UNDERSTANDING HEV

Blue light, also known as high-visible light (HEV), is a high frequency light that falls into the near-UV range. It is in the visible part of the light spectrum, and has wavelengths between 380 and over 500 nanometres (nm). Due to its high energy, it is more scattered than any other wavelength in the visible spectrum; this is why our eyes perceive a clear sky as being blue. The most damaging blue light wavelength is around 440 nm.

HEV is emitted naturally by sun, as well as artificially by laptop computers, tablets, cell phones, LEDs and fluorescent light bulbs. While the general public is somewhat familiar with the dangers associated with overexposure to UV light, most have never heard of and are completely unaware of the risks HEV pose to health.

Effects of HEV on Health

Similar to UV radiation, HEV possesses some health benefits. When exposed to it in small doses during the day, it plays an important role in the regulation of the circadian rhythm, boosting attention, reaction time, and mood. However as with UV radiation, HEV is also potentially dangerous. REcent scientific discoveries suggest that skin damage caused by high-energy visible light may be as harmful as the most damage caused by UVA and UVB light combined. The most worrying aspect is that this damage can be wrought just from overexposure to HEV during daylight hours.

An even more sinister risk from HEV to our health arises from a relatively new threat- technology. The plethora of electronic devices in use today- such as cell phones, tablets and laptop computers- have dramatically increased exposure to blue light. Another source of blue light is energy efficient technology in the form of fluorescent light bulbs and LED lights. It appears that these cost-saving light sources may come at a price. Curlicue compact fluorescent light bulbs and LED lights may be much more energy-efficient than the old-fashioned incandescent type but they also produce a greater amount of blue light. The eye's natural filters do not provide sufficient protection from the sunlight. Therefore the blue light emitted by these devices is manifestly more dangerous. And here lies yet another problem: not only does blue light at night disrupt the body's biological clock, it can severely affect our sleep, suppress melatonin production and contribute to a multitude of health issues- of which cancer, diabetes, heart disease and obesity are but a few.

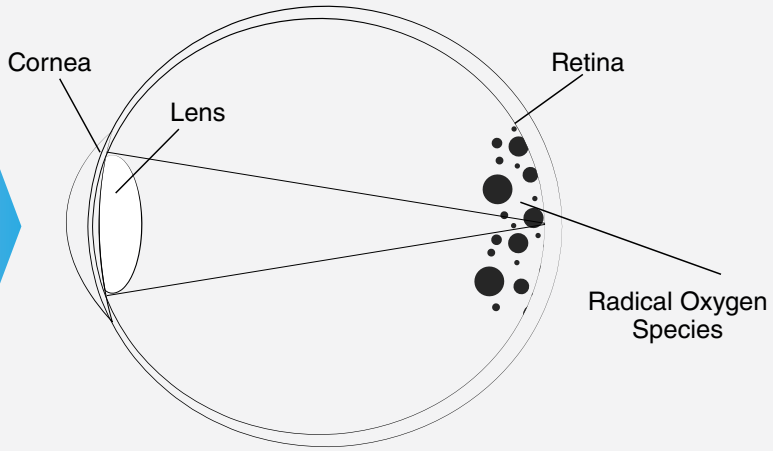
How Blue Light Affects The Eyes

While most studies in the past have concentrated on the harmful effects of UV radiation on the eyes, a large and growing body of evidence shows HEV to pose a significant threat to our eyes- particularly the retina.

Age-Related Macular Degeneration

AMD is a leading cause of vision loss among the elderly. It also has no effective cure. REcently researchers have discovered a strong link between AMD and radical oxygen species in macular photoreceptor cells, and proximate retinal pigment epithelium cells (RPE). BEcause both of these cells are non-replicating, they sustain cumulative stress from a lifetime of oxidative assault. Visible light, especially blue, appears to be a significant factor in the production of reactive oxygen species that damage the retina and contribute to formation of AMD. In fact, blue light produces some of the most oxidative stress within the retina and is believed to be responsible for exacerbating the extent of oxidative damage that occurs. This is why the risk of retinal damage from visible light has been termed “the blue light hazard”. although the human lens blocks UVB, and most UVA rays that enter the eye, virtually all HEV light can penetrate the lens and reach the retina at the back of the eye. this results in damage to the macular photoreceptor cells and RPE cells, playing a significant role in the development of AMD.

Blue Light



Choosing The Right Lens

Range of Luminous Transmittance	Suitable Light Conditions	Lens Category	Tint Class	Description
80-100%	**Indoor**	**0**	Clear or very light tint	Sunglasses are not needed Very low sunglare reduction Some UV protection
43-80%	**Limited**	**1**	Light tint	Sunglasses are not needed Limited sunglare reduction Some UV protection
18-43%	**Moderate**	**2**	Medium tint	Sunglasses needed Medium sunglare reduction Good UV protection
8-18%	**Strong**	**3**	**Dark tint**	Sunglasses needed High sunglare reduction Good UV protection
3-8%	**Extreme**	**4**	**Very dark tint**	Special purpose sunglasses needed Very high sunglare reduction Good UV protection

Well-designed and well-fitting sunglasses are one of the best lines of defence against damaging radiation from sunlight. However, not all lenses are made equal.

When choosing sunglasses, always look for UV-protection product labels. Sunglasses should block 99 to 100 percent of both UVA and UVB rays, and absorb most of the HEV radiation. Labels that read"UV absorption up to 400 nm"mean that the lenses block least 99 percent of UV rays. It is best ti avoid sunglasses that do not have a label, as we cannot assume that they provide protection. Ideally, UV-protection glasses should also reduce glare, leave colours undistorted, feel comfortable on your face and have unbreakable lenses that shield the eyes form injury.

Large lenses are better, as they provide greater coverage to the eye and surrounding tissue, which decreases the penetration of unfiltered light. Wrap-around frames are best.

BLUE-BLOCKING LENSES

Lenses that block blue light are tinted amber; However, when driving it is recommended that sunglasses be tinted grey to ensure proper traffic light recognition. Blue-blocking lenses can make distant object easier to see, especially in snow and haze, and are thus commonly used by skiers, hunters, and boaters.

PHOTOCHROMIC LENSES

Photochromic lenses darken or lighten automatically as the amount of available light change. Once the light source is removed, the lenses gradually return to their clear state. They are especially beneficial to people who wear prescription glasses. However, they can take time to adjust to different light conditions.

POLARISED LENSES

Polarised lenses reduce the amount of reflected light that enters the eye, eliminating the reflected glare that is most noticeable on water, snow, concrete, and roads. For this reason, they are beneficial to a variety of outdoor enthusiasts as well as general-use wearers.

POLYCARBONATE LENSES

Polycarbonate lenses offer impact protection, and are especially useful for participants of potentially hazardous sports and activities.

MIRROR-COATED LENSES

Mirror-coated lenses decrease the amount of light that passes through the lens by a further 10-60 percent, making them especially useful for sand, water, snow, and high altitued conditions.