



Fact Sheet

ZEISS PhotoFusion X at a Glance

What is ZEISS PhotoFusion X?	<p>PhotoFusion X is the new and improved generation of ZEISS photochromic lenses that turn dark outdoors and clear up again when the wearer is inside.</p> <p>They use an entirely new photochromic system, based on faster dyes that work in a robust, more open carrier matrix, allowing to reach their maximum performance level.</p> <p>As a result, the relaunch of the ZEISS photochromic portfolio has significantly improved transition speed and darkness of the lenses. Even the base lens material is new. ZEISS PhotoFusion X lenses are made with ZEISS BlueGuard lens material. The light absorbing ingredients of this material ensure sunglass-level UV protection in any state of the lens, clear or dark. In addition, 50 percent of potentially harmful blue light is blocked by the lens indoors and up to 94 percent outdoors when fully activated.¹</p>
How does the photochromic system work?	<p>Photochromic lenses are light-intelligent and contain billions of photochromic dyes that change their form. When exposed to UV radiation, the photochromic dyes react and darken the eyeglass lenses. Reduction in UV radiation as well as heat induces the reaction of the dyes back to their original shape, and the eyeglass lenses fade back to a clear state again.</p> <p>As the dyes change their shape, they need space to expand. Therefore, the carrier matrix in which they are embedded, needs to provide enough space so that the dyes can quickly react. At the same time, the matrix is robust and durable for everyday resistance of the lens surface.</p>
What is meant by the new generation of the carrier matrix?	<p>The polymer matrix, introduced with PhotoFusion X, provides a robust framework that delivers the toughness and durability expected from an ophthalmic lens material. But it also gives the new, faster dyes more room and freedom to perform at their maximum level.</p>

¹ Analyses by Technology and Innovation, Carl Zeiss Vision GmbH, DE 2021. Based on Blue Violet Block (BVB) metric that quantifies the amount of light 400-455nm blocked by PFX Extra Grey 1.6 HC form.



<p>What is the difference to the previous ZEISS PhotoFusion portfolio?</p>	<p>ZEISS PhotoFusion X uses an entirely new photochromic system and combines:</p> <ol style="list-style-type: none"> 1) Faster dyes contained in a speed-optimized carrier matrix, which gives the dyes more space to react while maintaining robust lens properties. The result is a darkening process up to 60 percent faster than the previous generation of ZEISS PhotoFusion.² The process of fading back to a clear lens is also up to 80 percent faster than the previous generation of ZEISS PhotoFusion.³ 2) ZEISS BlueGuard lens material is used as the base material. That enables blocking of potentially harmful blue light and sunglass-level UV protection, whether in clear or dark mode. 3) New and improved color tones in Grey, Extra Grey and Brown that are as dark or darker than the previous generation of PhotoFusion.⁴
<p>What protection does ZEISS PhotoFusion X offer?</p>	<p>Due to the material and coating combination, the lenses always block up to 100 percent of UV radiation up to 400 nanometer – indoors and outdoors, clear or dark – and up to 50 percent of potentially harmful blue light indoors in clear state and up to 94 percent outdoors when fully tinted.⁵</p>
<p>How will ZEISS PhotoFusion X benefit consumers?</p>	<ol style="list-style-type: none"> 1) Consumers could benefit from glare protection as well as blue light and UV protection without the need for additional glasses. 2) The new generation of photochromic lenses has a much faster response time in fading back to a clear state indoors and also darkens faster outside.⁶ 3) Blue light protection indoors and outdoors is highly demanded and is now included as standard. 4) Wearers of photochromic lenses are paying attention to attractive color and style options. There are a total

² Analyses by Technology and Innovation, Carl Zeiss Vision GmbH, DE 2021 in accordance to ISO 8980-3. Based on the average speed (%T/min) of activation from clear state to 30%T at 23°C in grey 1.60 index and polycarbonate in HC only form.

³ Testing by independent laboratory in USA, 2021 according to requirement in ISO 8980-3. Based on the average speed (%T/min) of fade-back from fully activated state to 80%T at 23°C in grey 1.60 index and Polycarbonate HC only form.

⁴ Analyses by Technology and Innovation, Carl Zeiss Vision GmbH, DE 2021 in accordance to ISO 8980-3. Based on the activated state Transmittance of PFX and PF at 23°C in 1.5 grey, brown, pioneer and blue HC form.

⁵ Analyses by Technology and Innovation, Carl Zeiss Vision GmbH, DE 2021. Based on Blue Violet Block (BVB) metric that quantifies the amount of light 400-455nm blocked by PFX Extra Grey 1.6 HC form.

⁶ compared to previous generation ZEISS PhotoFusion.



	of five photochromic colors to choose from and the additional possibility of combining with stylish flash mirrors.
How will ZEISS PhotoFusion X benefit eye care professionals?	The performance of the lenses is significantly improved, which helps counteract concerns among spectacle wearers about photochromic lenses. In addition, consumer awareness of blue light protection is increasing. In the new generation ZEISS PhotoFusion X, protection from potentially harmful blue light is incorporated in the lens material itself. The ECPs thus have good arguments for the currently growing photochromic market.
How is the photochromic market evolving overall?	Photochromics represent more than eleven percent of all prescription lenses sold in the world market and the segment is growing twice as fast as the total global lens market. ⁷
When will ZEISS PhotoFusion X be launched?	The worldwide rollout starts in January 2022 with sequential launches by region and market.
Availability	Available in ZEISS Rx lens designs in the five colors Grey, Extra Grey, Brown, Pioneer and Blue in a variety of indexes from 1.50 to 1.67 including impact resistant materials like Polycarbonate and Trivex. As stock lenses, ZEISS PhotoFusion X will be available in different optical designs including ZEISS ClearView across the three photochromic colors Grey, Extra Grey and Brown in various material and coating combinations.

PhotoFusion and BlueGuard are trademarks of Carl Zeiss Vision GmbH.
Trivex is a trademark of PPG Industries.

Status: January 2022

⁷ Strategy with vision: Consultants to eyewear and eyecare. World lens and frame demand study 2020. Germany: SWV, September 2020.