



Sensity Lenses...

New technologies + enhancements prime the photochromic market for growth

HOYA

Sensity by HOYA is a game changer.

Light-reactive technology isn't just improving. Thanks to advances by HOYA, it is now opening new revenue streams for eyecare professionals and new satisfaction levels among consumers, including younger ones.

This is definitely not your father's photochromic lens, and this paper will detail the why, what, and how behind HOYA's Sensity and the doors it is opening. First, the Cliff Notes version:

- **Sensity's three deep, natural colors offer consistent performance plus outstanding contrast and glare reduction.**
- **New technologies make Sensity Dark more responsive behind the windshield.**
- **Advances have led to Sensity Shine in new fashionable, mirror-coated lenses.**

Below is a deeper dive into the Sensity technology and opportunities for eyecare professionals.

GROWTH OPPORTUNITIES

Each Sensity design opens doors to different demographic groups and growth opportunities:

- **SENSITY.** Darkens and fades back quickly, while reducing glare and providing 100% UV protection.
- **SENSITY DARK.** Increased performance in both activation and fade speeds overcomes consumer concerns.
- **SENSITY SHINE.** Mirror coatings in the expanded offering add a fresh, fashionable aspect to lenses that appeals to a broad youth and fashion demographic.

EXCITING EVOLUTION

Sensity light-reactive lenses darken outdoors and quickly fade back to exceptionally clear indoors, ensuring comfortable vision plus 100% protection against UV rays.

Sensity Dark and Sensity Shine are the next generation photochromic

technology, achieving greater darkness outdoors in all temperatures. Because they react to a broader light spectrum, they even maintain a level of tint behind the car windshield.

The following is an in-depth look at all three technologies.

SENSITY

- **PERFORMANCE.** Sensity lenses promise consistent performance in different climates and seasons, thanks to HOYA's Stabilight Technology.
- **VERSATILITY.** They darken outdoors quickly and quickly fade back to exceptionally clear indoors.
- **CUSTOMER TIP.** Ideal for patients who have active lifestyles, enjoy convenience, and/or are light-sensitive.

SENSITY DARK

- **PROPRIETARY TECHNOLOGY.** Sensity Dark darkens even in hot temperatures, overcoming a main objection to old photochromic technology. The lenses also fade back to full clarity

indoors. Not only are they extra dark outside, they also darken while inside your car.

- **THE TINT.** Sensity Dark lenses are darker, providing more comfort in bright-light conditions. The tint (Silver Gray, Emerald Green, or Bronze Brown) is uniformly distributed at all activation stages.
- **BEHIND THE WINDSHIELD.** Instead of relying solely on UV-activated photochromic dye molecules, this new dye formula is also reactive to select high-energy wavelengths in the visible spectrum.

Sensity Dark and Sensity Shine are the next generation photochromic technology, achieving greater darkness outdoors in all temperatures.

Although most UV is blocked by the windshield, visible light rays pass through the windshield and reach the lens. At 410nm, for example, photochromic dye activation by visible light results in a 25% difference in darkening—that is, reduced light transmission.

- **CUSTOMER TIP.** Explain that the lens reacts moderately behind car windshields, and it will vary depending on the intensity of light coming through the windshield.

SENSITY SHINE

- **PROPRIETARY TECHNOLOGY.** The fashion and function of the mirror coating combines with excellent photochromic technology to deliver the next and best step in sun lens technology.
- **THE COATINGS.** The Sensity Shine and its mirror coating provide style

to a sunlens that adjusts to different lighting conditions and provides added protection from harmful UV and blue light through surface reflection.

▪ **THE COLORS.** The mirror coating is subtle indoors and distinct in the darkened activated state.

✓ **Silver Gray lenses...**the best for intense light environments.

✓ **Bronze Brown lenses...**offers greater contrast.

✓ **Emerald Green lenses...**allows for greater blue-light protection.



→ **SENSITY SHINE**

Each Sensity Shine mirror lens features multiple states of activation.

▪ **CUSTOMER TIP.** Explain how, in addition to a fashion statement, the Sensity Shine mirrors reduce light transmission outdoors, increasing both comfort and style.

HOYA STABILIGHT TECHNOLOGY

HOYA has focused on three key development targets: improving photochromic performance using a technology that enhances the photochromic dye chemical reaction in all temperatures; improving lens color and expanding tint color choices adding lenses with mirrors; and improving lens durability.

Here's how the company has succeeded in these critical categories with its HOYA Stabilight Technology.

HOW FAST?

The lenses now:

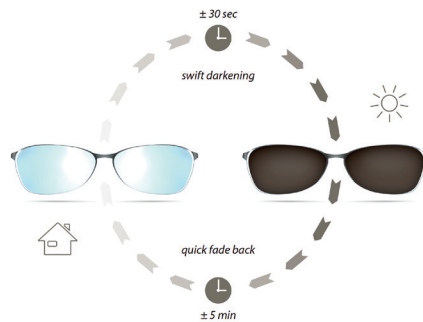
▪ **Fade back faster:** deactivating to a full clear state in <5 minutes.

▪ **Darken faster:** darkening to full density in about 30 seconds.

TEMPERATURE SENSITIVITY

Because Stabilight Technology is less UV- and temperature-sensitive than older technologies, it improves the consistency and stability of photochromic performance in all conditions.

While old photochromic technology is highly temperature-sensitive, Stabilight Technology manages light and temperature reactivity to provide consistent performance — quickly darkening to a Category 3 sun tint outdoors and producing a faster fade-back speed to clear indoors.



→ **PHOTOCHROMIC PERFORMANCE**

With Stabilight, full density is achieved in around 30 seconds.

COLOR IMPROVEMENTS

It is the color (hue) and its density (darkness) that result in glare and sun sensitivity reduction. HOYA's new photochromic technology maintains consistent color and darkness in all phases of activation.

▪ **IN SENSITY...**Developed by color experts to complement today's hottest sun lens trends, Sensity lenses now come in three deep, natural tints — Silver Gray, Bronze Brown, and Emerald Green.

▪ **IN SENSITY SHINE...**Each tint shade has a specific color mirror. The Silver Gray tint's light silver mirror adds comfort in intense light conditions. The Bronze Brown tint's copper mirror increases contrast. And, Emerald Green's blue mirror increases HEV blue-light protection.

▪ **IN SENSITY DARK...**All three colors provide saturation of up to 35% deeper color tone, darkening to Category 3 sun lenses. The transmission of 8% to 18% helps reduce discomfort and glare in very bright outdoor conditions.



→ **ENHANCED COLORS + PERFORMANCE**

Sensity lenses have been developed to complement today's hot color trends.

PROPRIETARY TECHNOLOGY

▪ **PPT.** All Sensity light-reactive lenses are made with HOYA's proprietary Photochromic Precision Technology (PPT). This microscopically precise spin-coating process ensures the even distribution of photochromic dye molecules over the entire lens surface. The even distribution and advanced adhesive properties extend durability and improve performance and lifespan.

▪ **PHOTOCHROMIC LAYER.** Sensity's photochromic layer is applied using the spin-coat process to ensure the precise application of microscopically thin layers. PPT results in superior adhesion and durability of the AR layer.

On the back surface, the hard coat, AR stack, and oil- and water-repellent

top layer are index-matched to the front-surface properties. The result? Superior substrate compatibility for a long-lasting bond.

UV PROTECTION + BLUE LIGHT

▪ **UV PROTECTION...**is the result of invisible dyes dispersed throughout the lens during the curing process and has nothing to do with tint level.

There is also some absorption of blue wavelengths. Sensity filters 20% of blue light in the deactivated state and roughly 80% in the activated state.

▪ **BLUE LIGHT.** The hazard of blue light is damage to the retina, which is thought to accumulate over a lifetime. Therefore, decreasing the level of lifetime exposure to blue light is sensible. Explain to customers that since the greatest exposure to blue light is from sunlight, added protection outdoors is an important feature of a quality sun lens.

Though at greatly reduced levels, digital devices also emit blue light. Since blue light from screens may

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contribute to eyestrain, reducing the amount of blue-light emissions from screens will potentially reduce blue light-induced digital eyestrain.

CONSUMER WANTS

What do consumers want from a photochromic lens? High-speed photochromic performance. Outdoors, they want lenses to activate to a sunglass-level tint quickly. Indoors, they want them to fade back to clear fast. They also want protection ... and photochromic lenses provide 100% protection regardless of the degree of tint.

HOYA's Sensity lenses provide wearers with all this and more. It's an all-around winning technology. For patients and for practices. ■

COMMUNICATIONS CHECKLIST

Here are a few patient communication pointers.

✓ **Tap a younger,** fashion-forward consumer with Sensity Shine mirrored lenses.

✓ **Recommend Sensity Dark** to wearers seeking function, practicality, and convenience.

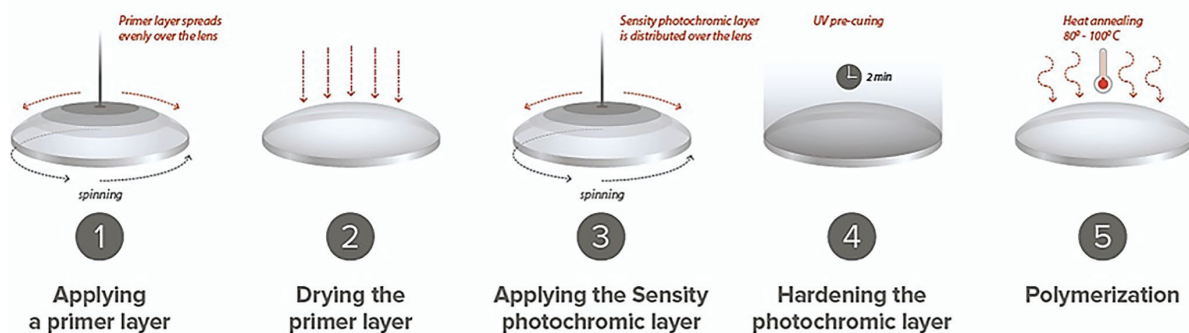
✓ **Visibly demonstrating** this technology will create a high-tech experience that resonates with consumers.

✓ **Stress that photochromics** provide 100% UV protection regardless of the degree of tint.

✓ **Explain that blue light** can cause damage to the retina, which is thought to accumulate over a lifetime.

APPLICATION PROCESS

The spin technology is currently applied to any continuous front-surface lens blank—i.e., free-form progressives, office-type, and, of course, single vision lenses, including stock and finished. Here's a look at that process.



STEP 1: A lens primer layer is applied to the lens surfaces. This adhesion layer bonds both to the lens surfaces and the next layer applied.

STEP 2: The primer layer is dried. Spin coating ensures uniformity of the coating thinness.

STEP 3: The photochromic layer is applied using the precision of this spin-coating process.

STEP 4: The photochromic layer is pre-cured using UV to start polymerization and harden the photochromic layer.

STEP 5: The photochromic hard coat goes through a final cure in an annealing oven at 80-100° C to fully harden and complete the coating polymerization and molecular bonding.