

# Making an Inexpensive Filter Cell for BAADER AstroSolar™ Material

**PLEASE READ AND FOLLOW ALL SAFETY PRECAUTIONS AND INSTRUCTIONS.**  
*Failure to do so could result in permanent blindness or other serious damage to your eyes.*

**The film must be mounted reasonably flat and free of any tension.** It is more desirable to have slight wrinkles than to stretch the material, which will damage the optical quality and possibly the coatings. Wrinkles, creases and folds in the material are normal and will not affect the function and performance in any way. When mounted carefully, AstroSolar™ Film can reach the quality levels of truly precision-made, diffraction-limited glass filters (not to be confused with inferior, inexpensive glass filters made of thin, machine-polished plate glass).

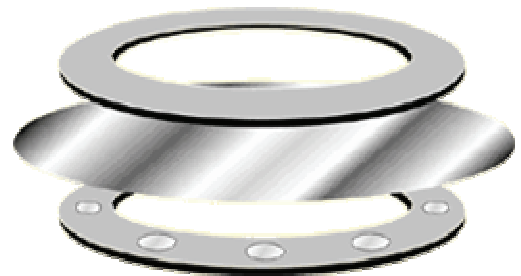
## **The "Cylinder"**

Construct a cylinder out of posterboard to fit over the front aperture of your telescope or dewcap. Start by cutting several long strips of the posterboard approximately 2" wide and wrap these around the lens cell or dewcap until you have 3 or 4 layers. Glue the layers to each other to form a thick, sturdy cylinder approximately 1/4" thick (do not glue this to the scope, please!).



The finished cylinder should fit snug on the scope yet slide easily on and off. The fit is very important – too tight and you can't get the filter on and off without damaging it – too loose and an accidental bump or a gust of wind could knock the filter off.

**Hint:** For small aperture telescopes, you might be able to find just the right-sized cardboard tube to fit over the aperture. Simply cut off 2" and use that as your cylinder. If the tube is slightly too large, use an adhesive felt liner or cork pads to make it fit snugly.



## **The "Filter Cell"**

Cut out two rings of posterboard or cardboard with the outer diameters equal to or slightly larger than the outside diameter of your fabricated cylinder. The inner diameter should correspond to the actual aperture of your telescope. On one side of each ring near the outer edge, attach a number of pieces of double-sided tape.

Now comes the tricky part – how to get the AstroSolar™ film onto the taped ring without wrinkles or ripples. The film must not be scratched. So, put one sheet of Kleenex™ (or other soft tissue) onto a flat table. Tape the tissue onto the table so that it is stretched out evenly and cannot move. Now put a square piece of AstroSolar™ material (slightly larger than the outer diameter of the cardboard rings) onto the piece of soft tissue. Do not tape the film and do not stretch it! Just let it rest relaxed and flat on the tissue.



Now, take one of the cardboard rings with the sticky tape face down and lower it straight down onto the film until the entire ring has made contact with the film. Turn this assembly around and tape the other ring onto the opposite side of the film. Now you can trim away any overhanging parts of the film. Your AstroSolar™ film should now be free from strain and wrinkles, sandwiched between the two cardboard rings. Finally, glue this "filter cell" assembly onto your prefabricated "cylinder." Lift the filter up to the sky and inspect the cell for light leaks prior to using it on your telescope or binoculars. **You must be sure that absolutely no unfiltered light gets through.** Use a black felt-tip marker **on the inside** of the filter (for esthetic appearance) to cover tiny pinholes in the filter material. Now

your “do-it -yourself” filter is ready. Enjoy!

### ***Special tip for owners of large aperture reflecting telescopes***

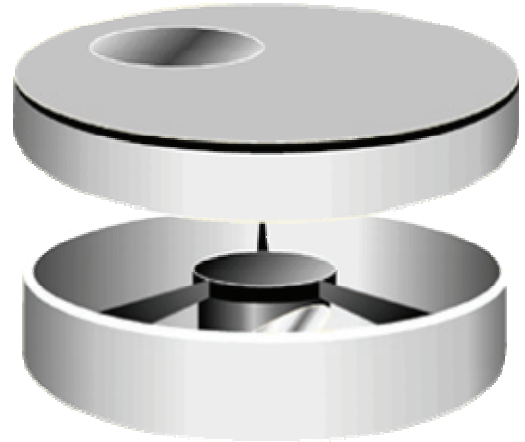
When covering a larger Newtonian or Schmidt-Cassegrain Telescope for solar observation, it may be that "Less is More"! Do not try to make a filter as large as the telescope aperture. The bigger aperture will be greatly affected by air turbulence, which can ruin fine detail. We suggest that you produce an off-axis filter cell, to observe the sun with a smaller (but much improved) telescope.

### ***Safely Storing Your Filter***

It is very important to store your filter safely so that it will not be damaged. If the filter is small enough, we suggest that you use a plastic food storage container with a cover. In addition to protecting the filter material, it will keep the cardboard material from becoming wet and soft.

### ***Cleaning Your Filter***

Please refer to separate document: “Cleaning AstroSolar™ Film” for instructions.



## **PLEASE OBSERVE THE FOLLOWING SAFETY PRECAUTIONS WITH EACH AND EVERY SOLAR OBSERVATION!**

**Failure to do so could result in permanent blindness or other serious damage to your eyes!**

- **Before using your solar filter, check the filter’s fit and integrity.** If your filter is damaged in any way, it must be replaced. **DO NOT** use if the AstroSolar™ material has any holes or the cell is weakened and will not stay on the telescope.
  - Slide the filter on and off your telescope and be sure that it won’t get knocked off by accident or get blown off by a gust of wind.
  - We recommend that you tape the filter onto the telescope for added safety.
  - Make sure the filter cell and cylinder are still securely glued together.
  - Hold the filter up to the sky and look for any pinholes in the filter cell itself or light leakage where the filter cell and cylinder are glued together.
  - **Tiny** pinholes in the filter material can be covered **on the inside** with a black felt-tip marker.
- **NEVER use the filter material at the eyepiece or anywhere else in the telescope’s optical path.** The intensely concentrated light energy at the eyepiece will burn up the filter in less than a second. (Do you remember burning leaves with a magnifying glass as a child?) **The filter will ONLY work when attached to the FRONT aperture of a refractor objective, in FRONT of the Schmidt plate (Schmidt-Cassegrain telescope) or in FRONT of the tube of a Newtonian telescope.**
- If you use a binocular, protect **both** objectives with a filter.
- **Be sure that the viewfinder of your telescope is properly covered**, either with a solar filter made as described above or with the original dust cover. Unprotected views through your finderscope would have the same catastrophic consequences for your eyes as a look through the main telescope itself!
- A filter made of AstroSolar™ filter material is relatively resistant to breakage in comparison to a glass filter. However, care should be taken with sharp pointed objects. **A punctured filter should be thrown away and replaced with a new one** (same as with a cracked glass filter).
- **Emphasize the importance of safety to those observing with you, especially children.** Intentionally removing or damaging the filter can endanger their eyesight. This is no place for jokes. Never leave the telescope outside unattended during the daytime!