YOUNGER OPTICS
The Optical Lens Innovators

LEDPRO™

LED light controlling lens

LED Pro lenses are the first patented ophthalmic lens technology to selectively absorb the high-intensity wavelengths that cause visual discomfort in white LED light.

Patent No.:
US 8,911,082 B2

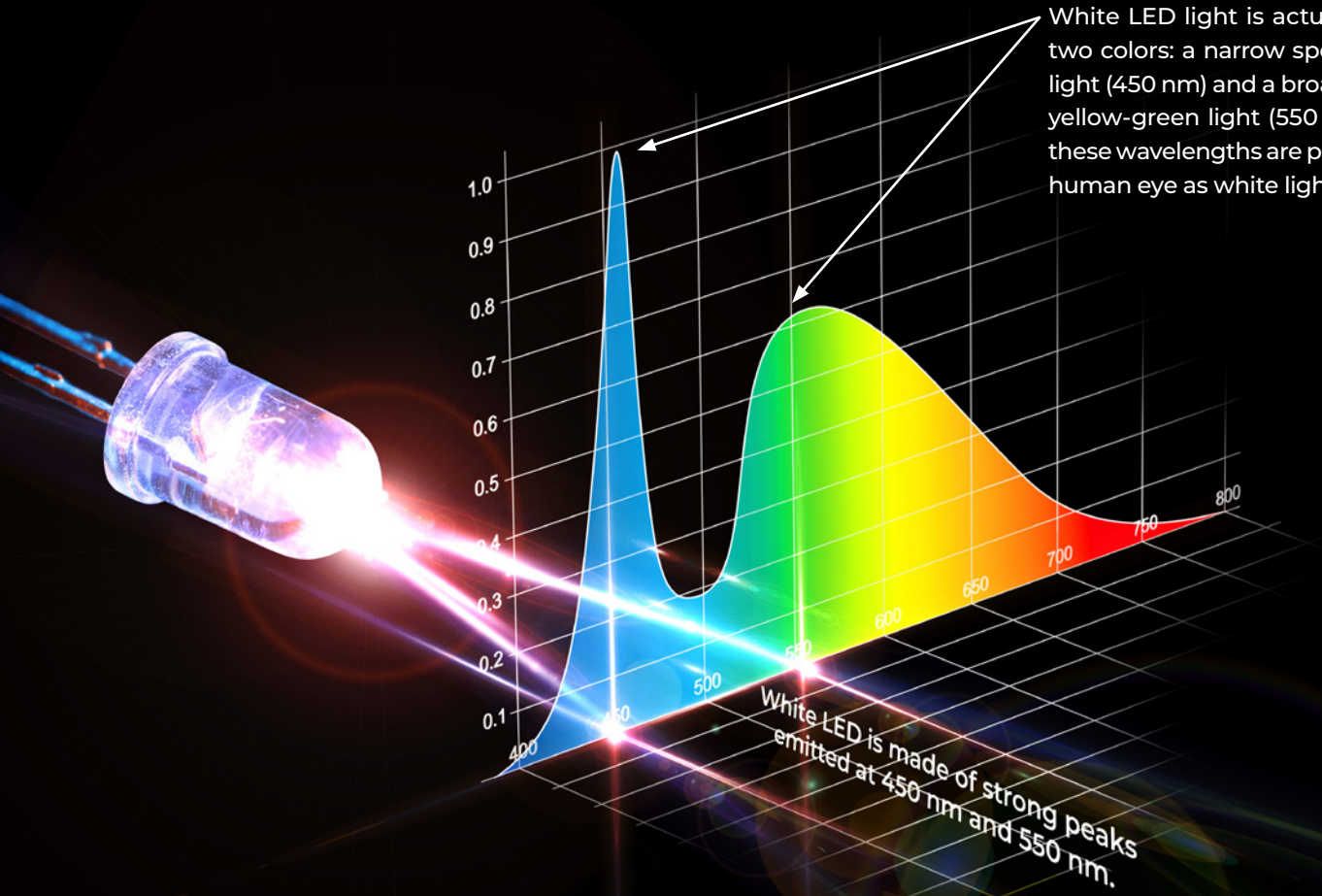
ledprolens.com

MR™
by Mitsui Chemicals

What is LED light?

Did you know?

White LED light is actually a blend of two colors: a narrow spectrum of blue light (450 nm) and a broad spectrum of yellow-green light (550 nm). Together, these wavelengths are perceived by the human eye as white light.



The invention of the Light Emitting Diode (LED) has radically altered how we illuminate our world. While the first LED was created as early as 1927, it was the late-20th-century invention of the high-efficiency blue LED that sparked a global revolution. By consuming 90% less energy than conventional bulbs, LEDs have become a cornerstone of modern sustainability, dramatically reducing energy consumption worldwide.

This efficiency comes from a unique way of creating light. Unlike earlier light sources, white LED light is produced by coupling a narrow spectrum of blue light (450 nm) with a broad yellow-green light (550 nm). When combined, the human eye perceives these two colors as white light. Consequently, most LEDs create sharp intensity peaks at these two points rather than a smooth, uniform spectrum.

LEDs are much brighter than traditional bulbs. While this brightness improves visibility, it presents a distinct disadvantage: the intensity can create significant discomfort and visual fatigue. This is especially true after prolonged exposure or when the light shines directly toward the eyes.

In today's world, our eyes are constantly exposed to LED light. Studies have shown that people who require visual correction are more likely to experience LED-related discomfort.[1]

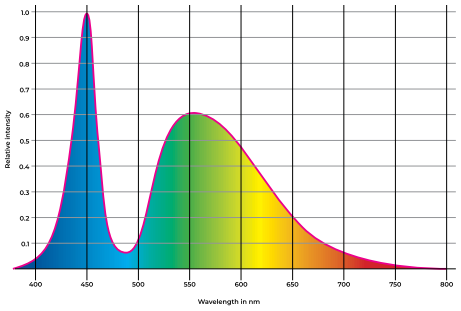
LED PRO lenses can offer great benefits to prescription eyewear users who are particularly affected by LED light.

1. Study DOI:10.1364/JOSAA.534837

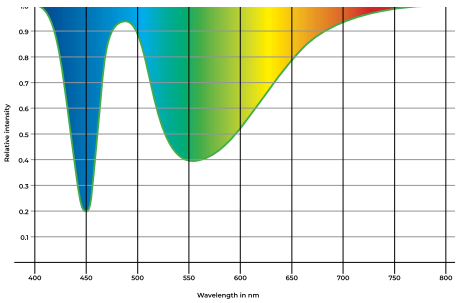
How LED PRO works

LED PRO utilizes a new technology of selective wavelength light absorption dyes. Instead of absorbing light across the whole visible spectrum, these dyes absorb a narrow band of the light spectrum at two specific wavelengths. Younger Optics R&D developed and patented the lens with high absorption at **450 nm** and **550 nm** wavelengths.

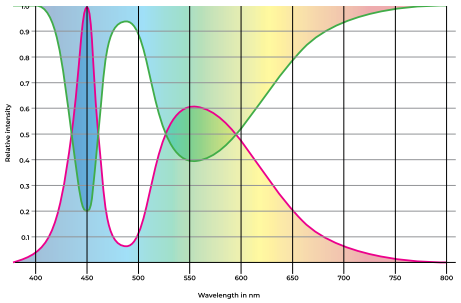
As a result, the LED PRO lens attenuates the emission peaks of LED lights, reducing the blinding effect of direct LED lights, as well as the visual fatigue of prolonged exposure.



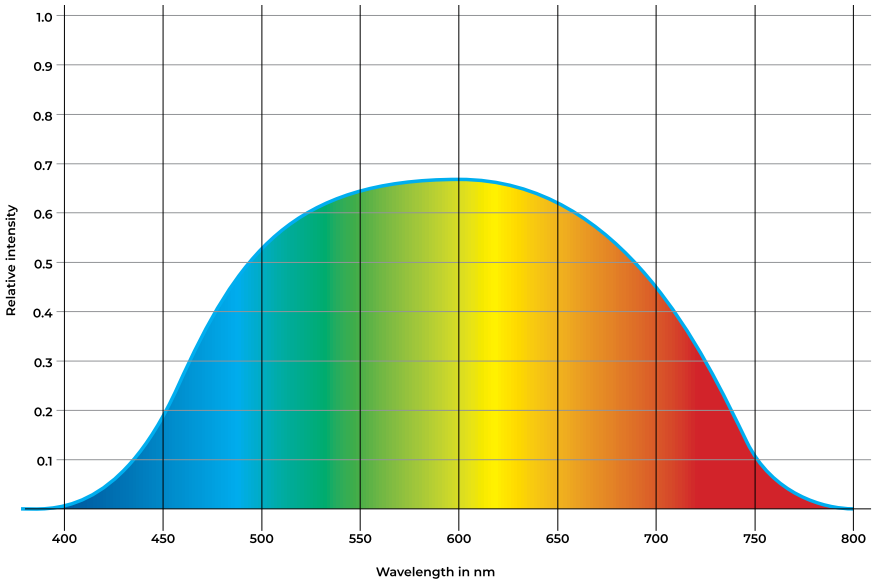
Visible spectrum of LED light



Absorbtion of LED PRO lenses



Blinding LED light peaks reduced

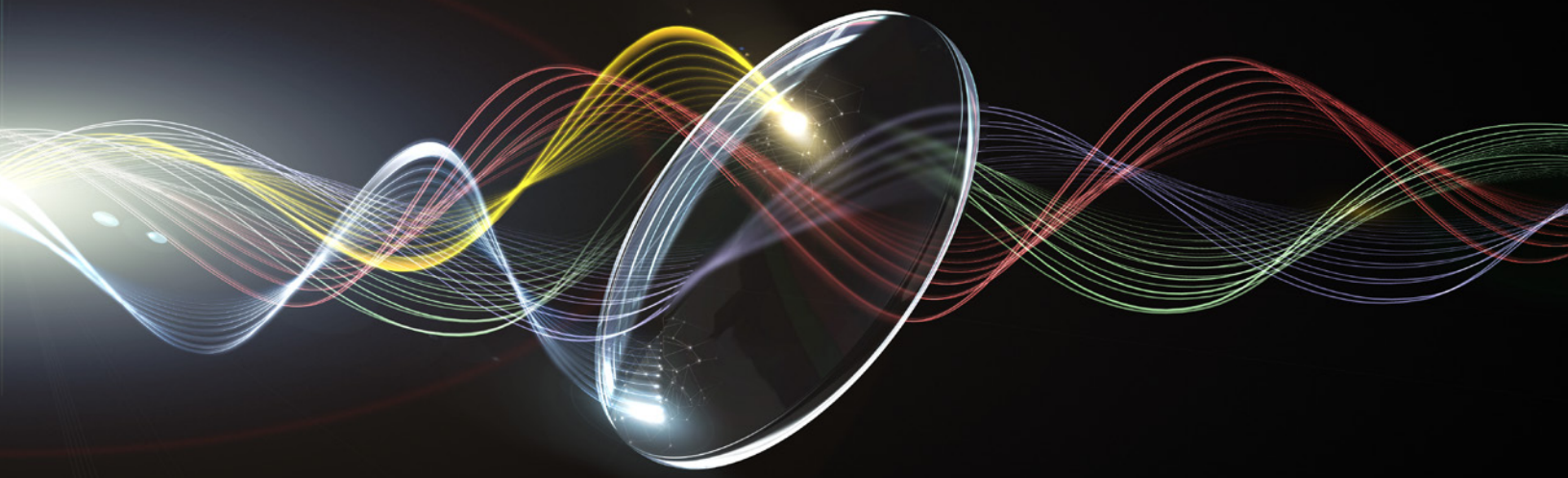


LED light transmission filtered by LED PRO

Spectral graphs are theoretical. Real LED light spectral output may vary slightly.

LED light control

LED PRO absorption dyes control light intensity at **450 nm** and **550 nm** to reduce vision discomfort.

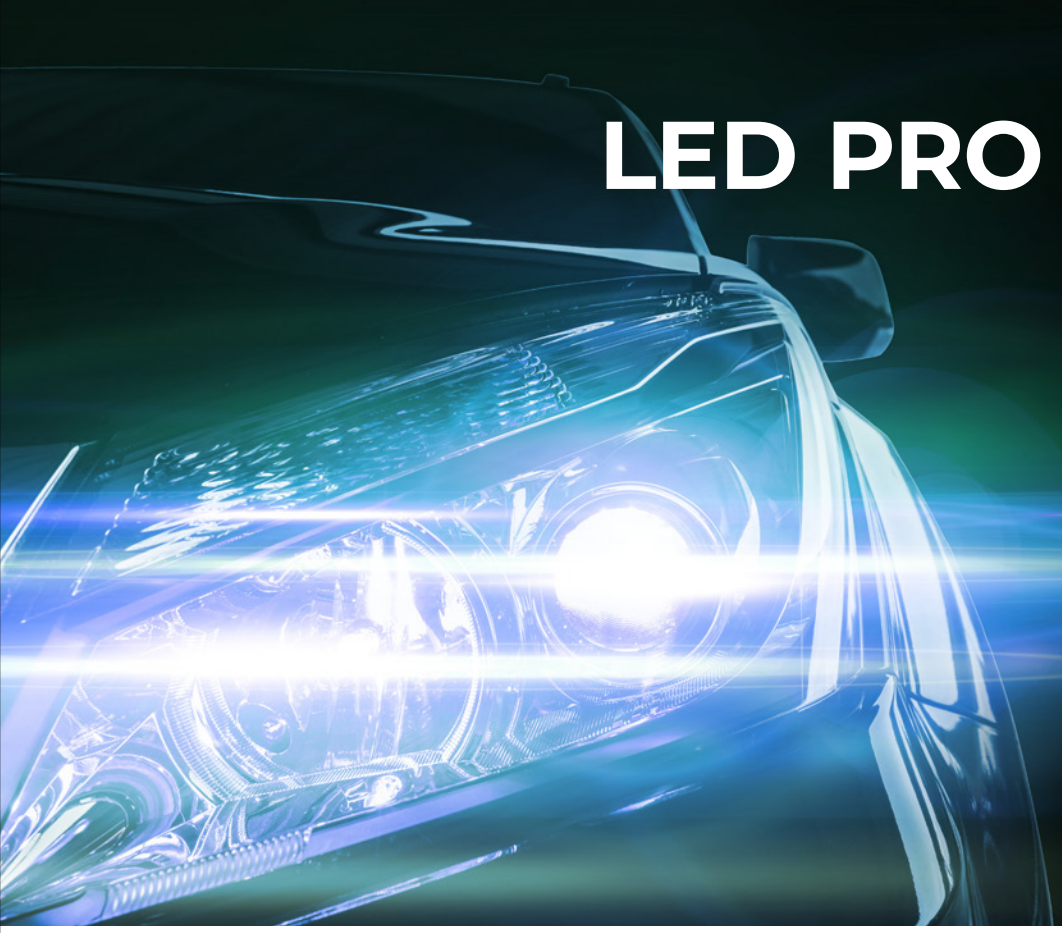


LED PRO lenses can be used in primary eyewear. In every situation, they benefit the wearer by reducing LED-related discomfort without compromising vision.

Because of the absorption of a portion of visible light, LED PRO lenses have a slightly visible green hue. However, combined with an efficient AR coating, they transmit almost 90% of visible light, passing all required standards for Class 1 eyewear with no use limitations.

LED PRO lenses block 100% UV light, as well as high-energy visible light up to 400 nm, offering great benefits to eye health, in addition to enhanced comfort under LED light exposure.

LED PRO benefits



NIGHT DRIVING

In the first major government study[2] to investigate this issue, the Transport Research Laboratory in the UK has concluded that a vast majority of drivers are sometimes bothered by LED headlights, with a higher severity reported among older drivers. The discomfort leads some people to avoid driving after dark altogether. The data suggest that LED and whiter headlamps are linked to the rising levels of discomfort.

2. Study DOI 10.58446/ldpz6744 PPR2069

SPORTS ARENAS

People who play sports* under artificial lighting are exposed to very strong LED illumination. Tennis, pickleball, football, soccer, baseball and other evening sports activities often expose participants to visual fatigue and general discomfort due to LED lights. Spectators, too!

INDOOR LIGHTING

Almost all indoor illumination today is LED, especially in industrial environments. It is usually stronger and brighter than conventional lighting, and long exposure to it can lead to visual fatigue. LED Pro lenses can improve the comfort of prescription lens wearers by attenuating the strong light waves at 450 and 550 nm.

LED MONITORS AND COMPUTER GAMES

Most computer monitors and game consoles use LED technology. It is known that prolonged exposure to LED light may cause visual fatigue and even headaches for some people. LED PRO lenses mitigate this effect, which can improve eye comfort for computer users and gamers.

* Compliance of the finished eyewear with all impact and safety standards applicable to its intended use is the sole responsibility of the entity performing final fabrication.

FREQUENTLY ASKED:

Are LED Pro lenses recommended for the primary or secondary pair?

LED Pro are Category 0 lenses that can be prescribed as a primary pair in place of clear lenses, or as a versatile specialty pair, such as for night driving, computer use, gaming, occupational use or low-impact sports.*

What is the % Transmission?

The approximate VLT is 78%, though the exact percentage is dependent on the Rx and the thickness of the lens. AR coating is highly recommended, which brings the VLT to nearly 90%.

Are mirrorcoats an option?

Mirror/flash coats reduce the visible light transmission and are *not* recommended.

What are the aesthetic considerations?

LED Pro lenses have an attractive pale chartreuse hue that should be brought into account when choosing a frame. Your choice of frame can either accentuate or downplay the perceptibility of the lens color.

Why do LED Pro lenses have this hue?

The specially formulated filter has been engineered to absorb the specific frequencies of the light spectrum at 450 and 550 nm that cause the most discomfort when facing bright white LED light. Patients usually adapt to the color shift within minutes and perceive increased comfort on their first day of use.

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Kyle, 56

Experiences eye fatigue while working long overnight shifts at a hospital. Prescribe LED Pro lenses in combination with a suitable digital progressive design.

Grace, 67

Plays in a pickleball league every Wednesday night but is bothered by the bright court lighting. Prescribe LED Pro lenses a sport frame* as a second pair to keep her eyes comfortable during play.

When patients like these come to you for help, recommend LED Pro lenses.

Do your patients experience discomfort due to bright headlights or digital screens? Ask them open-ended questions to explore their needs. LED Pro lenses can be combined with your favorite digital lens designs and A/R coatings to provide an enhanced visual experience at night or indoors.

Dave, 34

Is a game developer who games competively evenings and weekends. He says his eyes are starting to fatigue earlier than they used to. Prescribe LED Pro lenses with a personalized computer prescription to bring back Dave's gaming stamina.

Allan, 42

Commutes after dark and says the headlights of the oncoming cars are annoying. As a primary pair or as a second "driving" pair, prescribe LED Pro lenses to filter out the uncomfortable white headlights. Combine with a digital design for driving and supplement with an A/R coating on both sides.

Jasmine, 27

is a remote employee and grad student. Prescribe LED Pro lenses paired with her computer Rx to give her eyes extra comfort for those long nights in front of the screen.

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LED PRO lenses clinical study results

METHODOLOGY *. Participants rated their satisfaction with standard lenses and LED PRO lenses while performing specific tasks at different distances.

A satisfaction survey was completed to assess the initial wearing experience, using a scale from 1 (worst) to 5 (best).

1.

100% rated LED PRO lenses 4 or higher for glare and reflection reduction, vision in artificial light, adaptation ease, and lowlight vision.

2.

90% rated LED PRO lenses at 4 or higher for visual comfort and vision in natural light.

3.

80% rated LED PRO lenses at 4 or higher for visual fatigue, color perception, and overall vision.

Availability

SFSV High Index 1.67 MR-10™ Hardcoated

Rx Range: -14.00 D to +8.00 D

Available in 8 Base Curves from 0.50 to 7.00

High Index 1.60 MR-8™ *Coming Soon*

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