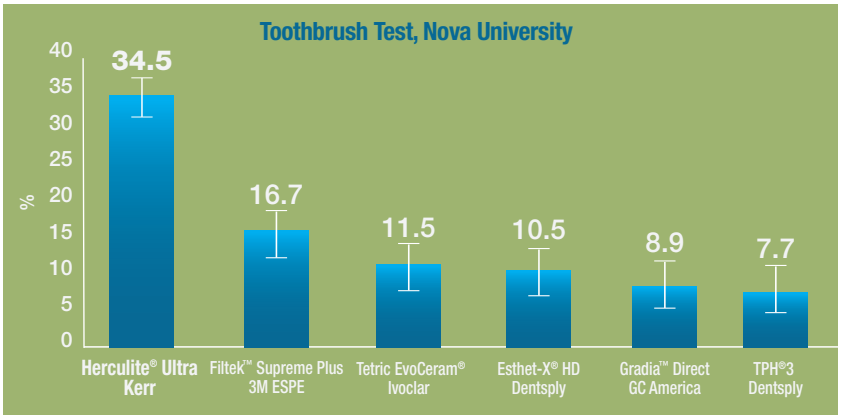
Handling and Polish

Herculite Ultra is non-sticky, easily sculptable, and feathers to a fine margin. Prepolymerized fillers increase the surface asperity, reducing surface contact with instruments, making the material smooth and non-sticky.

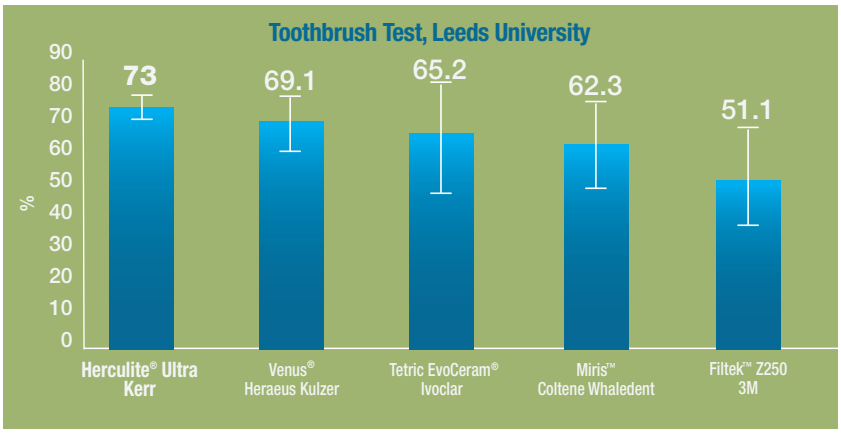
Herculite Ultra polishes very easily due to the proprietary 0.4 micron filler, first used in Kerr's Point 4 composite which is renowned for its microfill-like polishability. The smaller the particle size, the easier it is to polish. While other composites have an average filler size of 0.6 micron or more, Point 4, Premise, and now Herculite Ultra enjoy an average filler size of 0.4 micron, and thus display unmatched ability to polish.

Gloss Retention

Over time, resin in a composite restoration wears off, exposing glass fillers and creating a rough surface. When light shines on this rough surface, if the filler size is larger than the average wavelength of light (at 0.5 micron), the light will be highly diffused, leaving the surface dull, leading to a decrease in gloss. However, for filler size smaller than 0.5 micron, (as in the case of Herculite Ultra, Premise,™ and Point 4™), the particles act more like a liquid and appear as part of the resin due to their small size, and do not interact with light. As a result, gloss is retained over time despite resin wear. The gloss retention capability of Herculite Ultra is evident in various 3rd party evaluations, as seen below.



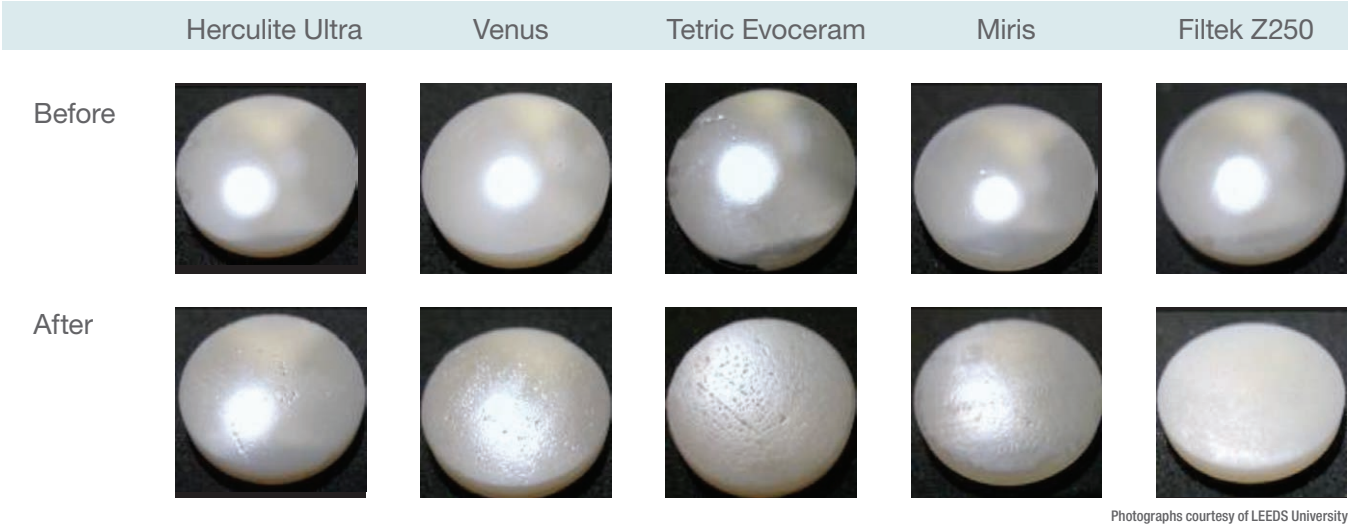
Gloss is measured after cured specimens are toothbrush abraded at 10,000 cycles (350 g pressure, 90 strokes per minute). Study conducted by Nova University. Data available upon request.



Gloss meter readings were taken using a gloss meter at 600 minutes after the initial reading. Study conducted by Leeds University. Data available upon request.

Simulated manual toothbrushing was carried out using a custom-built dentifrice test machine with reciprocal action. The brushes used were of medium stiffness with a mass of 350 g applied. The cycle was set at 1.5 Hz. Colgate® Total tooth-paste [Colgate-Palmolive, USA] diluted at a ratio of 3:1 with deionized water. Both toothpaste mixture and toothbrush head were replaced every 100 minutes. The samples were rotated by 72° every hour.

Product Samples Before and After Toothbrush Test



Photographs courtesy of LEEDS University

Chameleon Quality

The tooth is naturally opalescent, appearing orange when light is transmitted through it and bluish-white when light is reflected from it. This is due to light scattering within the body of the tooth. Opalescence and a high translucency are optical effects that give the tooth a vital appearance. A composite such as Point 4, Premise, and Herculite Ultra, that has particles of the same size as enamel rods, will scatter light similarly as the tooth (Point 4 filler US patent #6232367). The composite blends with the surrounding tooth structure, giving it a lifelike appearance upon completion of the restoration. This is known as the "chameleon-effect" in restorations. The unique chameleon quality of Herculite Ultra enables monolayering (one-shade restorations), a simple, easy-to-use technique that enhances esthetics without complication.

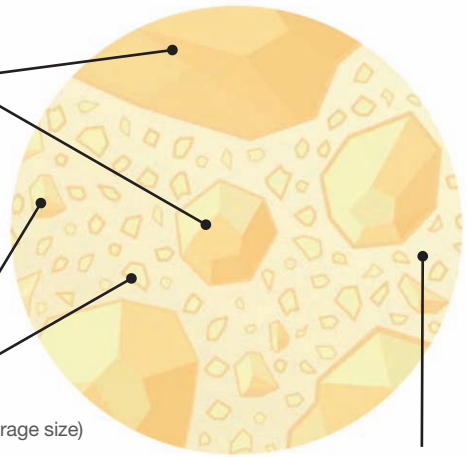
Anterior restoration using Herculite Ultra
(A1 Enamel shade) by Dr. Ara Nazarian

Posterior restoration using Herculite Ultra
(A2 Enamel shade) by Dr. Bruce LeBlanc

Incisal restoration using Herculite Ultra (XL shade)
by Dr. Bruce LeBlanc

Filler Technology

Prepolymerized Filler (PPF)
Large enough to increase loading and already preshrunk, our PPF is a proprietary blend of low-shrinkage resin, barium glass nanoparticles, so plucking becomes a nonissue.
- Decreased shrinkage
- Optimal handling



Point 4 Filler Technology
(barium glass filler of 0.4 µm average size)
- Clinically proven durability
- Clinically proven polish

Silica Nanofiller
(20-50 nm nanoparticles)
- Enhanced polish
- Decreased shrinkage

For more clinical cases using Herculite Ultra, visit **kerrdental.com/herculiteultra**

Kerr
SYBRON DENTAL SPECIALTIES

800.KERR.123