Fact Sheet

ZEISS SmartView 2.0 technology

What is ZEISS SmartView 2.0 technology?	ZEISS SmartView 2.0 technology forms the technological foundation of the entire ZEISS SmartLife lens portfolio. The technology consists of three cornerstones: 1. Smart Dynamic Optics: A ZEISS design optimization for today's dynamic visual behavior for all ages. 2. Age Intelligence: Visual challenges change with age. Therefore, Age Intelligence considers the wearer's age for further specific lens optimization. 3. Clear Optics and Thin Optics: Enable selective optimization of every individual point where the spectacle wearer looks through the lens. This guarantees optimum vision over the entire lens surface. ZEISS lens aesthetics with the best balance between excellent optics and thin and light lenses.
What is Smart Dynamic Optics?	Smart Dynamic Optics is the fundamental design concept used in ZEISS SmartLife lenses. The design is based on binocular vision for today's dynamic visual behavior. The key consideration is the relationship between the inclination (today the lower lens area is used more often) and the object distance/ viewing distance (which has become increasingly closer for the lower lens area). A three-dimensional object-space model is used to design the lens, which takes into account the distance, direction and inclination in relation to the spectacle lens within. This is the first time that ZEISS has used this three-dimensional model for single vision lenses too, enabling ZEISS SmartLife lenses to provide optimal near and far-distance vision for this group of consumers. Within the latest update of ZEISS SmartView 2.0 technology the three-dimensional object-space model was also adapted for children and young people (recommended for 6-19years). Next to the three-dimensional object-space-model, ZEISSDigital and Progressive SmartLife lenses use new design fingerprints (distribution

	of the vision zones). Both the object-space-model and the new design fingerprint take the dynamic visual behavior from near to far into account which leads to a smoother transition into the lens periphery with less blur than ZEISS Digital and Progressive lenses.
What are the vision needs of today's consumers?	Our eyes are constantly switching between our on- and offline worlds. Meanwhile, in today's busy world, we are always on-the-move. This means that our eyes aren't just moving between two worlds – they are also constantly moving in different directions and distances. On top of the additional cognitive capacity, this places more demands on our eyes, which for example need to accommodate more often. For example, a study[1] conducted by the ZEISS Vision Science Lab in Tübingen, Germany, confirmed that the presence of a smartphone directs our gaze downwards – almost without accompanying head movement. This means that our gaze is increasingly directed at the lower area of the lens. Overall, a greater area of the lens is being used. The ZEISS SmartLife lens design takes these new trends into consideration.
What is Age Intelligence?	Age Intelligence means that different, mainly age-related aspects are considered in each lens design. 1. The age of the wearer and the corresponding physiological and anatomical changes to the eye are factored into the design. 2. The visual needs that change with age, and which are sometimes subjective, also play a role in the design process. The visual needs of different age groups can be grouped into the following general categories: Age: 6-19 years | Clear vision, adapting to eyes and lifestyle while growing 20+ years | + Clear vision, near and far 30+ years | ++ Relaxed vision, especially after a long day 40+ years | + ++ Near vision support, reduction of eye strain 50+ years | + + ++ Intermediate vision support

[1] Dynamic Gaze Study – Changes in gaze behavior through digital devices. ZEISS Vision Science Lab, Institute for Ophthalmic Research, University of Tübingen, 2019. Data on file.

	With the help of three technologies, age-specific parameters are incorporated into the lens design: 1. ZEISS Luminance Design 2.0 technology takes into account pupil size, which changes with age. 2. ZEISS Dynamic AgeFit technology incorporates the changing anatomy of the face, especially in children and young people. 3. ZEISS Intelligence Augmented Design technology (IAD) adapts the lens design to individual visual behavior by using smart data science. Thanks to IAD, the questionnaire at the eye care professional can be optimized by incorporating long-term data into the final lens design.
What is the benefit of customizing the lens to the age of the consumers?	Today's lifestyle is similar for people of all ages, but it's just as important for everyone to be able to see well. However, the eye and visual capabilities change continuously with age. Anatomical and physiological changes of our eyes can lead to different visual challenges over time. This can be attributed to the following key factors: - A decrease in the amplitude of accommodation. - A change in pupil diameters – increasing for growing children and decreasing when we age as adults. - Kids and teenagers differ in age-specific facial anatomy and morphology resulting in changing parameters of wear to consider in the lens design. Furthermore, the ZEISS international global vision study 2020/21[2] showed that visual behavior noticeably differs between age groups, and certain age clusters were identified. These clusters also have an influence on the optimal design of the lens. In order to ensure optimal vision for all ages, all these aspects need to be considered in the lens design. This is the aim of ZEISS SmartLife lenses.
What is Clear Optics and Thin Optics?	In order to be able to produce precise lenses, knowledge about how eyes interact with them is fundamentally important. A part of this is

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

	determining the center of rotation (CoR)[3], an individual parameter that changes depending on what grade of vision impairment a person has. The ZEISS Vision Science Lab and the University of Tübingen, Germany, investigated how refractive errors and the length of the eye determine the position of the CoR during horizontal and vertical eye movements.[4] 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 entire ZEISS SmartLife portfolio.

Status: February 2023

[3] The center of rotation refers to the theoretical position of the rotational axes (vertical and horizontal) 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.

[4] 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.