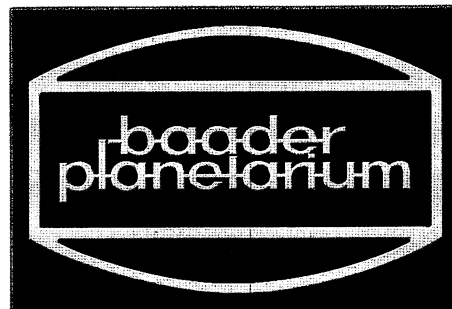


Original BAADER AstroSolar™ Safety Film

For construction of high-quality objective-filters for observing the sun with binoculars, camera or telescope

Specially CE-tested safety film with high-quality optical characteristics Reduces intensity of sunlight by 99.999%



How to make your own objective solar filter for binoculars, camera or telescope

- 1 Cut two equal sized rings of stiff cardboard. The inner diameter to be the same as the full aperture of the telescope-lens (or mirror), the outer diameter to be 10cm (~4") larger.
- 2 Cover one full face of each cardboard-ring with double sticky film or "Double-Tape". Cleanly cut any inner and outer excess of film, so that only the two cardboard faces are covered with sticky tape.
- 3 Stretch out a square piece of "Kleenex-Tissue" flat on a hard plane surface (a table) and secure the four corners of the tissue with clear adhesive tape. The tissue must be stretched out flat without ripples.
- 4 Cut a square piece of AstroSolar Film a little larger than the outer diameter of the stiff cardboard rings. (For cutting put AstroSolar Film between two sheets of white paper. This "sandwich" with both sides paper and the film in between can easily be cut without producing cheases or fingerprints on the film.)
- 5 Gently place AstroSolar Film onto the flat Kleenex-tissue and secure the four corners with tape – **but do not stretch it!**
AstroSolar Film must not be put under stress tension to retain it's precision optical property.
- 6 Hold one cardboard ring with the sticky side down 10mm above the film and let it **fall down** onto the film, so that the ring touches the film all around at the same time..
- 7 Turn around the cardboard ring with the film covered side facing upward and lay it back onto the Kleenex. Stick the second cardboard ring against it. Now you have created a round film-holder with AstroSolar Film cleanly and securely fastened without cheases and ripples – but most of all: **without stressing the film!**
- 8 Now put a 50mm (2") wide stripe of strong cardboard around the telescope dew cap or front end and tape the ends with double-tape. Repeat this procedure 3 times with double-tape between each layer to produce a stiff 50mm high cardboard cylinder to precisely fit onto your telescope.
- 9 At last glue the AstroSolar film holder onto the 50mm cylinder while the cylinder is still mounted onto the front end of your telescope.

Your homemade solar filter is ready! Store it properly!

Technical Details / Certification

Baader-Planetarium's AstroSolar™ safety film is a specially manufactured streak- and blister-free foil only 0.012 mm thick, and attains the optical quality of plane-parallel glass filters. The base material is not "Mylar." The highly uniform molecular structure of this material is the result of research in nuclear and elementary particle physics. The coating is subject to constant quality control. Its reflective property of over 99.999% has been tested by the *Physikalisch-Technische Bundesanstalt* (the German Republic Bureau of Standards) and conformity with EU norm 89/686 is certified with the CE-symbol. It reduces the intensity of sunlight by a factor of over 100,000. Coating on both sides of the foil ensures a highly uniform filtering, while neutralizing the occasional microscopic holes in the coating (which are also much more present in glass filters). One layer of this foil is sufficient for the construction of a safe, high-resolution solar filter. The quality of the solar image is immeasurably better than can be achieved by using so-called Mylar "rescue blankets" or similar materials, which must be used in several layers.

Please observe the following safety precautions

- 1 Before each and every solar observing session, check the filter's fit and, if necessary, tape it to prevent slipping. Never use the filter at the eyepiece (where you look into the telescope), only attach it onto the objective (where light enters the telescope); otherwise it can become dangerously hot inside the instrument – and inside the eyes! In case of binoculars, be sure both objectives are securely covered; with cameras cover the viewfinders front lens!
- 2 A filter made of this durable material is relatively resistant to breakage (even during intentional attempts) in comparison with a glass filter. However, care should be taken with sharp pointed objects. Also be aware that the coating can be damaged by scratching or rubbing and take this into account when storing the filter. A filter with damaged foil should be destroyed immediately to avoid accidental use.
- 3 Emphasize the importance of caution to those observing with you, especially children. Intentionally removing or damaging to the filter can endanger their eyesight. This is no place for jokes! Never leave the telescope outside unattended during the daytime!
- 4 If your telescope has a finder, you should also put a filter on it, or put dust cover on its objective and secure it with tape. Unprotected viewing through the finder would have the same catastrophic consequences as viewing through the main telescope. Additionally, an uncovered finder directed at the sun can produce exceedingly unpleasant scalp burns.

For larger requirements, such as instruments with large aperture, order AstroSolar™ Safety Film in rolled sheets of 50x100cm (approx. 4 Sq.Ft.) or 117x117 cm (46"x46")

Important hints for visual safety. Please read before use!

Avoid absolutely all forms of unprotected solar viewing! Your eyes could suffer irreparable damage. Smoked glass, darkened film negatives, CDs or doubled sunglasses do not offer sufficient protection, even at sunrise or sunset.

AstroSolar™ Safety Film reduces the intensity of incident sunlight by a factor of over 100,000. According to current medical research, the filter (when properly used) provides complete protection against thermal damage to the retina (photocoagulation).

Under certain circumstances, any intense source of light (e.g. spotlight, laser beam, welding arc, the sun) can trigger so-called photo-toxic processes in the eye. In extreme cases, such reactions can have an additive effect over time, leading to deterioration of the vision.

Please note: This filter provides protection against solar radiation similar to that offered by welding glasses. However, as long as it is not absolutely certain that even welders glasses completely hinder phototoxic reactions, the same reservations must apply to this solar filter.

Therefore, exercise your own best judgment when using this product.

Although we have never heard of a single case of eye damage in 10 years of sales of this product to thousands of telescope users, and knowing that welders ply their trade for years, while the solar filter's use can be measured in minutes, we believe it appropriate to inform you of the current state of scientific knowledge.

In any case, it is advisable to interrupt solar observation occasionally and look at other objects. If you have any doubts at all, especially in cases of known excessive eye sensitivity, consult your ophthalmologist or optician.

GUARANTEE

We guarantee the filtering capability of this solar safety film (reduction of light intensity by 99.999%). If your foil has arrived damaged, we will replace it free of charge. We cannot accept further liability, especially in cases of improper use.

Authorized AstroSolar™ Distributor:

**baader
planetarium**

BAADER AstroSolar™ Safety Film



Instructions for use

AstroSolar™-Safety Film is a strongly improved product, based on Baader Solar Filter Film which had been under production already for 12 years – until 1999.

AstroSolar™-Safety Film produces a natural white solar image without false blue or orange color. Sharpness and contrast largely exceeds the quality of most commercial glass filters available on the market.

The basic film of AstroSolar™ has been tempered in an elaborate ionization process to be free of inherent stress. Due to the added processes applied AstroSolar™ attains the quality grade of a planeoptical polished glass window of high precision. AstroSolar™ must not be put under stress tension!

The technical development of AstroSolar™ was only possible due to the very high demand during the 1999 Solar Eclipse over Europe.

For your own safety please observe following conditions:

1. Do not touch the metalized surfaces with bare fingers. Fingerprints contain salty sweat and urea, which acts like a weak acid to destroy the metal layers over time.
2. During handling and cutting always place the film between two stiff sheets of paper and cut the required shape from the sandwich.
Possibly draw the required final shape of the film onto the paper before cutting the sandwich to protect the film.
3. Be attentive. AstroSolar™ looks like an ordinary piece of metalized plastic – but it is not!
Greatest care has been applied to metalize both sides of the fine optical grade carrier film without destroying its isotropic tempered state.
Never put any stress onto the film during handling or mounting – stress tension would dramatically worsen the optical properties.
Take greatest care to mount AstroSolar™ “stressfree” – but without creating ripples and creases.
4. The metal coatings on AstroSolar™ film are equivalent to high reflective layers applied onto a telescope mirror. Treat the surfaces of AstroSolar™ with equal care as you would with your telescope mirror. If you want to “clean” AstroSolar™ from dust and pollen-grains, do not “rub” the surface. Only rinse the film with running water and add diskwater detergent. For careful wiping use pharmaceutical cotton-wool for applying and removing the detergent.
5. Before each solar session carefully inspect your AstroSolar™ filter for mechanical damages, broad scratches, streaks, extensive wipe marks and other quality degrading influences. Small pinholes do not degrade the eye safety or image sharpness of AstroSolar™!
Hold the filter at arms length towards the daylight sun to detect dangerous defects. Small pinholes may become visible but will not be dangerous, because the light going through will be dispersed across a wide area like in a “camera obscura”. This scattered light however will cast a “hue of light” to slightly overlay the solar image information and reduce image contrast somewhat.
For highest photographic performance and when using large telescope apertures at high magnification it is therefore advisable to “blacken out” these pinholes. Use thick black lacquer (black paint) and directly apply the paint onto the inner (telescope) side of AstroSolar™ with a very thin, sharp brush to just cover the size of the pinhole while holding the filter towards the sun.

All this effort will be worthwhile. If treated appropriately as detailed above AstroSolar™ delivers the same image quality as a 1000 Dollar precision polished glassfilter, far better than all common “float glass” solar filters available at economy price.

Metal coatings on film are prone to aging just like the coatings of a telescope mirror. A damaged, aged, frequently cleaned film which shows large areas of scratches or wipe marks must be discarded and not be used for solar observation.

This is the reason, why we try by all means to supply a film of highest optical quality at extremely low price, to enable you to use a fresh piece of film whenever you detect severe scratches or bright zones due to improper handling.

Always store your solar filter in a closed container and avoid the film faces to rub against any other surface during transport or storage.

Warranty:

We do warrant AstroSolar™ Film to be manufactured and inspected with greatest care – especially to be free of uncoated areas or areas where the optical density is lower than the stated density, be it for AstroSolar™ Safety Film or for AstroSolar™ Photo Film

However, we do not warrant AstroSolar™ when treated or stored improperly or when the solar filter has not been inspected for damages before each observing session.

Please only use this product if you feel well informed about its properties and the requirements for safe handling.

Never leave your Solar Telescope outside unattended to prevent children or uninformed visitors from looking at the sun without proper guidance!