



Ultraviolet (UV) Radiation and Your Eyes

Most consumers are aware of the risks of sunburn and skin cancer from the sun's ultraviolet (UV) radiation.

But did you know UV and other radiation from the sun can also harm your eyes?

Extended exposure to the sun's UV rays has been linked to eye damage, including cataracts, macular degeneration, pingueculae, pterygia and photokeratitis that can cause temporary vision loss.

Dangers of Ultraviolet Radiation to Your Eyes

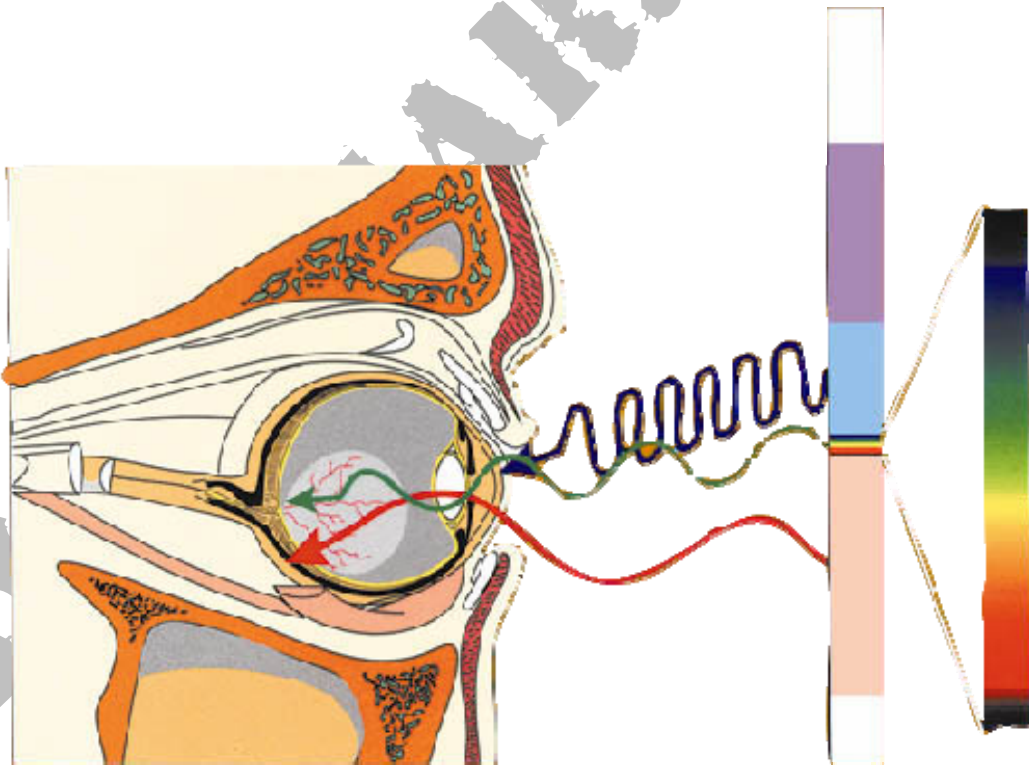
To protect your eyes from harmful solar radiation, visors and lenses should block 100 percent of UV rays. While many people refer to ultraviolet radiation as UV light, the term technically is incorrect because you cannot see UV rays.

There are three categories of *invisible* high-energy UV rays:

- **UVC rays.** These are the highest-energy UV rays and potentially could be the most harmful to your eyes and skin. Fortunately, the atmosphere's ozone layer blocks virtually all UVC rays. But this also means depletion of the ozone layer potentially could allow high-energy UVC rays to reach the earth's surface and cause serious UV-related health problems. UVC rays have wavelengths of 100–280 nanometer (nm).
- **UVB rays.** These have slightly longer wavelengths (280–315 nm) and lower energy than UVC rays. These rays are filtered partially by the ozone layer, but some still reach the earth's surface. In low doses, UVB radiation stimulates the production of melanin (a skin pigment), causing the skin to darken, creating a suntan. But in higher doses, UVB rays cause sunburn that increases the risk of skin cancer. UVB rays also cause skin discolorations, wrinkles and other signs of premature aging of the skin.
- **UVA rays.** These are closer to visible light rays and have lower energy than UVB and UVC rays. But UVA rays can pass through the cornea and reach the lens and retina inside the eye. Overexposure to UVA radiation has been linked to the development of certain types of cataracts, and research suggests UVA rays may play a role in development of macular degeneration.

Various eye problems have been associated with overexposure to UV radiation. As an example, UVB rays are thought to help cause pingueculae and pterygia. These growths on the eye's surface can become unsightly and cause corneal problems as well as distorted vision.

In high short-term doses, UVB rays also can cause photokeratitis, a painful inflammation of the cornea. "Snow blindness" is the common term for severe photokeratitis, which causes temporary vision loss usually lasting 24-48 hours. Because the cornea appears to absorb 100 percent of UVB rays, this type of UV radiation is unlikely to cause cataracts and macular degeneration, which instead are linked to UVA exposure.



Only a small corridor is *harmless visible light* as depicted by the green segment above. The most harmful part of the sun radiation is the UV radiation with wavelengths below 400 nm. Only glasses and goggles with high quality UV absorbers provide full protection up to 400 nm and this is where UVEX are market leaders.

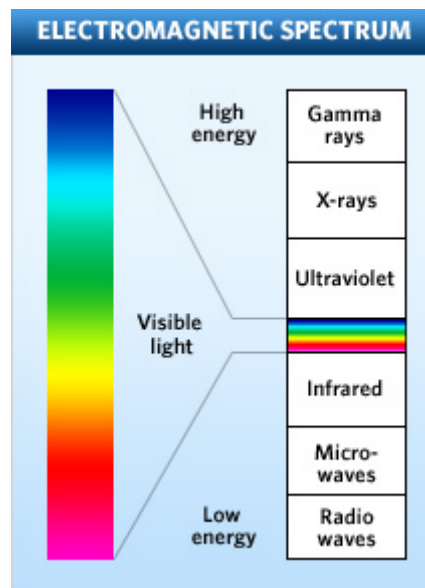
The companies name actually originates from their UV protection credentials : UVEX = **UltraViolet EX**cluded

Outdoor Risk Factors

Anyone who spends time outdoors is at risk for eye problems from UV radiation. Risks of eye damage from UV exposure change from day to day and depend on a number of factors, including:

- **Geographic location.** UV levels are greater in tropical areas near the earth's equator. The farther you are from the equator, the smaller your risk.
- **Altitude.** UV levels are greater at higher altitudes.
- **Time of day.** UV levels are greater when the sun is high in the sky, typically from 10 a.m. to 2 p.m.
- **Setting.** UV levels are greater in wide open spaces, especially when highly reflective surfaces are present, like snow and sand. In fact, UV exposure can nearly double when UV rays are reflected from the snow. There is less risk of UV exposure in urban settings, where tall buildings shade the streets.
- **Medications.** Certain medications, such as tetracycline, sulfa drugs, birth control pills, diuretics and tranquilizers, can increase your body's sensitivity to UV radiation.

Surprisingly, cloud cover doesn't affect UV levels significantly. Your risk of UV exposure can be quite high even on hazy or overcast days. This is because UV is invisible radiation, not visible light, and can penetrate clouds.



Ultraviolet (UV) rays are higher in energy and do not fall within the realm of visible light, as shown above. In the electromagnetic spectrum, radio waves have the lowest energy, and gamma rays have the highest energy.

Children Need UV Protection Even More Than Adults

The risk of damage to our eyes and skin from solar UV radiation is cumulative, meaning the danger continues to grow as we spend time in the sun throughout our lifetime.

With this in mind, it's especially important for children to protect their eyes from the sun. Children generally spend much more time outdoors than adults. In fact, experts say as much as 80 percent of our lifetime exposure to UV rays occurs by age 18.

Protect Your Eyes From UV Rays

Look for visors and goggles that block 100 percent of UV rays. UVEX are leaders in this respect.

The amount of UV protection visors provide is unrelated to the color and darkness of the lens or visor. A light amber-colored lens can provide the same UV protection as a dark gray lens. All UVEX visors regardless of colour carry the same protection.

Measuring Ultraviolet Rays

| UV INDEX | |
|----------|--|
| 0-2 | No danger to the average person |
| 3-5 | Little risk of harm from unprotected sun exposure |
| 6-7 | High risk of harm from unprotected sun exposure |
| 8-10 | Very high risk of harm from unprotected sun exposure |
| 11+ | Extreme risk of harm from unprotected sun exposure |

Many misconceptions exist about the right sun protection for your eyes. Keep these tips in mind:

- Very few visors/goggles (with the exception of UVEX) block 100 percent of UV rays. If you're unsure about the level of UV protection your current visor provides, take it to your eye doctor or optician for an evaluation. Many eye care professionals have instruments such as spectrophotometers that can measure the amount of visible light and UV radiation your visor may block.
- Remember to wear sunglasses even when you're in the shade. Although shade reduces your UV exposure to some degree, your eyes still will be exposed to UV rays reflected from buildings, roadways and other surfaces.
- Even if your contact lenses block UV rays, you still need protection. UV-blocking contacts shield only the part of your eye under the lens. UV rays still can damage your conjunctiva and other tissues not covered by the lens.
- If you have dark skin and eyes, you still need protection. Although your dark skin may give you a lower risk of skin cancer from UV radiation, your risk of eye damage from UV rays is the same as that of someone with fair skin.

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