



Press Release

ZEISS SmartLife Individual 3: A new generation of tailor-made lenses

ZEISS uses the latest scientific findings on the visual behavior and visual needs of different age groups to update its premium product portfolios.

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The ZEISS SmartLife premium lens portfolio has successfully established itself as the go-to portfolio for eyecare professionals in the market over the past three years. However, people's lifestyles and viewing habits are continually changing and scientific studies can now provide new insights into these changes. Based on these findings, ZEISS has improved the design of its ZEISS SmartLife lens portfolio. In addition, the new SmartLife Individual 3 lenses offer the highest level of personalization available in a ZEISS lens.

"The ZEISS SmartLife lens portfolio is an excellent example of the scientific standard at ZEISS. Based on the latest research and most up-to-date technology, we can now offer eye care professionals an even more customized product portfolio to meet their customers' modern visual requirements at all ages," says Manuela Weinreich, Head of Product Management Lens Designs at ZEISS Vision Care.

The essentials at a glance:

- A study by the ZEISS Vision Science Lab and the University of Tübingen, Germany, investigates the correlation of ocular biometry and refractive errors. It shows that each eye has two "centers of rotation" (CoR) for every eye movement: one horizontal and one vertical. Previous design calculations only incorporated an averaged CoR. ZEISS has now incorporated both CoR in SmartView 2.0 technology, which has resulted in wider fields of clear view.¹ SmartView 2.0 technology is featured in the entire ZEISS SmartLife portfolio.
- The ZEISS international global vision study², shows that visual behavior noticeably differs between different age groups, and certain age clusters can be deduced. In addition, it reveals that consumers' self-assessed lifestyle data miss essential components to match visual needs and behavior. These findings meant that the design

¹ Compared to previous ZEISS SmartLife lenses.

² International Global Vision Study, Carl Zeiss Vision International GmbH, DE, 2020-2021. (unpublished, data on file)



of all ZEISS SmartLife lenses could be further optimized to deliver the highest level of individualization under the ZEISS SmartLife Individual 3 portfolio of lenses.

There is no doubt that our viewing habits change according to our lifestyle. The ZEISS SmartLife lens portfolio was launched in 2019 as a solution to the challenges of modern, dynamic viewing behavior, which is typified by increased switching between digital and analog. Recent studies now show that viewing behavior has changed even more. Intense digital viewing in our daily lives with multiple devices at the same time has made dynamic visual behavior an even more important factor in a fast-changing, digitally immersive world. The trend can be observed across all age groups: More than half of the world's population now carries a portable digital device.³ 55 plus is the age group with the largest current smartphone penetration growth rate⁴ and 60 percent of children under the age of 5 years are already starting to engage with smartphones⁵.

Using ZEISS SmartView 2.0 technology to improve the portfolio

The ZEISS SmartLife lens portfolio is characterized by the fact that it takes the latest scientific findings and innovations into account. Therefore, the SmartView technology which is one of the underlying principles of the portfolio has been updated based on new studies conducted by the ZEISS Vision Lab and Tübingen University, Germany. In order to be able to produce precise lenses, knowledge about how eyes interact with it is fundamentally important. A part of this is determining the center of rotation (CoR)⁶, an individual parameter that changes depending on what grade of refractive error a person has. The study also investigated how refractive errors and the length of the eye determine the position of the CoR during horizontal and vertical eye movements.⁷ The results show that the horizontal and vertical CoR are different—they are in fact about 2.8 millimeters apart. Previous assumptions about there being a single CoR for both rotational directions were overhauled and the ZEISS SmartView 2.0 technology was updated. The result is wider fields of clear view for the whole ZEISS SmartLife lens portfolio.

Study shows age clusters for visual behavior

³ Deloitte LLP. (2017). State of the smart – Consumer and business usage patterns. Global Mobile Consumer Survey 2017: UK Cut. https://www.deloitte.co.uk/mobileuk2017/assets/img/download/global-mobile-consumer-survey-2017_uk-cut.pdf Accessed in December 2022.

⁴ We Are Social & Hootsuite. (2019). Digital 2019 Essential insights into how people around the world use the internet, mobile devices, social media and e-commerce.

⁵ Auxier B. et al. Children's engagement with digital devices, screen time. Pew Research Center. 2020.

⁶ The center of rotation refers to the theoretical position of the rotational axis that the eye moves around. The shape of the eye differs from person to person, and it is also dependent on the type of vision problems a person has.

⁷ Ohlendorf, A, Schaeffel, F, Wahl, S. Positions of the horizontal and vertical centre of rotation in eyes with different refractive errors. *Ophthalmic Physiol Opt* 2022; 42: 376– 383. <https://doi.org/10.1111/opo.12940> // Study details: A custom-built eye tracker was used to determine the center of rotation from the lateral displacements of the pupil center. The horizontal and vertical eye movements of the right eye were studied, and each measurement was carried out five times for each of the 59 subjects (32 females) with an average age of 36.6 ± 9.1 years. Spherical equivalent refractive errors ranged from -9.7 to $+6.8$ D with an average error of -1.5 ± 2.9 D. Axial lengths were measured with the Zeiss IOL Master 500.



As digitalization advances in everyday life, new technologies are also expanding possibilities for processing data in product development. In a new, large-scale ZEISS international global vision study⁸ completed under real-life conditions, 410 test subjects of different ages and life situations in the U.S., China and Germany were observed in their everyday life on five days per week over a period of three weeks to collect data on their visual behavior⁹ (eye movements, direction, distance, ambient light, and UV light).

The study shows that viewing requirements differ noticeably between different age groups. A total of six age clusters¹⁰ can be derived from this. In addition, it became clear that the self-assessment of the viewing behavior and habits of consumers through classic questioning deviates significantly from objective data analysis. These findings form the basis of the ZEISS Intelligence Augmented Design technology, which, with ZEISS SmartLife Individual 3 lenses, takes the precise fit of spectacle lenses and visual comfort to a new level.

Individual parameters are translated into target design

ZEISS Intelligence Augmented Design technology uses smart data science to further optimize lens design. The individual parameters of the wearer¹¹, which are collected by measurement and questioning done by the eye care professional, are compared with 12.5 million data points of the visual behavior of certain age groups in order to make the target design more precise. In this way, the technology determines not only the distances that will be needed in the lens in everyday life, but also how the eye and head movements of people who wear glasses will appear. Together, this is translated into a target design that optimally matches the visual behavior. 85 percent of wearers confirm that with ZEISS SmartLife Individual 3 lenses they have full freedom of vision in any distance and direction.¹²

“The design and performance capabilities of a personalized lens like the ZEISS SmartLife Individual 3 naturally results from the complex interaction of a large number of technologies. But the ZEISS Intelligent Augmented Design technology in particular enables us to make a real leap forward in individualization by defining the so-called target design for subsequent optimization in a level of detail we have never seen before in a ZEISS lens,” says Manuela Weinreich.

A premium lens for all target groups

In 2000, ZEISS brought the first individualized progressive lens to the market with the Gradal Individual. It was manufactured using free-form technology that had been developed by ZEISS. Today, ZEISS is once again a leader of innovation and its ZEISS SmartLife Individual 3 lens

⁸ International Global Vision Study, Carl Zeiss Vision International GmbH, DE, 2020-2021. (unpublished, data on file)

⁹ Data was collected in 2021 in the USA, Germany, and China on three weekdays and both days of the weekend. In total, the eye movements of each test subject were recorded 4,800 times. Survey data and self-assessments of each subject's lifestyle were also collected.

¹⁰ Six age clusters were identified: 20-29, 30-39, 40-49, 50-59, 60-69 and 70-79.

¹¹ Anatomy, physiology and habits.

¹² Market consumer acceptance test on ZEISS SmartLife Individual 3 lens portfolio with n=172 study participants in DE, IT, CN by Carl Zeiss Vision International GmbH, DE 2022. (unpublished, data on file)



means that wearers can have customized and effortless vision – in all directions and for all distances, compatible with their current lifestyle and age group.

“With the ZEISS SmartLife portfolio, eye care professionals can offer services to all age groups and know that they can recommend products that have been developed using the latest scientific research,” concludes Weinreich. “I’m particularly thrilled that with ZEISS SmartLife Individual 3 lenses we have managed to respond even better to the needs of spectacle wearers.”

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About ZEISS

ZEISS is an internationally leading technology enterprise operating in the fields of optics and optoelectronics. In the previous fiscal year, the ZEISS Group generated annual revenue totaling 8.8 billion euros in its four segments Semiconductor Manufacturing Technology, Industrial Quality & Research, Medical Technology and Consumer Markets (status: 30 September 2022).

For its customers, ZEISS develops, produces and distributes highly innovative solutions for industrial metrology and quality assurance, microscopy solutions for the life sciences and materials research, and medical technology solutions for diagnostics and treatment in ophthalmology and microsurgery. The name ZEISS is also synonymous with the world’s leading lithography optics, which are used by the chip industry to manufacture semiconductor components. There is global demand for trendsetting ZEISS brand products such as eyeglass lenses, camera lenses and binoculars.

With a portfolio aligned with future growth areas like digitalization, healthcare and Smart Production and a strong brand, ZEISS is shaping the future of technology and constantly advancing the world of optics and related fields with its solutions. The company’s significant, sustainable investments in research and development lay the foundation for the success and continued expansion of ZEISS’ technology and market leadership. ZEISS invests 13 percent of its revenue in research and development – this high level of expenditure has a long tradition at ZEISS and is also an investment in the future.

With over 38,000 employees, ZEISS is active globally in almost 50 countries with around 30 production sites, 60 sales and service companies and 27 research and development facilities (status: 30 September 2022). Founded in 1846 in Jena, the company is headquartered in Oberkochen, Germany. The Carl Zeiss Foundation, one of the largest foundations in Germany committed to the promotion of science, is the sole owner of the holding company, Carl Zeiss AG.

Further information at www.zeiss.com

ZEISS Vision Care

ZEISS Vision Care is one of the world’s leading manufacturers of eyeglass lenses and ophthalmic instruments. The unit is allocated to the Consumer Markets segment and develops and produces offerings for the entire eyeglass value chain that are distributed globally under the ZEISS brand.