



SAFE SOLAR OBSERVING

Permanent eye damage can result from looking at the disk of the Sun directly, or through a camera viewfinder, or with binoculars or a telescope even when only a thin crescent is visible such as during a Total Solar Eclipse.

The following methods for viewing the Sun are deemed safe, as long as the instructions are followed exactly. The Manchester Astronomical Society does not accept responsibility for any injuries sustained due to failure to follow these recommendations.

Pinhole Projection Method – Two thin but stiff pieces of white cardboard are required. Punch a small clean pinhole in one piece of cardboard and let the sunlight fall through that hole onto the second piece of cardboard, which serves as a screen, held below it. **Do not look at the Sun through the pinhole.**

Instrument Projection Method – This is similar to the Pinhole Projection Method, except that here an optical instrument such as a telescope or one half of a pair of binoculars are used to project the Sun's image onto a single piece of white cardboard. If using binoculars always make sure that sunlight is prevented from passing through the half of the binoculars that are unused – fit the lens cap or tape thick cardboard over the objective (sunward side) lens.

Beware of using this method with cheap plastic telescopes as the focussed heat of the sun may melt the plastic fitting holding the eyepiece or some other part of the telescope.

Solar Filters – Look directly at the Sun through a specially designed Solar Filter, available commercially and advertised in popular astronomy magazines as “Eclipse Glasses” or similar. When using this kind of filter, do not stare for long periods at the Sun.

Welders' Goggles or Glass – Goggles or the filter for a welders helmet with a rating of #13 or #14 are safe for looking directly at the sun. When using any kind of filter, do not stare for long periods at the Sun. **Do not attempt to use these filters behind a pair of binoculars or telescope.** The magnifying optics will focus the full power of the Sun onto the welder's filter, which could crack due to the intense heat after only a few minutes.

Metal Coated Filters – Aluminised **Mylar film** through which the Sun looks blue-greyish, or the more recent chromium **Baader film** through which the Sun looks orange, can be fitted over the lens of a camera or the aperture of a telescope or both halves a pair of binoculars. Do not fit over the eyepiece end.

Hydrogen Alpha filter (narrow passband) – these devices typically allow a fraction of a wavelength of light to pass through. They will normally have some kind of heatsink and fan to conduct the heat away, are specifically designed for solar observation use and cost many hundreds of pounds.

Fully Exposed Black & White Film – this must be either Kodak Tri-X or Pan-X, which contain a layer of silver that protects your eyes. Expose a roll of film to the sun for a minute and have it developed to provide you with the negatives. It is recommended to use two layers of negative. **There are some black & white films on the market that do not have the silver layer, and colour film is also unsuitable, as both these types of film contain only dyes – For these reasons the MAS does not endorse this method.**

EYE SUICIDE

Do not use any of the following for viewing the Sun:

The Naked Eye.

Standard or Polaroid sunglasses – these are not Solar filters.

Smoked Glass – this does not filter the infrared rays of the Sun.

Glass Solar Filters (sometimes included with cheap telescopes) – these can shatter or crack when subjected to the heat of the focussed Sun.

Hydrogen Alpha filter (broad passband) – these are for viewing deep sky objects such as nebulae and are totally unsuitable for solar viewing.