Fact sheet

ZEISS UVProtect

What is UV radiation?	Solar 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. The sun is important for our well-being and vitamin D production; UV rays tan our skin but can also damage it. UV radiation can also harm our eyes. The 380 – 400 nm range is of 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 UV radiation is also a problem, as is reflected UV radiation (from surfaces like water and snow). UV radiation can also be found wherever the sun shines indirectly or hindered – i.e. in the shade or on a cloudy day.
What affects the level of UV radiation? What is UV level and UV exposure?	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 scattering and the reflection by surrounding surfaces (e.g. clouds, snow, concrete, glass etc.). The level of UV radiation for a specific time and place is expressed with the so called UV Index (surnburnmap.com). The personal UV exposure depends not only on the current UV Index or level but also on clothing, applying sunscreen, wearing sun glasses, behavior 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. Particularly UVA radiation waves penetrate more deeply into the tissue, meaning they can cause damage.
How does UV radiation damage the eyes?	UV radiation can compromise eye health not only in the short term (like with Photokeratitis), but also in the long term. The body registers damage caused by UV radiation – and this damage accumulates over the course of our lives.

	Damages on or inside the eye and the sensitive part around the eye to which UV radiation is a major or contributory cause include: ▪ Photoaging, i.e. the premature aging of the skin (wrinkles), which is caused by repeated exposure to the sun. ▪ Eyelid cancer (cancer of 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 skin 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 with 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, a developing cataract can alter a person’s vision in the form of reduced contrast or color perception. ▪ Some scientist do not exclude age related macular degeneration as a damage to which UV is contributory cause.
Why don’t all plastic lenses protect against UV radiation up to 400 nm?	Applicable industry standards still define the upper limit of UV radiation at 380 nm. To date, 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. For UV protection, additives must be incorporated in the polymers, which in turn affects the lens: the challenge is that UV radiation will not be blocked fully, or 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, entering the lens from the front. A specially optimized UV 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 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 July 2018