

Transitions™

Signature®

GEN8™



GEN8™

New technology
New frontier of performance

[transitions.com](https://www.transitions.com)

Frames by CAROLINE ABRAM PARIS - Lenses Transitions® Grey

Photochromic performance is influenced by temperature, UV exposure, and lens material. ©2019 Transitions Optical Limited.

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Introduction

Transitions® Signature® GEN 8™
White Paper

The universal need for light control

The average adult spends...



93% of their life indoors²



Only 12 hours per week outdoors²



3.35 hours per day on digital devices³

Light is essential to sight and life, without it even a functional eye would not be able to see. Our eyes adapt all day long to a dynamic and constantly changing light environment. As a result, **our eyes accumulate exposure to a multitude of artificial light and natural sunlight** throughout the day and often at the same time. This daily under-exposure or over-exposure to light has an **impact on both visual performance and general health.**¹

As modern lifestyles change, **we are losing our connection to natural light.** Today, the average adult spends 93% of their life indoors—87% indoors and 6% in the car.² This translates to only 12 hours per week of cumulative time spent outdoors.² On top of this, they are spending 3.35 hours per day on digital devices.³

For eyeglass wearers, discomfort or pain associated with light is as vital to consider as vision correction. In fact, **9 out of 10 eyeglass wearers say they are sensitive to light.**⁴ These patients crave comfort and protection, but desire a hassle-free light intelligent solution that makes life easier, especially in the fast-paced tempo of daily life.

The need for a breakthrough that inspires new wearers

Today, 1 in 10 eyeglass wearers globally wear light intelligent lenses thanks in large part to the success of *Transitions[®] Signature[®] VII* lenses.⁵ *Transitions Signature VII* wearers are highly satisfied and loyal (97% repurchase).⁶ Nevertheless, we recognize that **a large number of eyeglass wearers (Figure 1) who want light intelligent lenses aren't wearing them.** For this reason, we set out to develop a new innovation that eyecare professionals can be completely confident recommending to clear lens wearers and existing photochromic lens wearers.

9/10

say they are sensitive to light⁷

8/10

say they would like their lenses to adapt to light⁷



1/10

wear light intelligent lenses⁵

Figure 1: Light Intelligent Opportunity with Eyeglass Wearers



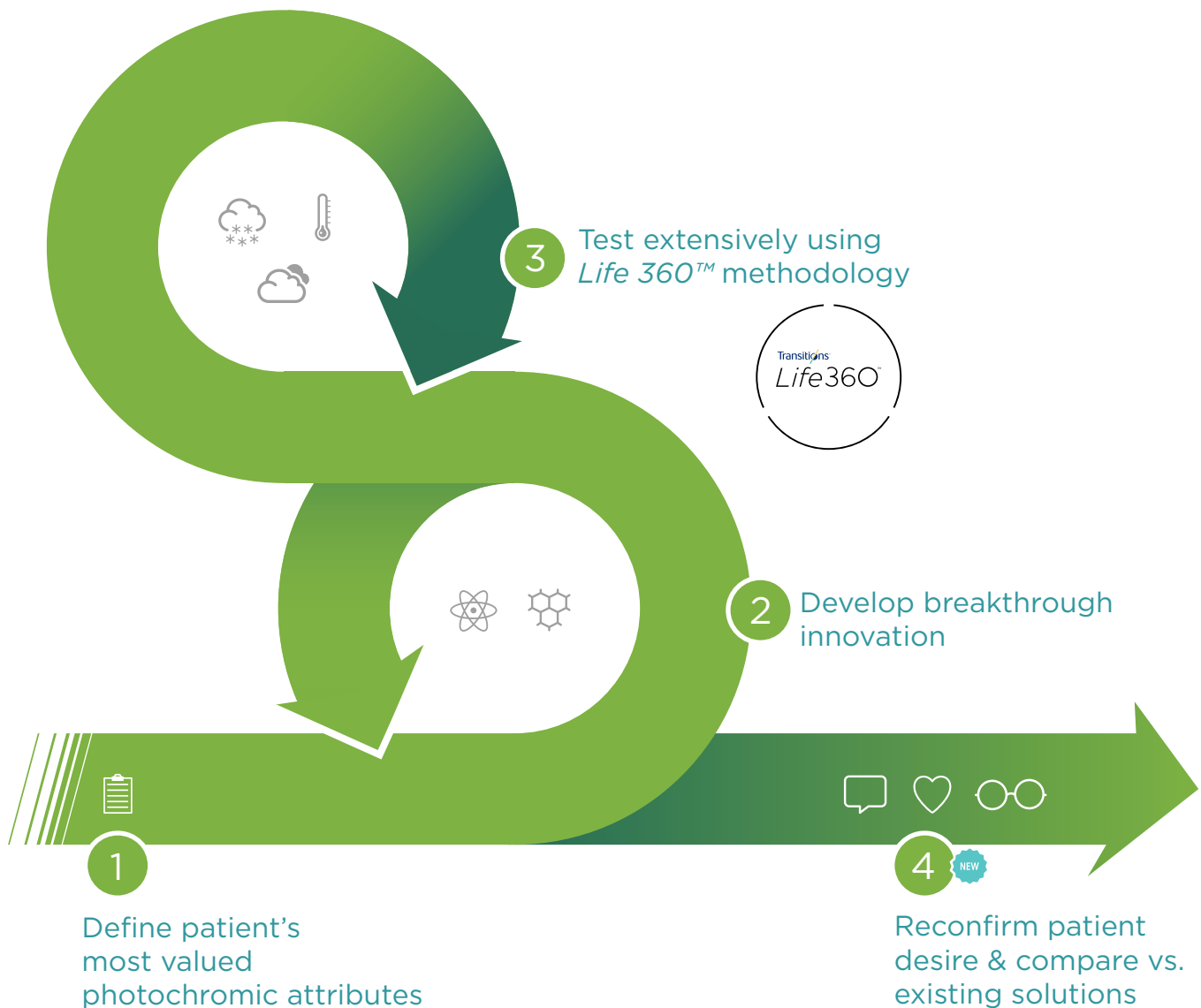
A New Frontier of Performance

Transitions® Signature® GEN 8™
White Paper

Agile development methodology

Figure 2:
*Transitions Signature
GEN 8 Development
Methodology*

Transitions[®] Signature[®] GEN 8[™] lenses are the result of a five-year unprecedented effort by our entire Transitions Optical organization to deliver the optimum light intelligent lens for patients (Figure 2).



Defining the patient's most valued photochromic attributes

Figure 3: Patient's Most Valued Photochromic Attributes



**PROTECTION UV
+ BLUE LIGHT**



RESPONSIVENESS



DARKNESS



**INDOOR
CLARITY**



**LONG LASTING
PERFORMANCE**

At the core of this new innovation is a relentless pursuit of defining, in detail, the **patient's most valued photochromic attributes (Figure 3)**. Starting with the research and development behind the successful launch of *Transitions[®] Signature[®] VII* lenses, we then sharpened our understanding over the last 5 years by surveying over 76,000 patients and over 8,400 eyecare professionals.⁸ The key insight we learned is that patients don't want one single dimension of performance (e.g. speed, darkness, etc.)—**they want it all.**

Breakthrough product innovation

To achieve the new frontier of performance desired by patients we had to fully reinvent our photochromic system. This innovative new system represents a **paradigm shift in the category** as this is the first time since 2005 that we have made a significant step change in improvements to **both** the dyes and the matrix in which the dyes reside. *Transitions[®] Signature[®] GEN8[™]* lenses are unique in that they combine a disruptive nanocomposite matrix and a new generation of ultra-agile photochromic dyes for **improved performance without sacrificing any one dimension of performance (Figure 4)**.

Figure 4: Paradigm Shifting
Photochromic System



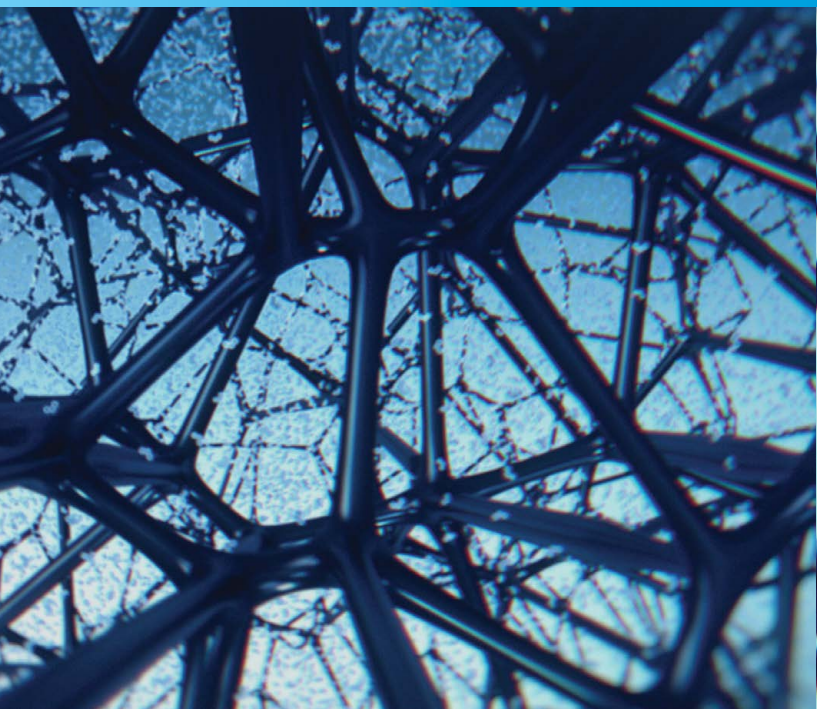
Hard Space



Soft Space

Disruptive nano-composite matrix

New ultra-agile dye generation



How photochromic systems work

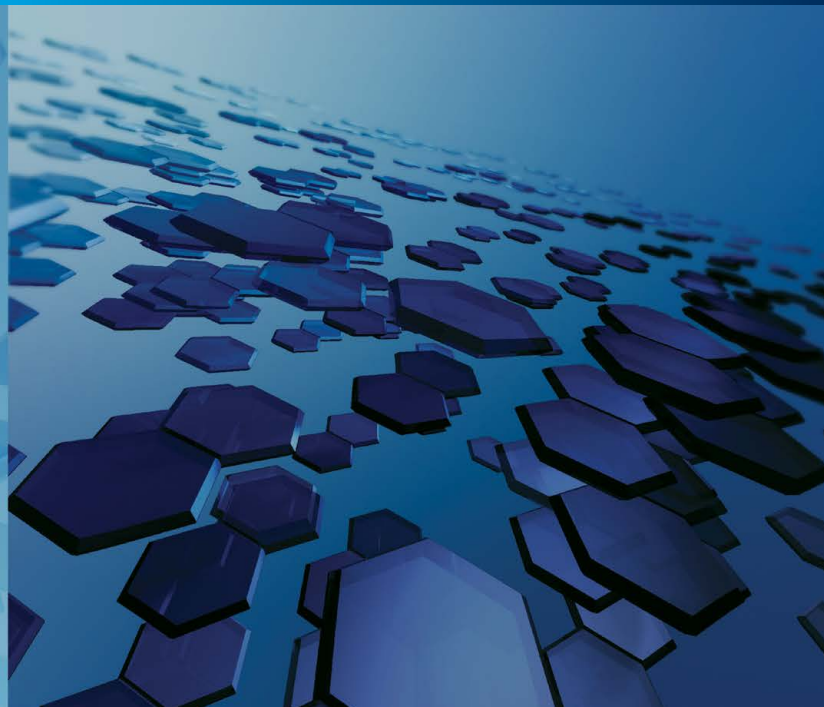
Light intelligent lenses have trillions of photochromic **molecules that are constantly changing shape** based on their level of light exposure (**Figure 5**). When exposed to UV light, a photochromic molecule rearranges itself into one flat plane causing the lenses to darken. When the UV light is taken away, heat reforms the molecule, and the lenses go back to clear. Because the molecules are changing shape, **they need space in the matrix to move**. Ideally, the matrix would be very soft so the dyes can move easily, but because this is an eyeglass lens, the matrix needs to be a hard material, resistant to scratches and durable.

Figure 5: How Photochromic Systems Work

Clear state



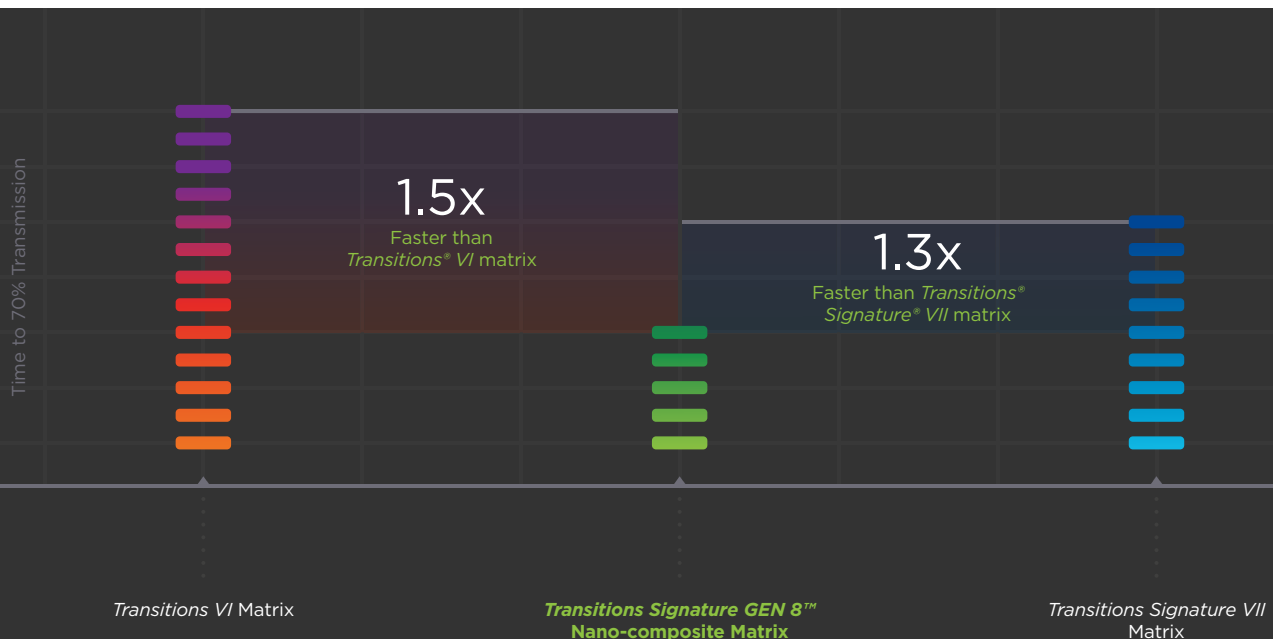
Tinted state



Disruptive nano- composite matrix

The breakthrough solution is a disruptive **nano-composite matrix that combines the freedom of a soft material with the durability of a hard material** at the nanometric level. This new nano-composite matrix mimics a semi-crystalline structure that creates more defined hard and soft domains. Usually, when you gain on one dimension (e.g. darkness or speed) you lose on another (e.g. hardness). By creating hard and soft spaces the dyes can easily seek the softer environments allowing them increased mobility and **resulting in lenses that activate and fadeback fast (Figure 6) without sacrificing darkness or durability.**

Figure 6: Same Dyes in Different Matrices— Fadeback Speed to Perceived Clarity



Ultra agile dyes

Transitions[®] Signature[®] GEN 8[™] lenses also include a **new generation of ultra-agile dyes** developed using the expertise we've gained designing over 6,000 photochromic dyes since the 1990's. These innovative, new ultra-agile dyes enable the lenses to:

- Improved responsiveness (**Figure 6**)
- Improved darkness
- Increase stability and consistency in performance across all colors
- Increase the longevity of the performance (**Figure 7**)

Figure 7: Impact of Aging on Darkness

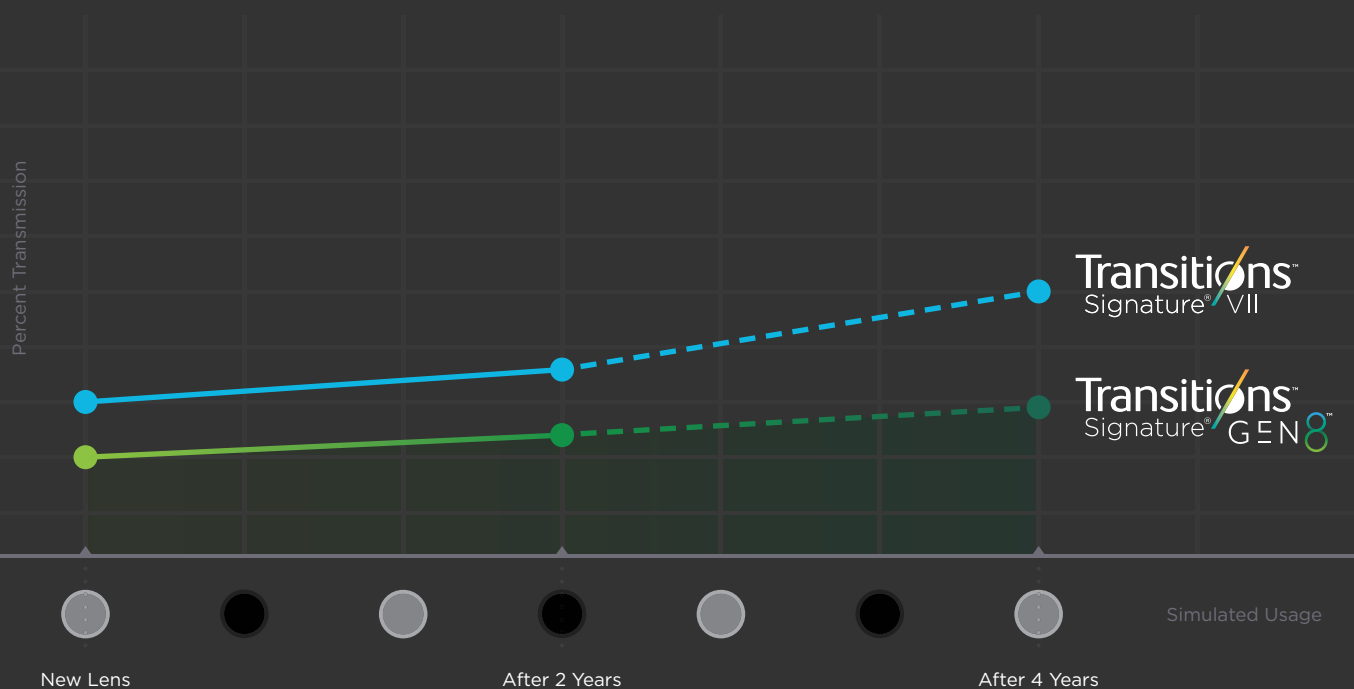


Figure 8: What is *Life 360* Testing Methodology?



Traditional Laboratory Measurements



Real World Measurements



Lab-to-Life Real World Modeling



Live Wearer Testing
Over 800 *Transitions*[®]
Signature[®] GEN 8[™] participants

Testing Methodology

Life 360 is our **proprietary methodology for designing, developing and analyzing photochromic performance** to find a truer, more optimal understanding of product performance and benefits. This revolutionary model utilizes four techniques: lab testing, real world measurements, lab-to-life real world modeling and wearer testing.





Life 360™ Results

When compared to the previous generation using *Life 360* testing, we can show that **Transitions® Signature® GEN 8™ lenses are a new frontier of performance.**

To see these results in action, check out our comparison video at TransitionsPRO.com.

Figure 9:
*Life 360 Results*⁹

9/10

who try are satisfied

7/10

prefer over their current lenses

are satisfied with indoor clarity

would consider for next purchase

8/10

would recommend to others

Faster

Transitions Signature GEN 8 lenses **fade back to clear up to 35% faster** than *Transitions Signature* lenses.

Transitions Signature GEN 8 lenses **activate to category 3 darkness up to 30% faster** than *Transitions Signature* lenses.

Darker

Transitions Signature GEN 8 lenses are **even darker** than *Transitions Signature* lenses.

Long Lasting Performance

Transitions Signature GEN 8 lenses **maintain their level of performance longer** than *Transitions Signature* lenses.

Ultimate Protection

Transitions Signature GEN 8 lenses **block 100% UVA and UVB rays.**

Transitions Signature GEN 8 lenses **block at least 20% of harmful blue light indoors** and over **87% of harmful blue light outdoors.**

100
80
60
40
20

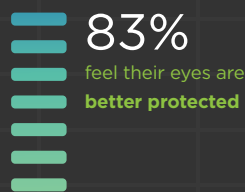
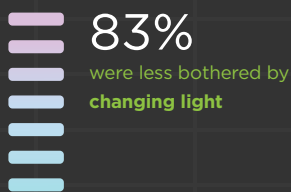
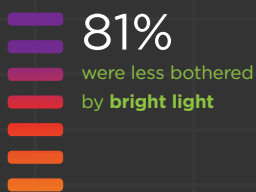


Figure 10



- Protection UV + Blue Light
- Responsiveness
- Darkness
- Indoor Clarity
- Long Lasting Quality

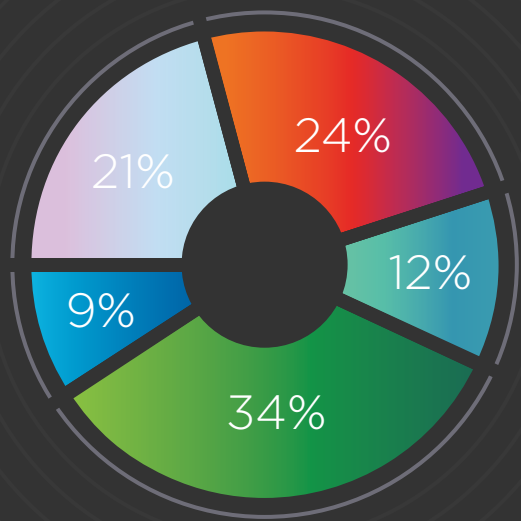


Figure 11:
Relative
Importance
of Attributes
Weighted by
Patients

Reconfirm & compare new breakthrough innovation

Reconfirm Patient's Desire

To eliminate any doubt, we conducted an extensive study¹⁰ of more than 1,000 wearers, representative of the U.S. eyeglass market comprised of 80% clear lens wearers and 20% photochromic lens wearers, adults of all ages, income levels, genders and prescriptions. Through this study, we found that patients do indeed want high overall performance with the right balance of protection, responsiveness (speed to activate/fadeback), darkness, indoor clarity, and long-lasting performance **(Figure 11)**. By quantifying this desire we were able to move on to our final stage of testing—comparison vs. existing solutions.

Figure 12: Comparison vs. Other Branded Solutions



Compare breakthrough vs. existing solutions

To inspire eyecare professional confidence to recruit new wearers, we knew we needed to definitively show that **Transitions[®] Signature[®] GEN 8[™] lenses are the ideal product for all eyeglass wearers.** To that end, we conducted extensive testing on the photochromic solutions in the market today. We then transferred all the performance data for each solution to a common scale, then weighted the data by the relative importance for that performance attribute (**Figure 11**) to obtain an overall performance score.

This score allowed us to consider each of the performance measurements not independently of each other, but all together. This multi-dimensional approach allowed us to anchor the results in patient's expectations for the best overall performance. **The result is that Transitions Signature GEN 8 lenses outperformed the entire field**—including the previous leader—*Transitions[®] Signature[®] VII* lenses (**Figure 12**).



Conclusion



Transitions® Signature® GEN 8™ pushes the limits of performance to satisfy existing photochromic lens wearers and recruit new clear lens wearers. Thanks to our unprecedented patient research and product testing versus clear and other photochromic lenses you can **confidently tell patients that they will love *Transitions Signature GEN 8* lenses.**

Key takeaways

- *Transitions Signature GEN 8* lenses are the result of a **five-year unprecedented effort** by our entire Transitions Optical organization to deliver **the optimum light intelligent lens for patients**
- After extensive research, we learned patients don't want one single dimension of performance (e.g. speed, darkness, etc.)—**they want it all.**
- *Transitions Signature GEN 8* lenses are unique in that they combine a disruptive nanocomposite matrix and a new generation of ultra-agile photochromic dyes for **improved performance without sacrificing any one dimension of performance.**
- By creating hard and soft spaces the dyes can **easily seek the softer environments** in the matrix allowing them **increased mobility** and resulting in lenses that **activate and fadeback fast without sacrificing darkness or durability.**
- 9/10 **clear and photochromic lens** wearers **who try *Transitions Signature GEN 8* lenses are satisfied**
- Using a multi-dimensional approach to compare vs. other photochromic solutions allowed us to anchor the results in patient's expectations for the best overall performance with the result **that *Transitions Signature GEN 8* lenses out performed the entire field—including the previous leader—*Transitions Signature VII* lenses.**

Sources

- ¹ Lighting for Health and Wellbeing Conference, U.S., July 2018
- ² Environmental Protection Agency, American Adult, 2018
- ³ eMarketer, June 18, 2018, Yoram Wurmser
- ⁴ Transitions Optical *Life 360™* Live Wearer Testing, (U.S., France, China), Ifop, 2016-2017, N=117
- ⁵ Transitions Optical Global Market Data, 2017
- ⁶ *Transitions® Signature®* wearers, U.S., MSW-ARS, 2017, N=574
- ⁷ Transitions Optical consumer research, U.S., Dynata, January 2019, N=993
- ⁸ Consumer & ECP Brand Tracking Studies, Various Wearer's Tests, 2014-2019
- ⁹ *Transitions® Signature® GEN 8™ Life 360™* Live Wearer Testing, U.S., Kadence, Q1 2019, N=330
- ¹⁰ Transitions Optical, Key Driver Survey, Dynata, January 2019, N=1037

Performance Disclaimers

- CR607 products fade back to clear 23% faster. Claim is based on tests across materials on grey lenses, being the most popular color, fading back to 70% transmission @ 23°C.
- CR607 products fade back to clear 2 minutes faster. Claim is based on tests across materials on grey lenses, being the most popular color, fading back to 70% transmission @ 23°C.
- CR607 products activate to a category 3 darkness 15% faster. Claim is based on tests across materials on grey lenses, being the most popular color, achieving 18% transmission @ 23°C.
- Lab measurement ISO standard @ 23 C / T=% Transmission.
- "Harmful blue light" is calculated between 380nm and 460nm, across materials and colors. Baillet G., Granger B., How *Transitions®* Lenses Filter Harmful Blue Light, Points de Vue, International Review of Ophthalmic Optics, online publication, March 2016.



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