

The Fisherman's Eye Protection Guide

What Fishermen
Need To Know
About Buying
Sunglasses

*And Other Valuable Information
About General Eye Protection*



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Sunglasses for Fishermen

It's a fact that the glare of the sun on the sea is highly polarized!

Indeed, the glare can be almost completely horizontally polarized, depending on the height of the sun. In addition, all reflections from objects above water are partially polarized. With polarized sunglasses the sea appears more transparent! The image to the left was taken through a polarizer with its transmission axis oriented horizontally. The image to the right was taken through a vertical polarizer. Which one would you like to use for fishing?

The sea appears more transparent with polarized sunglasses.



Surf through horizontal polarizing filter



Surf through vertical polarizing filter

The top image was taken through a polarizer with its transmission axis oriented horizontally. The bottom image was taken

through a vertical polarizer. Need we ask which one would you like to use for fishing?

Depending on the height of the sun, glare can be almost completely horizontally polarized. All reflections from objects above water are partially polarized.

This is just one more example of polarization by reflection. Although the light from the sun is not polarized, it can be separated into two polarized components that are reflected and transmitted in different amounts by the surface of the water (Fresnel laws). More of the horizontal component will be reflected than the vertical component, thus partially polarizing the reflected light (except if you look at a glancing angle or straight down).

When the sea is ruffled the sun reflection becomes the familiar glitter, an elongated pattern of shimmering water stretching towards the sun. Because different parts of the glitter are reflected from different wave slopes, the degree of polarization varies from place to place. In those conditions the sunglasses will also help for high or low suns and the benefit will depend on where you are looking.

The polarized sunglasses used by fishermen have polarized filters with the transmission axis oriented vertically to block the light reflected by the water surface. Note that if the fisherman moves his head up or down (nodding) the line joining the temples remains horizontal and the sunglasses continue to block the glare (of course, if he leans his head to one side the filters start to point in the wrong direction). By the way, they are not only used by fishermen but in all other water-sports. They are also becoming popular with truck drivers and for general outdoor activities. The last five years have seen a jump in their sales and are the fastest growing segment in eyewear.

Polarization

Light waves from the sun or even from an artificial light source such as a light bulb, vibrate and radiate outward in all directions. Whether the light is transmitted, reflected, scattered or refracted, when its vibrations are aligned into one or more planes of direction, the light is said to be polarized. Polarization can occur either naturally or artificially. You can see an example of natural polarization every time you look at a lake. The reflected glare off the surface is the light that does not make it through the "filter" of the water, and is the reason why you often cannot see anything below the surface, even when the water is very clear.

A polarized filter passes only the light that matches its orientation.

As you can see, only the part of the light wave that is aligned with the slots in the filter is able to pass through. Everything else is blocked. The light coming through the filter is considered polarized.

Polarized filters are most commonly made of a chemical film applied to a transparent plastic or glass surface. The chemical compound used will typically be composed of molecules that naturally align in parallel relation to one another. When applied uniformly to the lens, the molecules create a microscopic filter that blocks any light not matching their alignment.

Most of the glare that causes you to wear sunglasses comes from horizontal surfaces,

such as water or a highway. When light strikes a surface, the reflected waves are polarized to match the angle of that surface. So, a highly reflective horizontal surface, such as a lake, will produce a lot of horizontally polarized light. Therefore, the polarized lenses in sunglasses are fixed at an angle that only allows vertically polarized light to enter. You can see this for yourself by putting on a pair of polarized sunglasses and looking at a horizontal reflective surface, like the hood of a car.

Slowly tilt your head to the right or left. You will notice that the glare off the surface brightens as you adjust the angle of your view.

A lot of sunglasses advertised as polarizing actually are not. There's a simple test you can perform before you buy them to make sure.

Find a reflective surface, and hold the glasses so that you are viewing the surface through one of the lenses. Now slowly rotate the glasses to a 90-degree angle, and see if the reflective glare diminishes or increases. If the sunglasses are polarized, you will see a significant diminishing of the glare.

The lens in the foreground is a polarized filter. The hood of the car polarizes light. As the lens rotates, it almost completely blocks the light from the hood because of its polarization.

Polarized Sunglasses

For years, polarized sunglasses have been used by boaters and fisherman to reduce glare from the water that they spend so much time on. In the past few years, however, the benefits of polarized sunglasses have been realized by a variety of other outdoor sports enthusiasts as well as by drivers and general use wearers.

Thus, the popularity of polarized sunglasses has increased dramatically, as has availability.

The activities that utilize the benefits of polarized sunglasses the most include, other than water sports, skiing, golfing, biking and jogging. For these activities

they offer a clearer view and eliminate glare.

They are also recommended for driving in daylight and at night and in fact can reduce the glare that comes off a long, flat

How Do Polarized Lenses Work?

Light reflected from surfaces like a flat road or smooth water is generally horizontally polarized. This horizontally polarized light is blocked by the vertically oriented polarizers in the lenses.

The result: a reduction in annoying and sometimes dangerous glare.

There is some debate on the effects of polarized lenses on snow-covered surfaces. Some experts say they can reduce the intense glare that is caused by sunlight reflecting off snow. Others purport that the lenses are not satisfactory for sports such as downhill skiing because they may not provide the contrast the eye needs to distinguish ice patches or moguls.

Additionally, polarized lenses may also react adversely with liquid crystal displays (LCDs) found on the dashboards of some cars or in other places such as the digital screens on automatic teller (bank) machines. The problem with LCDs is that when viewed through polarized lenses from a certain angle, they can be invisible.

However, for most other sports and activities, polarized sunglasses can offer great advantages and benefits to the wearer. There are also many options available to the consumer in the types of polarized lenses on the market.

Polarized progressives are perfect for the presbyope who is also an outdoor sports aficionado. And polarized photochromic (that go from dark outside to light inside) lenses are right for the light-sensitive person who changes environments (inside to outside and vice versa) frequently.

surface such as the hood of the car or a highway. Polarized sunglasses can also be used indoors by light-sensitive patients or by those exposed to bright light through windows.

The bottom line is that whether you spend your time boating or waterskiing, in-line skating or mountain biking, driving at night or jogging at noon, polarized sunglasses are an excellent choice for sun wear.

Why so are these sun lenses so popular? Because polarized sunglasses are PERFORMANCE sunglasses — they do something:

- They reduce light transmission
- They reduce reflected glare
- They increase contrast sensitivity

Polarized sun lenses offer 3 advantages

- #1 – Eliminate reflected glare
- #2 – Enhance contrast
- #3 – Ideal for drivers, skiers, or anyone spending time on the water or sports activities.

Polarized lenses have the benefit of filtering out reflected light and glare off water, pavement and snow. This lens works great for fishing, boating, driving or any other glare intensive activity. Polarized lenses are the best way to eliminate both glare and UV light. The principle of a polarized lens can best be described by observing the use of a venetian blind. The blind blocks light at certain angles, while allowing light to transmit through select angles. Polarization is achieved by shutting out 100% of undesirable light and allowing 100% of desired light through the lenses. Many polarized lenses feature AR coating on the back of the lens for even better clarity and reduced back glare (Anti Reflective (AR) Coating is an extremely thin layer of film that is deposited on either

the front or the back surface of the sunglass lens that virtually eliminates



reflections from the back of the lens).



What are Polarized Lenses?

Polarized Lenses are special lenses manufactured using the fundamental properties of light waves.

When light from the sun reaches a reflective surface (windshields, ice, water, sand, etc.) the "rays of light" literally straighten out from the otherwise random pattern they are used to.

Polarized lenses effectively eliminate these glares from the sun where regular glass or plastic lenses would not.

Frequently asked questions about polarized sunglasses

How do I know if mine are polarized?

Just look through the glasses at the reflection of any object on a window panel (but not at yourself! you have to look at an angle to the glass). Then, turn the sunglasses around as if they were the hands of a clock facing you. If the intensity of the reflection doesn't change with respect to what you see through the window, they are not polarized.

I still don't understand, why are polarized sunglasses better than normal dark sunglasses?

Normal sunglasses decrease the intensity of everything by the same amount. Polarized sunglasses can selectively eliminate the reflection from light coming from above the water surface.

Then, could polarized glasses be crystal clear?

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No, they will always decrease the intensity of unpolarized light by at least half. In practice somewhat more because of losses in the material. They come in all shades from light gray (only polarizing) to very dark (polarizing plus black tint), and also light sensitive (photochromatic). You can even find sunglasses with darkness adjustable by the user.

Do polarized sunglasses help see fish and rocks below the water surface?

Yes. First, if there is glare, they help a lot by reducing its blinding effect. Second, even without glare they selectively reduce other reflections from objects above water, including clouds and even the sky (the reflected sky gives most of its blue color to the sea). Finally, light coming from under water is slightly polarized in the vertical plane (polarized on transmission). The end effect is that the water seems darker but more transparent! But remember, it only

works if you look at the water at some angle and not straight down.

Does it matter the time of the day?

Yes. Maximum polarization is obtained when the sun is at about 37 degrees from the horizon (in theory 100% polarization at the Brewster angle). If the sun is very low or very high the sunglasses will be of little help in filtering the glare in calm seas. A rule of thumb would be that polarized filters limit the glare from calm waters for a sun altitude between 30 and 60 degrees (but see next question). Anyway, it should be stressed that polarization won't help in looking directly at the sun (except in decreasing the overall intensity of everything by half).

Does it matter the choppiness of the sea?

Yes. When the sea is ruffled the sun reflection becomes the familiar glitter, an elongated pattern of shimmering water stretching towards the sun. Because different parts of the glitter are reflected

from different wave slopes, the degree of polarization varies from place to place. In those conditions the sunglasses will also help for high or low suns and the benefit will depend on where you are looking. As a side note, the width and length of the glitter together with the altitude of the sun can be used to compute the height of the waves without ever getting close to them!

Can I use my 3-D polarized glasses for fishing?

Not a very good idea. The filters on those glasses are oriented at 90 degrees to each other, almost always at +/- 45 degrees with respect to the line joining the temples (generally the transmission axis points down towards the nose). Thus, horizontally and vertically polarized light will be attenuated equally. In addition, you can get a bad case of dizziness: the left and right eyes may see polarized objects with very different intensities, confusing stereovision and resulting in vertigo.

Sunglass Materials

Sunglass frame materials include basic metal (usually a combination of a variety of metals), plastic (often called zyl), and specialty metals such as aluminum, titanium, and stainless steel. Today's unique looks incorporate both plastic and metal into the design of the frame.

As consumers look for lightweight sunglass options, the specialty metals have become increasingly popular. To gain the benefits of thinness and lightness, corrosion-resistance and strength, a more expensive investment such as titanium, aluminum, stainless steel and even beryllium frames are suggested.

How to Shop for Sunglasses

The frame should fit comfortably on your face and some manufacturers include head size indicators with each style. In most cases, if a frame is too large, or does not fit properly to the head, it can be adjusted.

Plastic frames can be heated and formed for better fit. Metal frames can sometimes be slightly bent or screws tightened on the hinges to fit properly.

Frame color and shape depends mostly on personal style and preference. Many say they feel more comfortable choosing bolder styles, colors and details since they will be wearing them occasionally as a sunglass, and not as frequently as with their eyeglasses.

Lenses

The optical quality and visual enhancement of the lenses is perhaps the most important aspect of effective sports sunglasses. Many lens colors that are particularly effective in certain situations (such as brown, green, gray, yellow, orange, etc.) are now available.

A benefit that is particularly appealing to many people involved in sports is super strong and impact-resistant features of Polycarbonate lenses.

Polarized lenses are also in demand, because they reduce glare produced on flat surfaces such as water, the hood of a car or a field of snow. There is, however, some debate as to polarized lenses' effectiveness when it comes to sports that require contrast definition like downhill and mogul skiing.

Choose the right lens tint. Weather, terrain and activity all come into play here.

- **Yellow, Gold and Amber (orange) tints**
 - Filter out blue light and haze in low light and fog
 - Preferred by skiers
 - Emphasizes shadows in the snow so you can see bumps better
 - Work well in moderate light
 - The brighter yellow the lens color is, the better it is for use at night
 - Preferred by shooters
 - They enhance the orange color of the target
 - Inappropriate for any activity that relies on accurate color
- **Vermilion (light purple) and Rose tints**
 - They offer the best contrast of objects against a green or blue background.
 - A good choice for hunting or water skiing
- **Green tints**
 - Filter blue light and reduce glare
 - In bright light will keep your eyes more comfortable
 - Offer the greatest visual acuity
- **Polarized**
 - block reflected glare off the horizontal plane and are great when it's bright out
 - may not be ideal near the end of the day when long shadows appear in the snow, because they are usually made with a darker tint than most sun lenses.
- **Mirror**
 - will block some, but not a lot of glare
 - usually more cosmetic than practical
- **Clear**
 - For night riding and skiing
- **Gray tints**
 - A great all-purpose tint
 - Reduce the overall amount of brightness with the least amount of color distortion
 - Offers good protection against glare
 - A good choice for driving and general use

Top Five Trends in Sports/Performance Sunglasses

1. Changeable lens systems that allow the wearer to use dark lenses for sunny conditions, clear lenses for darker or in-the-woods conditions or simply for protection from potential flying objects, or yellow and orange lenses for low light conditions.
2. Lightweight and durable frame materials such as polyamide, which keeps its shape even under stress.
3. Styles that have a performance advantage but with sleek fashion styling.
4. Polarized lenses are showing up in many, many frames, even fashion-oriented ones, and are designed to enhance sports performance.
5. No-slip temple grips and nose pads often made of rubber, that maintain full functionality even in the heat of competition.

For additional valuable information on learning about how to protect your eyes go to www.sunglasshaven.com