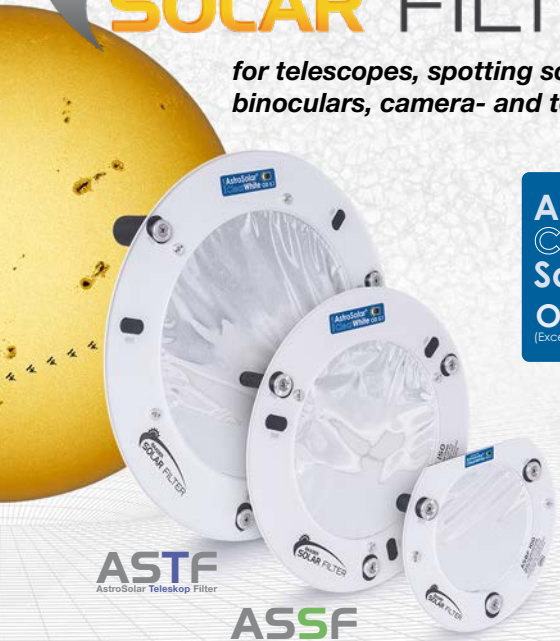
DE

baader planetarium

BAADER SOLAR FILTER

for telescopes, spotting scopes, binoculars, camera- and telelenses

Made with AstroSolar® ClearWhite Safety Film OD 5.1 (Exception: BDSF)



ASTF
AstroSolar Teleskop Filter

ASSF
AstroSolar Spektiv Filter

ASBF
AstroSolar Binokular Filter

BDSF
Baader Digital Solar Filter



Solar Film AstroSolar® ClearWhite Safety complies to ISO transmission requirements
www.astrosolar.com/en/iso

ISO

EN

INSTRUCTION MANUAL

EN – ver. 10/2026 –

Please note

If you have purchased a **BDSF** Filter for photographic use only, please read the following:

- Application notes for BDSF Filters, equipped with AstroSolar® Photo Film
- Unterschiede der verschiedenen AstroSolar® Folien-Typen

BDSF Filters must not be used for visual observation, permanent eye-damage may occur.

Designed, Manufactured, Assembled and Distributed by

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Fax: +49 (0) 8145 - 80 89-105
www.astrosolar.com / kontakt@baader-planetarium.de

BAADER SOLAR FILTER

ASTF AstroSolar Telescope Filter
ASSF AstroSolar Spotter Filter
ASBF AstroSolar Binocular Filter
BDSF Baader Digital Solar Filter

Instruction Manual

Thank you for purchasing this Baader Planetarium product. For the proper use of your Baader Solar Filter, please read this instruction manual thoroughly before starting to work with the Solar Filter. Keep this User's Guide available for future reference. On our website you will finde up-to-date information about our mounted solar filters and the used AstroSolar® film: :

www.baader-planetarium.com/astrosolar-clearwhite

Please read and follow the instructions in this manual carefully, otherwise your eyes could suffer irreversible damage.

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SCOPE OF SUPPLY
ASTF / BDSF (AstroSolar® Telescope Filter)

As you unpack your Baader Solar Filter, check the list below and make sure that all items shown below are included. If anything is missing, contact your original retailer.





1. Solar Filter Holder incl. AstroSolar® ClearWhite Safety Film OD 5.1 (for ASTF), or AstroSolar® Photo Folie (for BDSF), printed index scale, warning text
2. 6x centering bolts in 38 mm length (3 bolts with 10 mm diameter / 3 bolts with 20 mm diameter)
3. 3x Black sliding washers
4. 3x Aluminum sliding fastener
5. 3x M4 cross-head screws
6. 6x rubber plugs (3x for covering the holes which are not used / 3x spare part)
7. 3x Safety Straps with Velcro fasteners

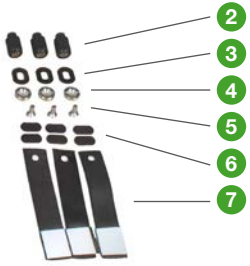
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SCOPE OF SUPPLY
ASSF (AstroSolar® Spotting Scope Filter)

As you unpack your Baader Solar Filter, check the list below and make sure that all items shown below are included. If anything is missing, contact your original retailer.







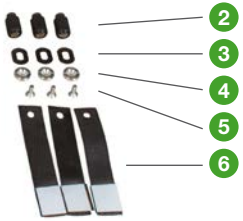
1. Solar Filter Holder incl. AstroSolar® ClearWhite Safety Film OD 5.1, printed index scale, warning text
2. **ASSF 50-115:** 3x Centering Bolts (24 mm long, Ø 13 mm)
   ASSF 130-150: 3x Centering Bolts (38 mm long, Ø 10 mm)
3. 3x Black sliding washers
4. 3x Aluminum sliding fastener
5. 3x M4 cross-head screws
6. **ASSF 130-150:** 6x rubber plugs (3x for covering the holes which are not used / 3x spare part)
7. 3x Safety Straps with Velcro fasteners

SCOPE OF SUPPLY
ASBF (AstroSolar® Binocular Filter)

As you unpack your Baader Solar Filter, check the list below and make sure that all items shown below are included. If anything is missing, contact your original retailer.







1. Solar Filter Holder incl. AstroSolar® ClearWhite Safety Film OD 5.1, printed index scale, warning text – cut-off on one side
2. 3x Zentrierstift in 24 mm Länge mit 13 mm Durchmesser
3. 3x Black sliding washers
4. 3x Aluminum sliding fastener
5. 3x M4 cross-head screws
6. 3x Safety Straps with Velcro fasteners

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1. Introduction

Baader Planetarium produces safe filter films for solar observation since 1990. This family of mounted Baader Solar Filters is designed to preserve the precision optical quality and diffraction-limited performance of AstroSolar® ClearWhite Safety Film OD 5.1 and AstroSolar® Photo Film through the use of a mechanically appropriate filter cell, allowing their full optical performance to be realized.



Baader Solar Filters provide a safe way to use AstroSolar® Film to observe the Sun (OD 5.1) and photograph it (using either visual or photographic film) with the highest possible image quality. With many homemade filters, the filter material is stretched tightly to make it look like a glass filter. However, this completely destroys the image quality and makes the filter unsuitable for higher magnifications. AstroSolar® Safety Film must be mounted completely free of tension to perform like a high-precision, optically flat and polished window.

Made with AstroSolar® ClearWhite OD 5.1

Although this may seem contrary to conventional perceptions of quality, AstroSolar® Film must exhibit slight ripples. If the filter material is subjected to tensile stress due to an inadequate filter cell, its optical performance will be no better than that of a simple glass filter made from ordinary, non-optical window glass.

2. Safety Instructions

Protect Your Eyes

Read and follow all instructions in this manual carefully. Failure to do so can result in permanent eye damage.

Use Baader Solar Filters only if you fully understand the risks associated with improper use.



- Never look at the Sun through an optical instrument without a suitable solar filter securely mounted in front of its aperture. AstroSolar® ClearWhite Safety Film OD 5.1 provides the necessary protection when correctly mounted. Read this manual carefully to learn how to attach the filter correctly to your telescope, spotting scope, binoculars or camera.
- Never use **BDSF** filters for visual solar observation.
- Always attach the safety straps to all three centering bolts and secure the matching adhesive-backed pads to the instrument's tube. This helps prevent the filter from coming off, for example in strong winds.
- If you have unusually sensitive eyes or an eye condition, consult your ophthalmologist before using this product.
- Solar observation products are not intended for use by children under 14 years of age.
- Never leave your solar telescope unattended outdoors. Children or people unfamiliar with solar observing could otherwise look at the Sun without proper guidance.

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- Store the filter in a closed box to protect it from premature aging, accidental damage and excessive dust accumulation.
- Do not clean the filter by rubbing it. If stored correctly, it should not normally require cleaning. If necessary, wipe it only very gently, without applying any pressure, using an Optical Wonder Cleaning Cloth (Baader item no. 2905000).
- Do not touch the silver-colored film with bare hands. Acidic residues from your skin may damage the coating.
- Before every observing session, inspect the filter carefully for damage, such as scratches. Also refer to the quality information in Appendix B.
- For additional information on the safe use of AstroSolar® Film, visit: www.baader-planetarium.com/en/astrosolar-clearwhite



3. Assembly Instructions



Safety first when observing the Sun. Always attach the safety straps to prevent your Baader Solar Filter from coming off your instrument.

Take the utmost care when attaching the filter in front of your instrument's aperture. All three safety straps supplied with the filter must be used.

A strong gust of wind, a loosely tightened centering bolt, or someone unaware of the danger to the observer's eyesight could dislodge even a well-fitted solar filter. This would expose the observer's unprotected eye to intense solar radiation.

The three safety straps provide a simple, repeatable way to secure the filter and prevent it from coming off.

Read the instructions for attaching the safety straps carefully. Always use this essential safety feature

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3.1 Preparation

Lay out all components on a table. Check the appropriate scope of supply to make sure nothing is missing: **ASTF** and **BDSF** on page 5, **ASSF** on page 6, **ASBF** on page 7

3.2 Safety Straps

3.2.1 Lay the centering bolts on a table. Attach a safety strap by pushing the hole in the strap over the upper end of the bolt until it sits in the recessed groove.

3.2.2 Make sure the side of the strap with the double-sided adhesive tape faces the bolt

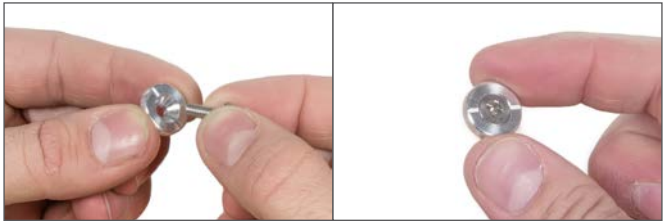
(For **ASTF / BDSF** select the appropriate centering bolt diameter for your instrument. Refer to the clamping ranges in **Appendix C**)





3.3 Adjustable Centering Bolts

3.3.1 Insert an M4 cross-head screw into an aluminum sliding block.



3.3.2 Fit a black sliding cover plate over the screw from the rear. Align its edges parallel to the machined flats on the underside of the sliding block.



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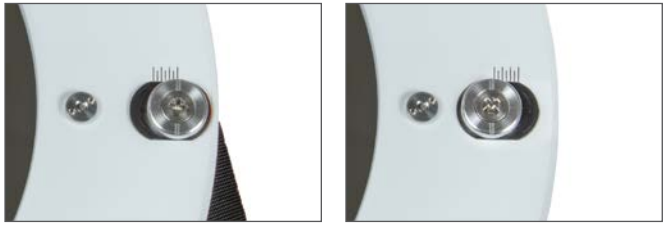
3.3.3 Insert the three-part assembly into one of the elongated adjustment slots. Make sure the machined indicator points toward the printed index scale. When the machined flats of the sliding block are correctly aligned with the slot in the front ring, the assembly should no longer rotate.



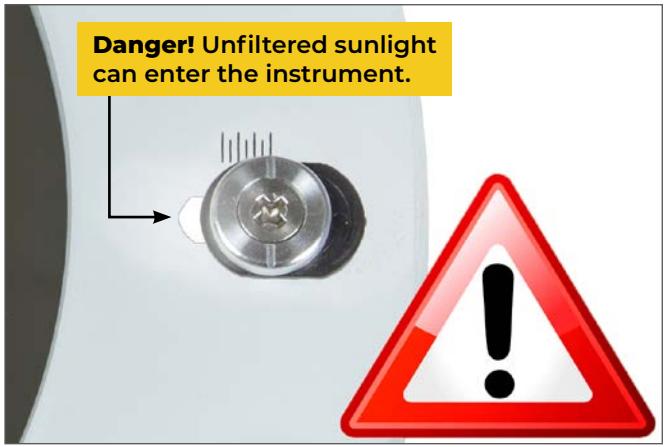
(For **ASTF / BDSF** and **ASSF 130/150,** use either the inner or outer adjustment slots, depending on the required clamping range. Refer to **Appendix C**)

3.3.4 Make sure the black sliding cover plate completely covers the adjustment slot so that no unfiltered sunlight can enter your instrument. Position the plate so that the entire slot in the front ring remains covered.

Correct:



Wrong:



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3.3.5 Hold the assembly in place and turn the entire filter ring over.



3.3.6 Hold the screw head with one finger to prevent it from turning.

3.3.7 Thread the centering bolt, with its safety strap already attached, onto the screw from the rear. For ASTF / BDSF only: Choose the appropriate bolt diameter for your instrument: 10 mm or 20 mm.

Installing Ø 10 mm centering bolts



Installing Ø 20 mm centering bolts





Side view of a fully assembled Ø 10 mm centering bolt with safety strap

To secure the assembly more firmly, gently tighten the screw with a cross-head screwdriver while holding the centering bolt on the opposite side with two fingers.



3.3.8 For ASTF / BDSF and ASSF 130/150 only: Insert the rubber plugs into the unused adjustment slots on the front of the filter ring.





3.3.9 Repeat the steps **3.2 through 3.3.8** for the other two centering bolts.

Your Baader Solar Filter is now assembled and ready to be attached to your instrument.

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4. Attaching the Filter

Follow these steps to attach your Baader Solar Filter to your telescope, spotting scope, binoculars or camera lens:

4.1 Hold the filter in front of the instrument's tube and gently slide the three centering bolts around its outer rim. The safety straps should hang loosely from the bolts.





4.2 Peel off the backing at the end of a safety strap to expose the adhesive on the Velcro pad. Gently extend the strap to its full length without pulling it forcefully, then attach the adhesive-backed pad to the tube. Press it firmly into place so that it cannot come loose accidentally.





4.3 To remove the filter, detach the safety strap from the Velcro pad. Leave the adhesive-backed pad on the tube so that the filter can be reattached quickly and easily in the same position.



4.4 Repeat steps **4.1 through 4.3** for the other two safety straps.

4.5 Before observing, make sure all three safety straps are securely fastened.

Enjoy observing and photographing the Sun with your Baader Solar Filter!

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5. Care and Maintenance

5.1 Durability of AstroSolar® Filme

The following information applies to both our classic AstroSolar® Film and AstroSolar® ClearWhite Film:

Our patented AstroSolar® Film is metallized using a coating technique similar to that used for telescope mirrors, but on both sides of the film. Even if the coating on one side were locally scuffed, the film would still transmit only 50% of the light because the coating on the opposite side remains intact. This proprietary metallization process produces a coating that is considerably more resistant than conventional industrial metallization. The challenge is to coat the second side without damaging the first. Other manufacturers therefore use two layers of film to provide two metallized layers with a similar optical density

Mounted AstroSolar® Film does not age or oxidize, when stored correctly. We have had mounted AstroSolar® filters in use since 1999 that still provide excellent image quality because the complete filter assembly has been stored in a closed, dry box after every observing session

Nevertheless, the durable metallized coating can become scratched or deteriorate under certain conditions. The main causes are accidental contact with bare skin and the accumulation of dirt and pollen when the filter is left unprotected on the telescope for extended periods. Pollen, in particular, contains essential oils that can act like a weak acid.

Over time, these oils can attack the metallized coating, just as they can affect the coatings on multicoated lenses. Pollen and acidic fingerprints must therefore be removed with the utmost care using Baader Optical Wonder Cleaning Fluid. A small amount of dust, however, is not a problem. It is better to leave it undisturbed and clean the filter as infrequently as possible.

Strong or fluctuating wind pressure, dust, pollen and attempts to remove contamination can cause tiny, pinpoint-sized holes in the metallized coating. See **Appendix B.2** for more information.

The mounted filter **must** be inspected thoroughly before every use. The film may have been visibly dented while removing the filter from the telescope, or damaged during an attempt to clean it. Use the inspection method appropriate to your film type, as described in **Appendix B.2**.

Check for damaged areas or scratches more than approximately 0.5 mm wide. Dented areas with small cuts or tears can cause the film to tear completely. **In any such case, the film must be discarded and replaced immediately.**



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5.2 Replacing AstroSolar® Film

5.2.1 At our factory, each sheet of film is attached to a white plastic ring (**ASTF / BDSF**) or a black plastic ring (**ASSF / ASBF**), using a special heat-resistant, age-resistant double-sided adhesive tape. This ring must be exposed before the film can be replaced.

5.2.2 Remove the black injection-molded plastic ring from the white metal front ring by undoing the M3 cross-head screws with a small precision screwdriver.

5.2.3 Separate the rings to access the side of the carrier ring to which the film is attached

5.2.4 Make a cut in the center of the old film. Carefully peel the film away from the carrier ring, working from the center outward. Remove all of the old film. If you work slowly and carefully, the original double-sided adhesive tape can remain on the ring and be reused to attach the new film

5.2.5 If any of the double-sided adhesive tape comes away from the carrier ring when removing the film, remove all of the tape around the ring and replace it with new double-sided adhesive tape.

5.2.6 To attach the new film to the carrier ring, follow steps 3 through 7 of the instructions at:

www.astrosolar.com/en/information/how-to/how-to-make-your-own-objective-solar-filter-for-your-camera-or-telescope

AstroSolar® Folie Film for visual observation and/or photography is available in various types and sizes from most specialist dealers.

Contact your preferred dealer or explore the available AstroSolar® Film options on our website: *www.baader-planetarium.com*

5.3 Handling and Storage

We recommend storing the filter in its original packaging in a safe, dry place. To store it with the centering bolts attached, cut out the three marked areas on the back of the empty cardboard box. Place the fully assembled filter inside, allowing the three rubber centering bolts to protrude through the openings. This helps protect the film from dust and scratches.

To keep the original packaging intact while storing the filter fully assembled, use a closed plastic storage container, such as a Tupperware-style box. This helps protect the film from dust and moisture and reduces the risk of premature aging.

Where appropriate, place some desiccant in the container. Reusable desiccant is available from Baader Planetarium (item no. 1905160).

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Appendix A:

Product Features

All ClearWhite Baader Solar Filters Feature:

- Original Baader AstroSolar® ClearWhite Safety Film OD 5.1 (For **BDSF**-Filter only: Original Baader AstroSolar® Photo Folie), mounted and quality-checked by experienced members of our staff.
- A white, infrared-reflective aluminum front ring with reinforcing rims around its inner and outer edges to protect the film from contact with sharp metal edges.
- Three centering bolts with threaded brass inserts to center the filter cell in front of the instrument's aperture. Three different bolt diameters are used across the **ASTF / BDSF / ASSF / ASBF** ranges. Each bolt has a ribbed rubber covering that allows the filter to slide onto the tube while resisting accidental removal.
- Centering bolts that can be attached and adjusted without tools to fit a wide range of tube diameters. They can grip the outside of the tube or, where appropriate, its inside.
- Non-rotating aluminum sliding blocks that hold the centering bolts. Each block has a machined indicator that points toward the printed index scale.
- Cross-head screws fitted into the sliding blocks, allowing the centering bolts to be tightened further with a screwdriver if necessary.
- An index scale beside each adjustment slot for quick, repeatable centering of the filter on tubes of different diameters.
- Black sliding cover plates that completely cover the adjustment slots and prevent unfiltered sunlight from entering the instrument beside the film.
- For **ASTF / BDSF** sowie **ASSF 130/150** Filter only: Three rubber plugs to close the unused adjustment slots.
- Three safety straps with hook-and-loop fasteners and matching self-adhesive pads to secure the filter in front of the instrument.
- A warning printed on the front of each filter: Read the Instructions before use.

Baader Solar Filters are available in three categories with a total of 21 filter sizes:

A.1 ASTF / BDSF (AstroSolar® Telescope Filter)

This range of solar filters uses a specially engineered mounting system. AstroSolar® Film must not be subjected to tension, either during assembly or as a result of temperature changes. **ASTF** filters therefore use a temperature-compensated filter cell.



The film is attached to an injection-molded carrier ring whose material has the same coefficient of thermal expansion as the film. The film can be replaced as described in Section 5.2. This carrier ring floats freely behind the aluminum front ring.

It is held in place by a second injection-molded ring made of fiberglass-reinforced plastic for resistance to breakage. This tempe-

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rature-compensated design allows the AstroSolar® Film to retain its optical quality, even at -30 °C or +50 °C.

ASTF / BDSF filters with apertures from 80 to 280 mm include two sets of centering bolts, all 38 mm long: 3 bolts with a diameter of 10 mm and 3 with a diameter of 20 mm. This accommodates a wide range of tube diameters

Some **ASTF** filter sizes are also available as „**BDSF**“ (Baader Digital Solar Filter) models with AstroSolar® Photo Film.

A.2 ASSF (AstroSolar® Spotting Scope Filter)

This range offers a stable mounting solution for spotting scopes, telephoto lenses and amateur telescopes at magnifications up to approximately 120x. The AstroSolar® Film is attached to a plastic ring that also reinforces the aluminum front ring. The plastic and the film have similar coefficients of thermal expansion.

ASSF 50 bis 115 include a set of centering bolts, 13 mm in diameter and 24 mm long.

ASSF 130-150 include a set of centering bolts, 10 mm in diameter and 38 mm long, together with rubber plugs for the additional unused adjustment slots.



A.3 ASBF (AstroSolar® Binokular Filter)

These filters are mechanically similar to the **ASSF** models. The sole difference is that one side of the front ring is cut off so that two filters can be fitted side by side on binoculars. However, **ASBF** filters are also suitable for spotting scopes and camera lenses.



ASBF include three centering bolts, 13 mm in diameter and 24 mm long.

Appendix B:
Quality Information

The text and photographs in Sections **B.1** and **B.2** show typical examples of mounted AstroSolar® Film that may appear imperfect but are within the manufacturing tolerances and function without any loss of image quality.

After production and assembly, every Baader Solar Filter undergoes a thorough quality inspection at our facility in Mammendorf, Germany.

Each box is sealed with a Baader logo sticker. Minor manufacturing-related cosmetic irregularities, such as ripples, small indentations, folds and even tiny, pinpoint-sized holes, are within the manufacturing tolerances. They do not adversely affect image quality or endanger the observer's eyesight.

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If additional imperfections develop in your AstroSolar® Film over time, as described in Sections 5.1 and B.2, the film should be discarded and replaced (see Section 5.2). Further information is available at www.astrosolar.com.

By contrast, scratches and areas where the metallized coating has been accidentally rubbed off during handling pose a real risk to your eyesight and your camera sensor. Dents, sharply impressed creases and tears caused by accidental contact or mishandling may cause the film to tear completely in strong winds.

Before every solar observing session, the film must show no signs of damage. Film that appears scratched, dented or otherwise damaged must be discarded and replaced immediately (see Section **5.2**).

B.1 Folds, Ripples and Creases



The example shown here is a filter made with AstroSolar® Film produced without tension. The manufacturing process deliberately allows gentle ripples to remain in the film.

Trying to remove these surface structures by stretching the material would cause severe astigmatism and a noticeable loss of image sharpness. The structures themselves do not affect the image; they are purely cosmetic

B.2 Pinholes

Before every use, inspect your filter for damage, large scratches, wipe marks or other conditions that could affect its safety:

ASTF / ASSF / ASBF (AstroSolar® ClearWhite Safety Folie OD 5.1): Hold the filter at arm's length and briefly inspect it against the Sun.

BDSF (AstroSolar® Foto Folie):
Inspect the filter against a bright LED or halogen lamp

Tiny pinholes less than 0.5 mm across do not pose a safety risk because each acts like a miniature pinhole camera. They form images of the solar disk at extremely low resolution because of their very small apertures. Several of these ghost images overlap and brighten the background of the solar image produced by the telescope.

If more of these approximately 0.1 mm pinholes develop over time, the increased background brightness reduces contrast, particularly in fine details on the solar surface. We therefore recommend replacing the film.

Alternatively, isolated pinholes can be blackened on the inside of the Baader Solar Filter, facing the telescope. Use a black felt-tip marker to place a tiny black dot over the pinhole. Compared with the total filter area, this slight reduction in light-transmitting area has no adverse effect on image quality. Instead, it can improve contrast in fine details on the solar surface.

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Appendix C:

Clamping Range

For further technical details, visit www.astrosolar.com

ASTF / BDSF – ClearWhite Baader Solar Filter for high-end Telescopes
(including temperature compensated filter cell)

Filter Name	ideally suited for aperture range ~	Clamping Range: contacting inner tube diameter with 10mm bolt	Clamping Range: contacting inner tube diameter with 20mm bolt	Clamping Range: contacting outer tube diameter with 10mm bolt	Clamping Range: contacting outer tube diameter with 20mm bolt
ASTF 80	70 – 90	130 – 160	140 – 170	110 – 140	100 – 130
ASTF 100	90 – 110	150[1] – 180[2]	160 – 190	130[3] – 160[4]	120 – 150
ASTF 120	110 – 130	170 – 200	180 – 210	150 – 180	140 – 170
ASTF 140	130 – 150	190 – 220	200 – 230	170 – 200	160 – 190
ASTF 160	150 – 170	210 – 240	220 – 250	190 – 220	180 – 210
ASTF 180	170 – 190	230 – 260	240 – 270	210 – 240	200 – 230
ASTF 200	190 – 210	250 – 280	260 – 290	230 – 260	220 – 250
ASTF 240	230 – 250	290 – 320	300 – 330	270 – 300	260 – 290
ASTF 280	270 – 290	330 – 360	340 – 370	310 – 340	300 – 330

ASSF – ClearWhiteBaader Solar Filter ffor Spotting Scopes, Telescopes and Camera-Lenses

Filter Name	ideally suited for aperture range ~	Clamping Range: inner tube Ø with 13mm bolt	Clamping Range: outer tube Ø with 13mm bolt
ASSF 50	40 – 60	81 – 96	55 – 70
ASSF 65	55 – 75	96 – 111	70 – 85
ASSF 80	70 – 90	111 – 126	85 – 100
ASSF 100	90 – 110	131 – 146	105 – 120
ASSF 115	105 – 125	146 – 161	120 – 135
		with 10mm bolt	with 10mm bolt
ASSF 130	120 – 140	168 – 198	148 – 178
ASSF 150	140 – 160	188 – 218	168 – 198

ASBF – ClearWhite Baader Solar Filter for Binoculars and Camera-Lenses

Filter Name	ideally suited for aperture range ~	Clamping Range: inner tube Ø with 13mm bolt	Clamping Range: outer tube Ø with 13mm bolt
ASBF 50	40 – 60	ASBF filters cannot be clamped to binoculars from the inside because the lenses are too close to the edge.	55 – 70
ASBF 60	50 – 70		65 – 80
ASBF 70	60 – 80		75 – 90
ASBF 80	70 – 90		85 – 100
ASBF 100	90 – 110		105 – 120

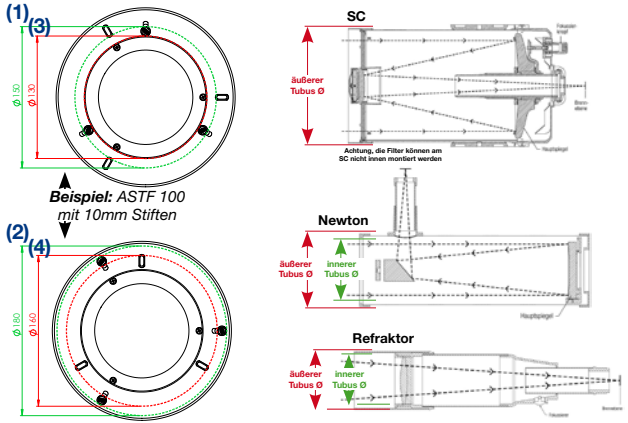
Mentioned dimensions are in mm. **Align all filters with the optical aperture by adjusting the filter with the centering bolts to fit the inner or outer tube diameter.**

Appendix D:

Recommended Accessories

Available from your specialist dealer or directly from: www.baader-planetarium.com

Artikel-Nr.	Produkt
1905160	Silica Gel Desiccant, 125 ml
2905000	Optical Wonder™ Cleaning Cloth
2905007	Optical Wonder™ Cleaning Fluid
2459286	AstroSolar® Safety Film 5.0 / ECO-size (140 × 155 mm)
2459281	AstroSolar® Safety Film 5.0 / A4-size (20 × 29 cm)
2422003	AstroSolar® ClearWhite Safety Film OD 5.1 (100 × 50 cm)
ONLY for photographic use:	
2459278	AstroSolar® Photo Film OD 3.8 / A4-size (20 × 29 cm)



Learn more about
AstroSolar® Film at:

AstroSolar.com



Need filters for other instruments?
Find the right model with our Baader Solar Filter Finder Tool:



www.astrosolar.com/baader-solar-filter

Producing Solar Safety Films since 1990

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