

Solar Eclipse Glasses: Why Everyone Needs Them and Best Places to Buy Them

As people across the country prepare to watch what is being called "[The Great American Solar Eclipse](#)," experts warn that viewing the phenomenon can be dangerous without the appropriate protection.

On Aug. 21, a [total solar eclipse](#), where the moon completely covers the sun, will be visible in the U.S. from Oregon to South Carolina. It's the first total solar eclipse that can be seen coast to coast and only from the continental U.S. since the country's founding.

Experts warn against staring directly at the sun, which can damage the eyes. But eclipse gazers can find ways to protect themselves, using [eclipse glasses](#) and filters. Here's everything you need to know, including where to find eclipse glasses and how to avoid counterfeit ones:

What are eclipse glasses?

Eclipse glasses often look like old-fashioned 3D glasses made from thick paper, but the lenses are black or may have a silvery coating on the outside and are specially built to block a majority of the sun's rays.

"They're much darker and much closer to a welder's mask in blocking light than traditional sunglasses," said Dr. Russell Van Gelder, a clinical spokesperson and past president of the [American Academy of Ophthalmology](#). "They block about 99.99% of light rays."

In comparison, ordinary sunglasses only block about 60% of light rays.

There are also special filters for telescopes, binoculars and cameras. Anyone who uses these devices without protection can increase the amount of damage to their eyes as they amplify the sun's rays.

Why is it so dangerous to look at the eclipse without glasses?

Van Gelder notes that anyone who's taken a magnifying glass out on a sunny day to burn holes in leaves has seen how powerful the sun's rays are. When we look directly at the sun, the part of our eye that is in danger is the retina, a light-sensitive layer that can easily be damaged by high levels of light.

"There are no pain fibers in the back of the eye, unlike our skin. We have a natural aversion to staring at the sun, but it's possible to overcome that by force of will," Van Gelder said.

Looking directly at the sun can cause temporary or permanent damage to the retinas. The most dangerous time during an eclipse is when the sun is not fully blocked by the moon, during what's known as a partial solar eclipse. Many parts of the country (including Belleville) will only see a partial solar eclipse, and even the parts that will see a total solar eclipse will see a partial eclipse before and after totality. Anyone viewing a partial solar eclipse should use protective eyewear the entire time they're watching.

Where can you buy eclipse glasses?

Eclipse glasses and lenses are offered in range of styles at varying price points. The American Academy of Ophthalmology, NASA and the American Astronomical Society have listed several vendors and manufacturers that sell authentic eclipse glasses, including **American Paper Optics** (starting at \$1.25 each for a set of 50), **APM Telescopes** (starting at \$11.69), **Baader Planetarium** (starting at \$4.13), **Celestron** (starting at \$2.95), **DayStar** (starting at \$2), **Explore Scientific** (starting at \$2.49 for a pack of two), **Lunt Solar Systems** (starting at \$8.95 for a pack of five), **Meade Instruments** (starting at \$12.99 for a pack of five), **Rainbow Symphony** (currently sold out), **Thousand Oaks Optical** (starting at \$35 for a pack of 25) and **TSE 17** (starting at \$15.88 for a pack of five).

These glasses or filters are all designated as meeting the ISO 12312-2 standard, which means that the lenses have met the international standard for safely viewing the sun.

Where can you get eclipse glasses for free?

It is probably too late to purchase and receive solar viewing glasses in time for the eclipse. The Royal Astronomical Association of Canada (RASC) - Belleville Centre's public viewing session at the Market Square (behind the Belleville City Hall) will have a number of FREE solar viewing glasses available. They will also have some telescopes, equipped with solar filters for a "close-up" view of the eclipse. The viewing session will be held on Monday August 21st, from 1:00 pm until 4:00 pm. This coincides with First Contact at 1:14 pm, Maximum Eclipse (66.5%) at 2:34 pm, and Final Contact at 3:50 pm.

Are all eclipse glasses the same?

Fienberg, from the American Astronomical Society, says he's seen counterfeit eclipse glasses and glasses with fake certifications appearing online, which means they may not properly protect an eclipse viewer's eyes. Fienberg advises people buy directly from reputable and recommended vendors, as listed above. NASA, AAS and AAO have all issued warnings about counterfeit glasses and have put together lists of reputable sellers that have verified their glasses meet the ISO standard.

"What you absolutely should not do is search for eclipse glasses on the internet and buy whatever pops up in the ads," AAS **said in a release**.

NASA also warns against using lenses that are homemade, wrinkled, scratched or older than three years.

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