

# Protecting Vision in Extreme Conditions



Much like clothing, while 'one size fits all' might be true in some situations, it's rare that one pair of spectacles is going to be adequate for all activities of a busy modern lifestyle. David Birch explains why lenses specifically selected for certain tasks can help optimise your patient's vision for nearly any scenario.

WRITER David Birch



The term 'extreme conditions' means different things to different people. It includes, but is not restricted to, extreme cold, extreme heat, glare, protection from projectiles, and harsh weather. Extreme conditions can be encountered during work and play.

Specialty optical and sun lenses can make these extreme conditions easier to bear and optimise performance.

When consulting a patient, the first thing a dispenser should ask is what will they use their spectacles for. Are they for sport? If so, what sport? Are they safety glasses? This is the first and perhaps most important step to take when customising your patients' spectacles to meet their needs.

### LENS MATERIALS

Depending on your patient's needs, there are a multitude of lens materials to choose from.

#### Polycarbonate

Lenses made from polycarbonate material are extremely flexible and resistant to impact. They are more than 40 times more impact resistant than standard plastic lenses, have an Abbe value of 30, are lightweight, and block 100% of the sun's harmful UV radiation.

However, there are some disadvantages to polycarbonate lenses. The main one is sensitivity to common solvents, such as acetone and alcohol. The slightest contact with these solvents can soften polycarbonate lenses, rendering them unsafe. The optical clarity of polycarbonate, while satisfactory, is not as good as the clarity of regular optical lenses.

#### Trivex

Trivex, also branded as Trilogy or Phoenix, is resistant to most common industry solvents e.g., perfumes, Windex etc., and is impact resistant.

The lightest lens material available today, trivex is twice as scratch resistant as polycarbonate, and 60 times more impact resistant than standard plastic, exceeding United States Food and Drug Administration (FDA) impact guidelines. Trivex has an Abbe value of 43 and exceeds ANSI UV380 protection guidelines. This lens material is elastic and exceptionally strong, heat resistant up to 90°C, and chemical resistant.

#### Polycarbonate vs Trivex Lenses

Both polycarbonate and trivex lenses offer adequate eye protection for medium impact in accordance with ASNZs/1337.6. However, polycarbonate does have the distinct advantage of being able to withstand a much higher velocity impact than trivex before breaking. It also costs a bit less and comes in a wider range of lens styles.

Trivex material is more optically stable, giving the wearer greater optical clarity than

polycarbonate. Most importantly, trivex is relatively unaffected by contact with solvents and even resists highly corrosive liquids including ammonia and hydraulic fluids. If you think your patient's safety glasses will come in contact with any solvents, then trivex lens material may be the best option.

### SPORTS EYEWEAR

Today, sports eyewear can be spotted on almost anyone who picks up a ball, bat, racquet or snowboard – whether they play professionally or as amateurs.

By changing the lens tint of sunglasses, you can improve your patients' visual acuity on the tennis court, golf course, and even the slopes.

Sport-specific eyewear can also enhance their performance by improving visual clarity while protecting their eyes from injury. The best material for these glasses and sunglasses is impact-resistant polycarbonate or trivex lenses.

#### Choosing the Best Tint

There is now an almost endless variety of lens tints and gradient colour options for sports sunglasses. By choosing a specific tint and intensity, you can selectively filter glare. Additionally, you can select lens tints that make objects appear with greater clarity and contrast against the background – like a ball against the sky.

For example, golf glasses with copper-coloured lenses enhance the contrast of a white golf ball against the sky and the green background of fairways and greens. Yellow is desirable in tennis, as it heightens the colour and contrast of the ball against the sky.

Amber or rose-coloured ski goggles enhance the soft greys on a ski slope that indicate ridges or bumps in the surface. Increasing the visibility of these changes to the slope is significantly beneficial to skiers and snowboarders.

However, standard lens tints such as grey, brown, or mirrored, are suitable for most outdoor applications.

#### Reducing Glare and Adjusting to Changing Conditions

Polarised lenses have a special filter that blocks glare from reflective surfaces, such as water or snow. They are ideal for outdoor activities, such as fishing, skiing, and boating. They can also be helpful for driving, as they reduce glare and provide clearer vision and react faster in bright conditions.

Anti-reflection (AR) coating should be applied to the back surface of sports sunglasses to

eliminate sunlight reflecting off the back surface of the lenses when the sun is behind the wearer.

Photochromic lenses, which are often considered the ultimate light-control sports glasses, are terrific for golf where the player moves frequently from bright sunlight to shade and may continue playing until dusk during the course of a round.

#### UV PROTECTION

Eye protection from UV radiation is needed for all who work and play outdoors. A lens that absorbs both UV-B and UV-A radiation provides the best protection. Tinted lenses that promise protection against sun glare must comply with Australian Standards and meet more stringent requirements than sunglasses. The Australian Radiation Protection and Safety Agency recommends wearing sunglasses that absorb more than 95% of the full UV spectrum.

#### EXTREME COLD

Exposure to cold temperatures, wind, and snow glare poses unique challenges to eye safety during winter. While it's easy to overlook the need to protect your patients' eyes from extreme cold, many will thank you for suggesting goggles.

Goggles designed for prolonged winter wear have features similar to ski goggles. These features include soft, dense foam around the face, dual-pane lenses, and wide, comfortable headbands. It is also essential to recommend a goggle that meets Australian standards for maximum impact protection.

The sun reflecting off a fresh blanket of snow can cause photokeratitis for people who don't wear proper eye protection. Tinted polycarbonate lenses are the best way to combat this combination of sunlight and reflected UV exposure.

#### Anti-Fog Coating

Lens fogging can be a significant frustration in cold climates. Choosing an appropriate lens design will help to reduce the chance of fog. Dual-pane lenses are well suited for winter applications because they feature two lenses separated by an air chamber. The air between the two lens panes acts as an insulator that reduces condensation and thus fogging. Just like other winter eyewear, dual-pane lenses should be treated with an anti-fog coating to maximise performance.

Anti-fog coatings help reduce and delay the condensation that can build up on the interior of lenses. Lenses still need to be wiped down to remove excess moisture.

#### EXTREME HEAT

When looking for a lens to cope with extreme heat, glass is the obvious choice. However, it is heavy and unattractive, so is rarely used.

Under these circumstances it is better to use polycarbonate or trivex lenses and wear a protective mask over the top.

#### SAFETY EYEWEAR

Safety eyewear will be covered more thoroughly in a few months' time however, as there is a cross-over, here are the basics.

Safety eyewear helps protect workers from the spectrum of dangers present in their work environment when standard lenses are inadequate.

Typical tasks giving rise to low and medium impact hazards include:

- Low impact: hammering, handling wire, rocks, bricks or cement, manual chipping, riveting, grinding powders in a chemical laboratory.
- Medium impact: grinding, stone-dressing, woodworking, machine disc cutting.
- Other hazards: fumes, dusts, or splashes.

Consider all protection and comfort requirements, as well as practicality when deciding on the right eye protection.

As discussed, polycarbonate and trivex lenses are our main options, but any specific needs should be discussed with your safety lens supplier.

Take a look at the following lenses that are designed and manufactured to meet the needs of your patients who encounter extreme conditions.

David Birch commenced his career as an optical mechanic at OPSM before establishing Australia's first intraocular lens (IOL) lab and then The Fred Hollows Foundation's first IOL lab in Eritrea. He later trained to become an optical dispenser and is currently a wholesale sales representative for OptiqueLine.

The author acknowledges the support of Hoya in writing this article.

## Lenses for Extreme Conditions

### CR Labs

Australia has one of the highest rates of migraine in the world with one in four people affected.<sup>1</sup> Up to 60% of migraine attacks are caused by light or glare.

Avulux Migraine and Light Sensitivity lenses, a clinically proven Class 1 Medical Device which is backed by Harvard research,<sup>2</sup> uses proprietary multi-band precision optical technology to selectively filter 97% of the most painful blue, red and amber light wavelengths, while allowing sufficient green light to get through.<sup>3</sup>

Created by a team of neuro-ophthalmologists, optical engineers, and precision lens experts, Avulux can be worn as both a preventative measure or for the immediate relief from migraine or light sensitivity symptoms. They are effective indoors and outdoors.

Avulux is colour neutral, which allows users to manage their symptoms without affecting their quality of life. Independent clinical trials have reported that 90% of wearers

were able to return to or continue their daily activities; 74% of wearers were able to reduce or eliminate their usual amount of medication; and 0% of wearers reported any negative side effects.<sup>4</sup>

Available in plano /RX and a range of lens designs.

**Visit:** [crsurfacing.com.au/avulux](http://crsurfacing.com.au/avulux)

References available at [mivision.com.au](http://mivision.com.au).



CR Labs

AVULUX 

# Migraine & Light Sensitivity Lenses

Avulux® Migraine &  
Light Sensitivity lenses  
are clinically proven  
and may help you live  
with migraine.



CR  
Labs

Available exclusively in Australia  
through CR Labs.

[crsurfacing.com.au](https://crsurfacing.com.au)

## Eyres Safety by Shamir

Prescription safety eyewear is an important part of a worker's personal protective equipment because vision problems can significantly affect their performance and put them in danger.

Eyres has been a leading manufacturer of high quality plano and prescription eyewear for over 35 years. Now, with Shamir Australia's renowned lens designs and pioneering technologies, it is delivering precisely crafted, custom-made prescription safety solutions for almost any work environment.

Eyres's range of products is tested and certified to Australian and international standards, and its lenses are manufactured in Australia.

**Visit:** [eyresbyshamir.com.au](http://eyresbyshamir.com.au)



Eyres



Tokai

## Tokai

Tokai Optical produces glass lenses for extreme prescriptions, such as 24 dioptres power in the prism, over 100 dioptres sphere power or 30 dioptres of cylinder power. To produce such a prescription, the tools need to be designed and created before the lens can be made. Made in Japan, Tokai Optical glass lenses are available with some tints.

**Contact:** Tokai Optical (AUS) 1800 864 886

## Zeiss Vision Care

Zeiss Safety Eyewear offers the highest level of eye protection with technically advanced lenses in both trivex and polycarbonate materials, combined with high-quality safety frames. Certified for medium impact, Zeiss' trivex material is thin, light, and has a scratch resistant surface that provides both protection and optimal optical performance.

Zeiss DuraVision Platinum UV coating improves image quality and contrast, making Zeiss lenses an ideal choice for safety eyewear. Zeiss lenses also offer full UV protection all day, every day.

**Contact:** Zeiss Vision Account Manager



## Gelflex

Gelflex is Australia's largest contact lens laboratory. With more than 100 different lens designs covering all patient needs, a full-time technical support team of four experienced and highly trained lens specialists, and offices in Perth and Melbourne, Gelflex continues to demonstrate its commitment to specialty lens fitting in Australia.

Gelflex Ortho-k, Paragon, Euclid, Zen Lens, Rose K, Limbal Lift, and Keracon are just some of the leading products available. The new CTE scleral lens, developed by Gelflex, is one more example of the company's ongoing passion for delivering the right solution for your patients.

**Contact:** Gelflex (AUS) 08 9443 4944 