Fact Sheet HE 5200

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Choosing Sunglasses[1]

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Sunglasses are an important consideration for those living in the Sunshine State. Days are long and the sun is bright. For people who spend time outdoors, particularly around water and sand, sunglasses are a must. Many drivers depend on sunglasses to overcome the glare from the highway and other surroundings.

In the 1920s, military aviators donned green-tinted glasses to cope with high altitude glare. At first the idea caught on slowly, but soon it accelerated, and now most people are aware of the need for sunglasses.

Sunglasses are now considered a fashion item as well as a functional one. Well-known entertainers and people of wealth use sunglasses as a disguise. Advertisers equate the use of sunglasses with glamour. High priced sunglasses carry the name of prestigious fashion designers. (For example, which are you more likely to find on the market, sunglasses by Liz Clayborne or by the Mayo Clinic?)

As the public becomes more aware of, and concerned about, the long-term effects of over exposure to sunshine, a new marketing approach is beginning to appear. The new emphasis is on the performance of sunglasses.

Some sunglasses claim to protect the user from ultraviolet light. Others claim to block the blue segment of visible light, invisible infrared rays or a combination of these.

SUNLIGHT AND VISION

Sunlight contains lightrays of varying wavelengths. Some of these are visible to the eye as light while others are not. Wavelengths are measured in nanometers (billionths of a meter). The shortest wavelengths are believed to be the most dangerous. Studies indicate ultraviolet light (UV) does the most damage to the eye, and especially the band known as UVB, which includes the shortest wavelengths of light reaching the Earth's surface. Although the longer wavelengths of the UV ban, (called UVA) can do damage, they are less detrimental than the UVB.

The human eye has a transparent covering over the iris (colored part of the eye) and pupil (dark center of eye). This covering is called the cornea. The cornea absorbs the UV rays. It is susceptible to damage from UVB and especially from wavelengths shorter than 295 nanometers.

The cornea, under normal conditions, can repair damage to itself from UV. However, when subjected to prolonged exposure under bright conditions, it cannot adequately protect itself, and recent studies indicate the lens can be damaged.

This can result in some types of cataracts (clouding of lens that interferes with vision). The lens acts as a filter absorbing all the UVA and any UVB not blocked by the cornea. It protects the light sensitive retina at the back of the eye. Some medical authorities now believe that exposure to bright light over many years may age the retina and contribute to

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the development of macular degeneration, a disease that causes blindness in older people.

In 1986, the American National Standards Institute (ANSI) developed voluntary standards for manufacturers of non-prescription sunglasses. There are three types: cosmetic, general-purpose, and special purpose. The standard included limits on the transmission of UVB and UVA. They are:

- Cosmetic glasses must block at least 70 percent of the UVB.
- General purpose must block 95 percent of the UVB and most UVA.
- Special purpose must block 99 percent of the UVB and most UVA. (For skiing, mountain climbing and other outdoor sports.)

There have been a number of cases of permanent damage to the retina of people who have stared at solar eclipses without eye protection. For years scientists thought this damage was caused by infrared rays, a long wavelength that produces warmth and is found in visible and invisible light. Some sunglasses claim to block infrared rays.

Recent research has found infrared rays are relatively harmless to the eye. The damage from viewing a solar eclipse resulted from photochemical damage to the retina and is caused by the shorter wavelength of visible light, the blue end of the spectrum. This has caused some scientists to become concerned over the long-term outdoor exposure to blue light. Some companies now promote sunglasses that filter out blue light. These types of glasses are not new however. Most are amber glasses used by boaters and hunters to increase visibility in a blue haze.

Today sunglasses are treated with a chemical to absorb UV rays. When visible light and UV wavelengths are reduced, so is the blue light. Tests on sunglasses indicate that any sunglasses that blocked 75 percent of the visible light adequately reduced the blue light.

TYPES OF SUNGLASSES

Sunglasses are available in a wide range of types and prices. Almost all of the sunglasses marketed today provide adequate eye protection. The quality of protection from UV has improved greatly over the past few years. The FDA has impact standards for eyewear, so sunglasses do not break easily, and do not pose a safety hazard.

Most sunglasses manufactured today have plastic lenses. This enables the lenses to be light in weight, tough in strength, and resistant to breakage. Most plastic lenses have the color added as an ingredient of the plastic. (When color is added as a coating, scratches can ruin the finish.)

Polycarbonate plastic is used for some sports sunglasses. It is quite tough but it will scratch fairly easily. Polycarbonate lenses should have a scratch-resistant coating.

There are six general types of sunglass lenses:

- Plain lenses are consistent in color (no variation). They are available in a variety of colors. Depending on the color, most screen out from 60 to 97 percent of the light.
- Polarized lenses are constructed by sandwiching the polarizing material between two layers of plastic or glass. Because of this unique composition, polarized lenses eliminate the glare reflected from flat surfaces at specific angles. They help cut reflected glare from surfaces such as water, pavement and flat beaches.
- Photochromic lenses are made of a light-sensitive material that darkens automatically when exposed to outdoor sunlight and lightens in subdued indoor light. Although response speed has improved, it still takes about five minutes for the lenses to lighten and about one-half to a minute for them to darken. The lenses are temperature sensitive, darkening more in cold weather than in hot. If used for driving, remember you are sitting in the shaded car, not the direct sunlight.
- Mirrored or flash lenses have a thin reflective coating. The coating can be of any color. If it is mirrored, the coating is a thin silver colored metallic coating. The coating can be easily scratched. These lenses do not offer any special advantage over other types of lenses.
- Gradient lenses can be either single gradient or double gradient. A single gradient lens is darker at the top and lighter toward the bottom. This type could be helpful when driving since the dark top could give protection from a sunlit highway.

The light bottom of the lens would make it easier to see the car's instrument panel.

- A double gradient lens is darker at the top and bottom, and lighter in the middle. When gradient lenses are used the fluctuation in lighting can be an advantage in some situations but annoying in others.

COLOR

One important consideration for sunglasses is color. Neutral gray and sage green are the most desirable and effective for providing protection from glare and radiation without distorting the color sensitivity of your eyes. You are able to see items in their true colors. Other colored lenses change the tint of things you see. Amber lenses are sometime promoted to filter out blue light. However, the amber color changes the color of items viewed through the glasses and blue light can be reduced by other ways.

Color represents a personal choice. There is nothing wrong with choosing a color that changes the tint of objects viewed, if you wish.

DARKNESS OF LENSES

The darker the lenses, the smaller the amount of light that enters the eye. However, most lenses now on the market, regardless of price have been treated to absorb UV. Therefore, the darkness of the lenses should be selected for comfort of the individual user. If the sunglasses are to be worn in bright sunshine, the lenses should be quite dark. If the glasses are to be worn where light is not as bright, a medium-dark lens would be more desirable.

UV PROTECTION

When a consumer organization conducted laboratory tests on 180 pairs of sunglasses to evaluate their effectiveness, it found most of the sunglasses tested met ANSI's UVB standard for special purpose glasses even though they were being sold as general purpose. Some variation was found in the UVA blockage however, 98.9 percent reduced UVA as much as the visible light was reduced. (Example, if visible light was reduced 75 percent, UVA was reduced 75 percent.) Most of the 180 pairs of sunglasses tested reduced UVA by 90 percent or more.

COSTS

Sunglasses vary widely in cost. There appears to be no strong correlation between cost and quality. Also, cost is no indicator of UV protection. Almost all sunglasses provide UV protection.

There is some correlation between cost and labeling information. The least expensive sunglasses, especially those costing under $10, rarely contain labeling information, except country of origin. The medium-priced glasses usually contain some information (but not always), while the more expensive ones usually contain considerable information.

As would be expected, inexpensive sunglasses usually come without a case, while more expensive ones have a padded case.

As a general rule, more expensive sunglasses have better constructed frames. However, there is variation and the most expensive glasses do not consistently have better frames than those selling at a lower price. For example, the frame of glasses selling for $75 is usually better than the frame of a $4.50 pair; it may not be better than the frame of a $25 pair.

The price tag is often determined by the name on the label. Designer names usually carry a higher price tag than similar glasses of less prestigious brands. It pays to comparison shop for sunglasses. Often there are wide variations in the prices charged by different merchants for the same glasses.

DECIDING WHICH TO BUY

Sunglasses, just as eyeglasses, are defined by the Food and Drug Administration (FDA) as a medical device. They are required to be impact resistant (not break easily), and to be safe and effective.

There are voluntary industry standards that recognize types of lenses. Manufacturers are not required to adhere to these standards, but are encouraged to do so. Unfortunately, labeling and advertising make very little of the information on standards available to the consumer. You are left to find your own way of judging quality and types.

Price ranges are not helpful in determining which sunglasses are better quality. High prices are often

charged for designer and cosmetic features instead of quality.

Select your sunglasses carefully because they affect your vision. Think about how you plan to use the glasses and your sensitivity to glare and bright sunshine. People differ in their tolerance to bright light, and in their occupational and recreational activities. People who are in the sunshine or under bright lights usually need sunglasses more than those who do not have this exposure. Generally a person should wear sunglasses if bothered by watery eyes, squinting or considerable blinking when out-of-doors. In Florida, it is wise to wear sunglasses when in the bright sunshine.

Lenses should be free of distortion and imperfections. FDA and the American Optometric Association suggest a simple test to check for the refraction quality.

- Hold the glasses at arm's length. Look at a straight line such as the edge of door or its frame, while slowly moving the glasses across the line. If the straight edge appears distorted, or sways, curves or moves, the lens is not optically perfect.

- Both lenses in a pair of sunglasses should have the same coloring. Hold the lenses so that you can see through them clearly. Check to see if the coloring is even, and neither lens is darker than the other. For gradient lenses, make sure the coloring lightens gradually in the same areas of both lenses.

- The frames of sunglasses should be large, sturdy and free of rough spots. The temples should not block side vision. Frames should be comfortable, yet fit close enough to stay in place. Test the glasses by putting them on and lowering your head. The glasses should remain in place. Sometimes temples can be adjusted for better fit. The lenses should be large enough to cover the eye area.

Comparison shop for sunglasses. Inspect different brands and visit more than one store. If sunglasses are inexpensive, you should inspect two or three of the same brand. Some glasses on the shelf may be bent out of shape or scratched.

TIPS

Wear your sunglasses when in the bright sunshine. This will provide comfort and protect your eyes from UV. Also, some studies suggest exposure to bright sun without protection can decrease night vision.

Handle your sunglasses with care to avoid bending and scratching.

Keep your sunglasses clean. Wash with a mild soap and water and dry with a soft, lint free material.

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