Fact sheet

ZEISS UVProtect

What is UV radiation?	UV radiation comes from the sun, as do visible light and infrared radiation. The UV spectrum is split into UVA (315–400 nanometers [nm]), UVB (280–350 nm) and UVC radiation (100–280 nm). UVC doesn't make it to the Earth as it's absorbed by the ozone layer. UVA and a portion of UVB, however, do reach us. UV radiation is not visible for the human eye. The sun is important for our well-being and vitamin D production; UV rays tan our skin but can also damage it. The same goes for our eyes. The 380–400 nm range is of particular relevance as around 40 percent of solar UV rays that reach the Earth fall within it.
Where is UV radiation?	Put simply, UV radiation can be found outside wherever there is sunlight. Scattered radiation is the real problem. It can also be found wherever the sun shines indirectly or unhindered – i.e. in the shade or on a cloudy day.
What affects the level of UV radiation?	The level of UV radiation primarily depends on geography and altitude, the weather, the time of day and the composition of the ozone layer as well as on the reflection by surrounding surfaces (e.g. snow, grass, concrete, glass etc.).
What happens when our eyes are exposed to UV radiation?	Our eyes can reflect, absorb and transmit UV radiation (which can then be absorbed by the tissue). This can result in negative consequences wherever it is absorbed. Particularly UVA radiation waves penetrate more deeply into the tissue, meaning they can cause damage.
How does UV radiation damage the eyes?	UV radiation compromises eye health not only in the short term, but also in the long term. The body registers damage caused by UV radiation – and this damage accumulates over the course of our lives. Damage caused directly on or inside the eye and the sensitive part around the eye include: ▪ Photoaging, i.e. the premature aging of the skin (wrinkles), which is caused by repeated exposure to the sun. ▪ Eyelid cancer (ocular adnexa): According to the German Cancer Society (DKG), UV radiation is one of the main causes of changes to

	the skin: the eyelids. A mere five to ten percent of all cancer cases relate to the eyelids. ▪ High UV exposure may also cause “sunburn of the cornea” (aka photokeratitis), resulting in temporary pain, tears, twitching, light sensitivity and contracted pupils. ▪ This also affects the eye’s lens. The risk of clouding (cataract) rises after exposure to UV radiation, and in many cases the process can be accelerated significantly. If it goes untreated, the patient runs the risk of going blind. But even before cataract is diagnosed, UV radiation can alter a person’s vision in the form of reduced contrast or color perception. ▪ A possible consequence of high UV exposure on the retina is macular degeneration. Vision is severely impaired, and the patient ultimately runs the risk of losing their sight. Such UV-related risks can only be effectively reduced if the eyes are protected against UV radiation from morning to night.
Why don’t all plastic lenses protect against UV radiation up to 400 nm?	The applicable ISO industry standard still classes the limit for the UV protection of eyeglass lenses at 380 nm. To date, this means a large proportion of clear plastic lenses have only protected the eyes up to 380 nm. Some lenses with a refractive index of 1.5 only protect up to 355 nm.
Is ZEISS the only lens manufacturer that offers full UV protection?	ZEISS is the only manufacturer to offer full UV protection up to 400 nm as standard for all clear plastic lenses. ZEISS is bridging a major gap by providing UV protection for the eyes. While other lens manufacturers also offer lenses with protection up to 410 nm, 420 nm or even 430 nm, this compromises visual perception. For UV protection, additives must be incorporated in the polymers, which in turn affects the quality of the lens: too little and UV radiation will not be blocked fully, too much and it will affect the transparency of the lenses. However, ZEISS scientists have found ways to modify the clear lens polymers so as to offer full UV protection without noticeably changing visible light transmission. A compromise between lens clarity and full UV protection has now been found.

Do antireflective coatings with a UV coating provide complete protection?	Most UV light enters the lens from the front. “UV coatings” only help reduce the amount of reflected, indirect UV radiation from the back – but not the UV rays that hit the lens from the front. Lenses with ZEISS UVProtect technology absorb direct UV rays. A specially optimized coating on the back of the lens reduces the amount of indirect UV radiation.
When purchasing ZEISS plastic lenses, do consumers automatically get full UV protection?	Since early 2018, all clear ZEISS plastic lenses offer full UV protection up to 400 nm.* Anyone who decides against full UV protection can order lenses with a low refraction index (1.5), without ZEISS UVProtect technology from a ZEISS partner eye care professional.
Availability	ZEISS UVProtect is available for all clear plastic lenses.

*Excluded are Aphakia and bifocal lenses.

Status as of May 2018