Technical Bulletin

Herculite® XRV 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® XRV Ultra™, a universal nanohybrid composite with high polishability and gloss retention, while retaining the superior physical properties known to microhybrids. Herculite XRV 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."

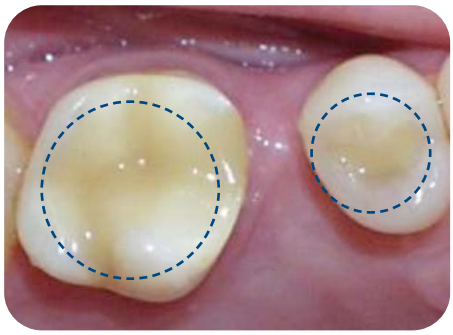
Dr. Arne Lund
Bergen, Norway

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 XRV Ultra, a material that is truly universal – strong and durable for posterior restorations, and polishable and aesthetics 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.*

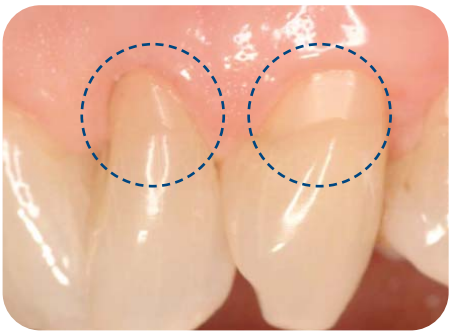
** Based on internal sales data.*

Exemplary cases showing the longevity of Herculite in the mouth.



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

Herculite restorations 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
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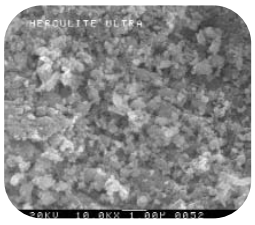
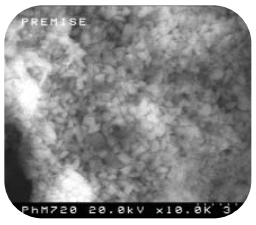
SEM Analyses

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

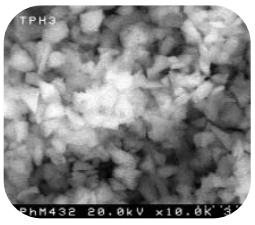


Herculite Ultra
Average Filler
Size 0.4 µm



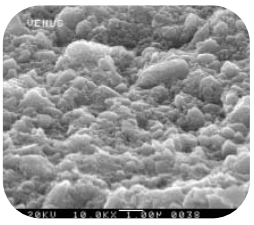
Premise
Average Filler
Size 0.4 µm

Gradia Direct
Average Filler
Size 0.85 µm



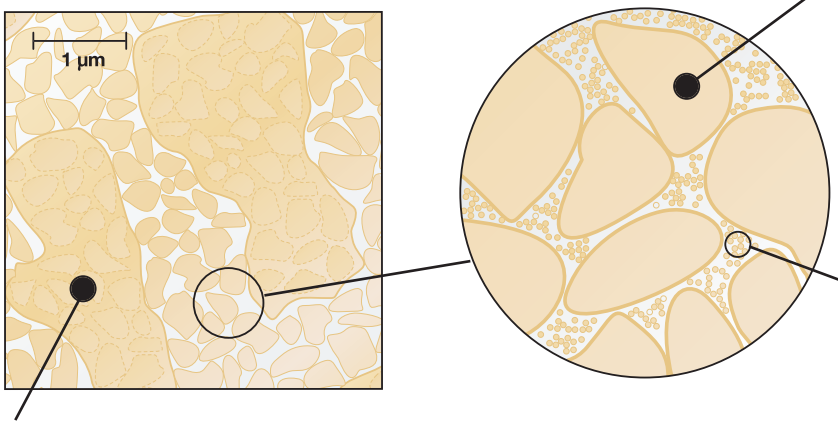
TPH3
Average Filler
Size 0.7 µm

MICROHYBRID COMPOSITE



Venus
Average Filler
Size 0.7 µm

Filler Technology



Point 4 Filler Technology
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

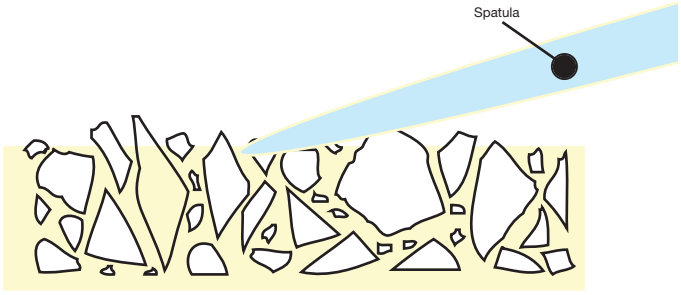
Prepolymerized Filler (PPF)
Large enough to increase loading and already preshrunk, our PPF is a proprietary blend of low-shrinkage resin, barium glass nanoparticles, so plucking becomes a nonissue.
- Decreased shrinkage
- Optimal handling

Handling

Optimised consistency for universal use
Herculite XRV Ultra consistency is optimised to achieve balance between stiffness, easy sculptability and no stickiness. In posterior area it is easy to pack and condense in the cavity and at the same time the material wax like consistency enables easy sculpting. In anterior area it spreads well and can be applied in fine layers.

Handling features:
- Non-sticky
- Easily sculptable
- Non-slumpy, retains the anatomy
- Spreads well into fine margins
- Adapts well to interior cavity walls and margins
- Good to pack and condense in posterior area

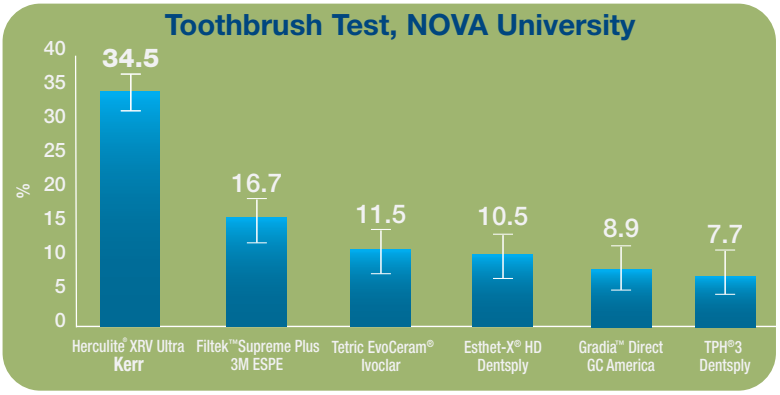
Non-sticky consistency
Prepolymerised fillers increase the surface asperity, reducing suface contact with instruments, making the material smooth and non-sticky.



Polishing and Gloss Retention

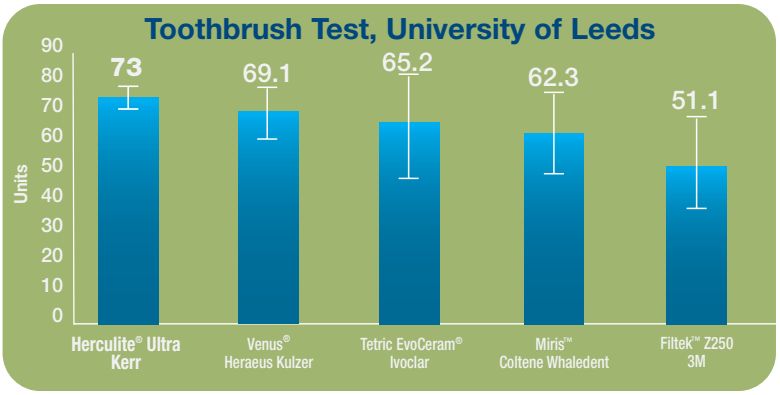
Herculite Ultra polishes very easily due to the proprietary 0.4 micron filler, first used in Kerr's Point 4 composite which is renowned for its microfill-like polishability. The smaller the particle size, the easier it is to polish. While other composites have an average filler size of 0.6 micron or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

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, hence a decrease in gloss occurs. 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).

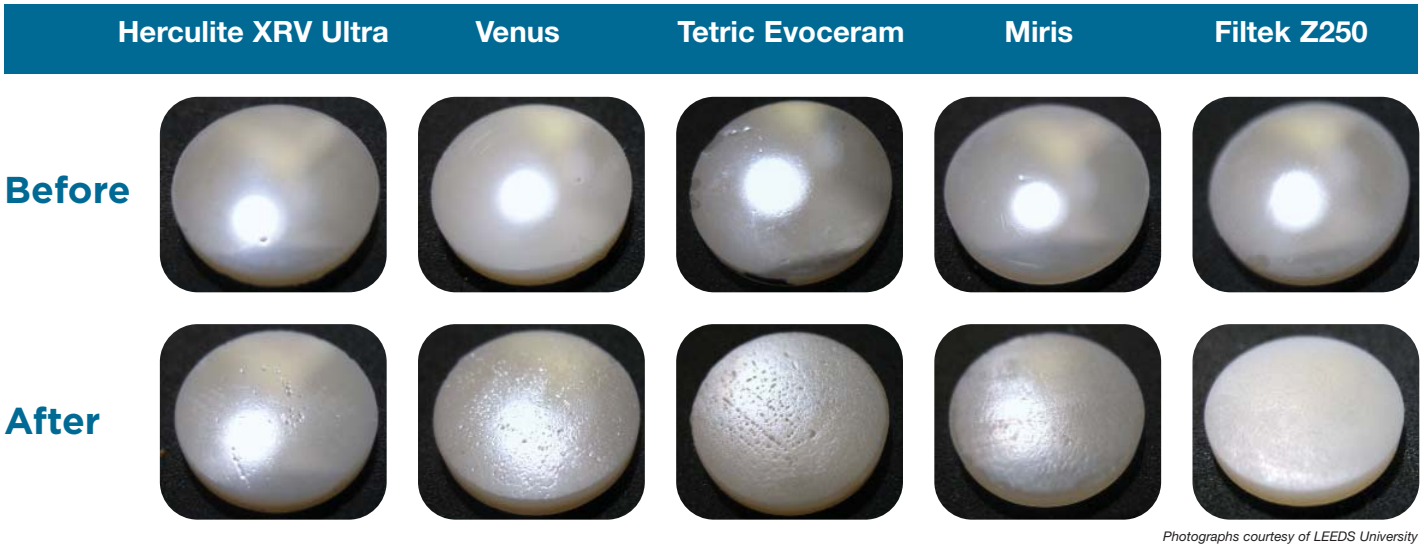
Study conducted by Nova University. Data available upon request.



Gloss meter readings were taken using a gloss meter at 600 minutes after the initial reading.

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 toothpaste [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.

Study conducted by University of Leeds. Data available upon request.



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 know 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 aesthetics 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

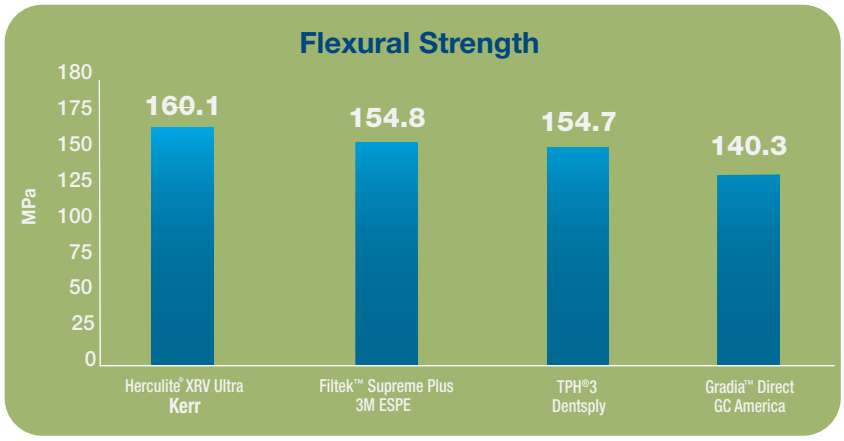
Incisal restoration using Herculite Ultra (XL shade)

by Dr. Bruce LeBlanc

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

Mechanical Properties

Herculite XRV Ultra was developed with the intention to keep the mechanical properties of its successor with improvements in aesthetics and handling properties. Herculite XRV has always been known for its durability and strength. In new formula of Herculite XRV Ultra we have used the same resin matrix of Herculite XRV. This proven resin matrix cures effectively and provides durability, colour stability and clinical performance over time to the new formula of Herculite XRV Ultra.



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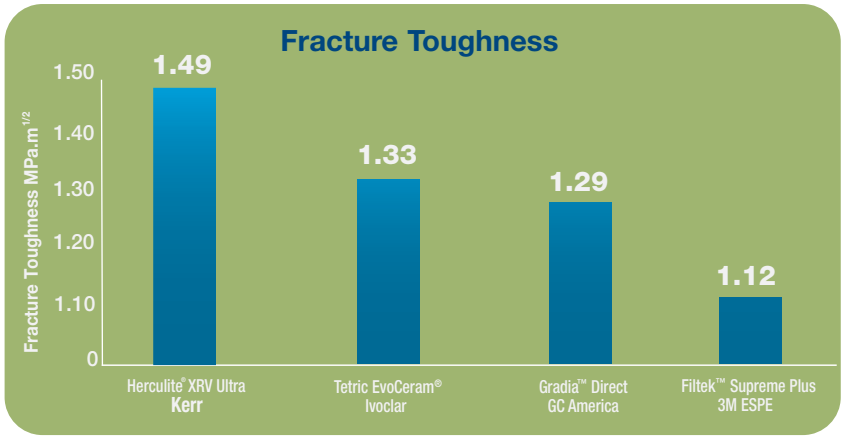

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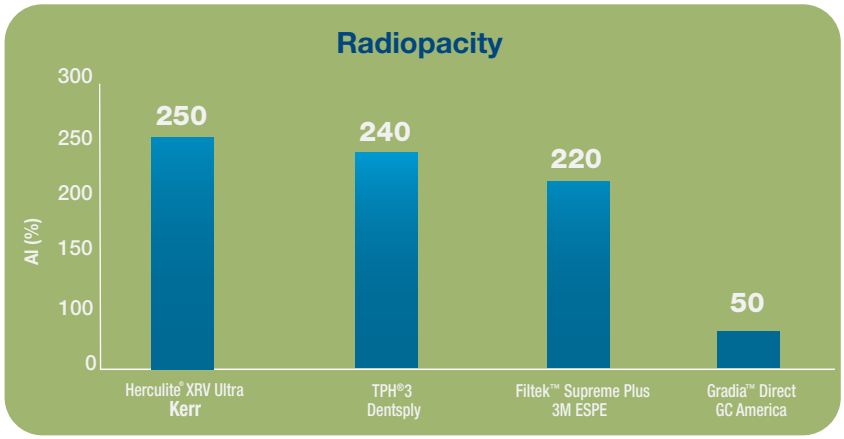

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