



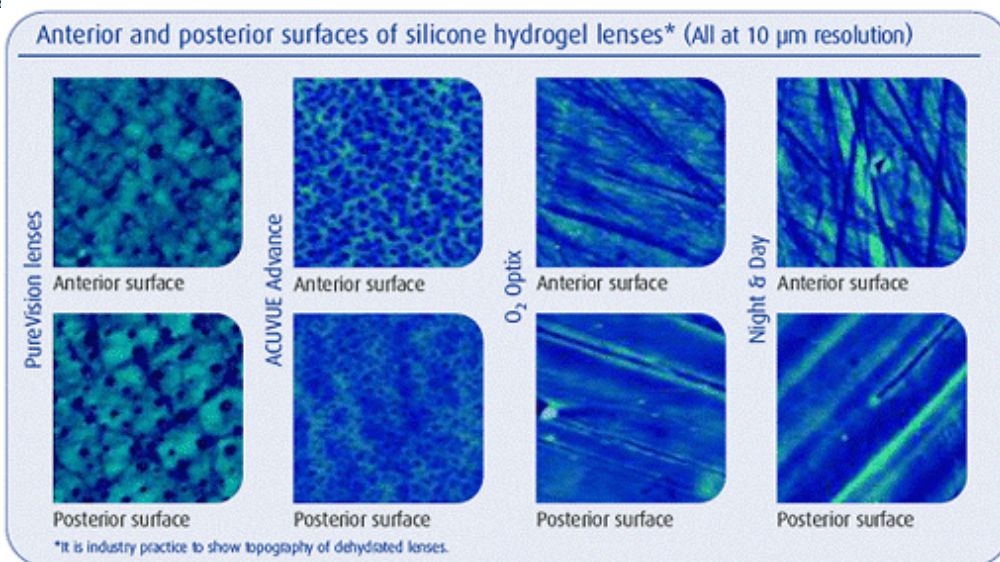
Silicone hydrogel lens surfaces: examining their role in delivering comfort and health to your patients.

As an eye care professional, you know that since every silicone hydrogel material is different, every silicone hydrogel lens *surface* is different. But every lens surface design should have the same goals: excellent oxygen transmissibility, consistent wettability, and enhanced deposit resistance. In this issue of *Eye Matters*, we'll make sense of surface smoothness—what's different in each lens and what remains the same. And we'll look at the surface technologies that contribute to the exceptional health and comfort that silicone hydrogel lenses provide.

Silicone hydrogel lens surfaces: vary in appearance, by design

Any examination of surface smoothness starts with getting a closer look. With Atomic Force Microscopy (AFM), we examined both the anterior and posterior surfaces of four brands of silicone hydrogel lenses while the lenses were in a dehydrated state (the standard industry practice). Images were taken at a resolution of 10 μm and then tinted electronically with the same shade of blue (figure 1).

Figure 1: Anterior and posterior surfaces of silicone hydrogel lenses*



Clearly, every silicate surface looks different at the microscopic level—a result of different lens formulation and manufacturing processes used to create each lens. While topographies are different, a closer look shows that silicone hydrogel lens surfaces are consistently smooth.

By taking microscopic measurements of the distance in nanometers (nm) between the peaks and valleys of a lens surface, we determined each lens' Root Mean Square (RMS) roughness. The result: all silicone hydrogel surfaces exhibited the desired surface smoothness levels—levels that were better than already smooth levels found in previous-generation lathed lenses.

Why is surface smoothness important? It's generally understood that a rough lens surface could impact patient comfort. A rough



The silicone hydrogel contact lenses with enhanced aspheric optical design.

- Enhanced aspheric optical design delivers next-generation aberration correction for exceptional quality of vision. This design reduces both inherent (in the ocular system) and induced (by the lens) spherical aberrations.

- Patented AerGel™ silicone hydrogel material delivers high oxygen transmissibility for exceptional health.

- Performa™ surface process delivers enhanced wettability and deposit resistance for exceptional comfort.

[Learn More about PureVision™](#)

surface can promote the accumulation of deposits and debris.¹ When the roughness of a surface is negligible, as it is with the silicone hydrogel lenses we evaluated, so are the levels of deposits.

Figure 2:
Root Mean Square (RMS) roughness of different lens surfaces

| Surface | RMS Roughness (in nanometers)** |
|-----------------------------------|---------------------------------|
| PureVision | 6 nm (+/-3 nm) |
| O2 Optix | 7 nm (+/- 3 nm) |
| Night & Day | 6 nm (+/-3 nm) |
| ACUVUE Advance | 4 nm (+/-1 nm) |
| Previous-generation lathed lenses | 17 nm |

The science behind the Performa™ surface process of Bausch & Lomb PureVision™ contact lenses

The Performa surface process of PureVision lenses was engineered to create an exceptionally smooth lens surface that is clean, and comfortable. During the Performa surface process, the lens is bombarded with electrically excited gas molecules that transform the hydrophobic silicone of the lens surface into a hydrophilic silicate. These hydrophilic components are “locked in” on the surface, becoming an integral part of the lens (**not a coating that could rub off**). Combined with the patented AerGel™ material, a unique combination of silicone and hydrogel, the resulting lens surface:

- Resists the build-up of lipids, proteins, and environmental debris.
- Helps control hydration dynamics, facilitate fluid transport, and promote natural oxygen transfer to the cornea.
- **Enhances lens wettability for all-day comfort.**

With PureVision contact lenses, your patients get an exceptionally smooth, healthy, and comfortable lens surface. More importantly, they get an excellent balance of material, surface, and enhanced aspheric optical design that maximizes the potential for successful lens wear.

[Find out more about the science behind PureVision lenses by watching the PureVision Experience video online.](#)

¹ Baguet, Joel Et. Al. Imaging surfaces of hydrophilic contact lenses with the atomic force microscope. *Biomaterials* 1993 Vol. 14 No. 4 2 Data on file, Bausch & Lomb. ** Data on file, Bausch & Lomb. Laboratory measurements for all lenses were taken on -1.00D, -2.00D and -3.00D lenses, minimum of three lots per brand, three lenses per lot, three spots on anterior side and three spots on posterior side.

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