

# ASKAR SQA 85

The new products from the Chinese manufacturer ASKAR (Sharpstar) are coming out at a steady and sustained pace. With the series already available and acclaimed by the world of passionate amateur astronomers, the catalog is expanding again with a new complete range called SQA (Super quintuplet Astrograph) which remains anchored in the field of wide field or very wide field. The range includes, at the time of writing this test, three diameters ranging from 55mm to 106mm. The SQA 55 with a focal length of 267mm, the SQA 85 with a focal length of 408mm and the SQA 106 with a focal length of 510mm whose metallic gray finish stands out from the rest of the catalog except for the Askar V (60-80mm modular optics) and the Sharpstar Z4. In the range of equipment offered by Askar as well as other manufacturers, this type of scope obviously already exists with the Petzval type optical formula of which Televue was one of the precursors. Other manufacturers continue to exploit this segment including Takahashi, TS Optics, Omegon, Borg, Vixen. These optics cover F/D ratios between 4.4 and 5.6 with the exception of Borg with its eluvise 107 FL (F/D=3.9) and Vixen with the VSD 100 (F/D=3.8) now replaced by the VSD 90 SS (F/D=5.5). We will focus on the SQA 85 model and see if this refractor brings something more to the FRA range which already gives very good results.

A quick reminder of the ranges of refractors offered by ASKAR :

The PHQ range with 5 models (65-80-107-130-151mm) which are quadruplets (except the 65 which is a quintuplet)

The FRA range with 5 models (300-400-500-600) which are Petzval-type quintuplets. The only range whose name is based on that of the telephoto lenses of major photographic brands, namely the focal length and not the diameter: e.g.: The FRA 500 has a diameter of 90mm.

The APO range with 5 models (103-120-140-185-203mm) which are triplets. The 71F, an entry-level quadruplet. This wide range allows the potential buyer to choose the model that suits them!

Let's go back to the model that interests us: the SQA 85

The optical tube abandons white in favor of a superb gray metallic anodization made, according to Askar, to last over time. The complete set: rings, finder bases, standard Vixen style 290mm dovetail plate are black anodized. The final touch is provided with gold logos that emphasize the high-tech side of the set. The dew shield is sliding with a 50 mm stroke. The length of the dew shield could have been increased by 40mm without affecting its storage in the case by simply moving the rings by the same value. The black anodized aluminum cap with edging on its periphery and decorated with the logo is of the most beautiful effect. A screw allows it to be immobilized when it is removed. The rings are redesigned and contribute to the overall aesthetics. The set comes with a magnificent reinforced nylon case (AM5 type) which is much lighter than an aluminum case and especially less likely to damage the equipment in the trunk of the car during transport (Fig. 1). The focuser outlet has an M48 adapter with its cap and two M54 and M68 well machined adapters. An inspection report, two stickers, a protective cap for the micro focuser and a user manual complete the offer. The total weight is 4.7 kg with a tube length of 405 mm in the retracted position,





The SQA is a quintuplet air space lens design with two SD glass. Five elements in three groups to obtain an F/D ratio of 4.8, therefore more "open" than the FRA range (F/D=5.6), the lens design has been redesigned. The front triplet has a central lens in SD glass, another SD glass lens of a slightly smaller diameter offset by several centimeters in the body of the tube and a lens located in the body of the focuser. We can see in (Fig. 2) the difference between the lens design of the Askar FRA 500 and that of the SQA 85. The use of SD glass in place of ED glass is supposed to increase the transmission coefficient. The SD name is popular with some manufacturers who offer high-end versions in SD glass (APM for example with its binoculars).



Apart from certain designations such as S FLP 53, S FPL 51, FCD1, OK4, H-FK61 which are familiar to us and which can condition us for a future purchase, it is difficult to know the exact designations of the lenses used on all ranges of refractors because this is part of the manufacturing secrets. Among all the data which characterize the quality of the lenses, there are two essential parameters: The Abbé number (1) and the MTF (2) After all becomes more opaque (no pun intended) and one quickly gets lost in this maze of combinations of more or less exotic lenses and surface treatments which lead to the final result. You will find in the comparative table (Fig.3) the main lenses used for the manufacture of apochromatic refractors.

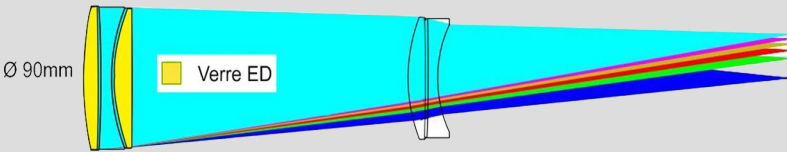


When we look more closely, the refractor that comes closest, in terms of its characteristics, is the FSQ 85 EDX: Ø 85mm, focal length of 450mm F/D= 5.3 and Petzval lens design. However, as I mentioned on page 1, it is interesting to compare it with the FRA 500 (Ø 90mm, focal length of 500mm and F/D=5.6) only to appreciate the difference that this new refractor could bring to an already well-stocked catalog.

Principaux verres utilisés pour les objectifs des réfracteurs Apochromatiques				
Fabricant	Désignation	Indice de réfraction	Nombre d'abbé	Observations
	CaF2	1,4338	95,23	Au sommet : La Fluorine qui donne le meilleur indice de réfraction
OHARA	S-FPL 55	1,4387	94,66	légèrement inférieur au S-FPL-53, mais plus facile à travailler et susceptible De remplacer le S-FPL-53 dans les nouvelles conceptions d'objectifs.
OHARA	S-FPL 53	1,438	94,94	Moins cher + facile à polir que la Fluorine avec des résultats quasi identiques
OHARA	S-FPL 52	1,456	90	Remplacé par la S-FPL 53
OHARA	S-FPL 51	1,497	81,54	Moins cher et plus stable que le S-FPL53
HOYA	FCD1	1,497	81,61	Equivalent au S-FPL51
CDGM	D-FK 95	1,4378	94,52	Equivalent au S-FPL53
CDGM	H-FK71	1,4565	90,27	
CDGM	H-FK61	1,497	81,61	Equivalent au S-FPL51, moins cher
SCHOTT	N-PK52A	1,497	81,61	Equivalent au S-FPL51
LZOS	OK4	1,447	92,04	Equivalent au S-FPL53

Fig.3

ASKAR FRA 500



ASKAR SQA 85

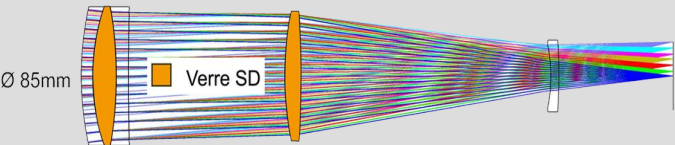


Fig.2

Knowing that this manufacturing secret would not be revealed, which I respect, I still asked the question to ASKAR who give me the following succinct answer:

*The main difference between ED glass and SD glass is the ABBE number, SD glass is a kind of high-end ED glass and its ABBE number is often higher than 95. We cannot provide the specific SD glass model that we use.*

(1) The Abbe number, called constringence or dispersion coefficient of an optical glass, which is used to determine the variation of the refractive index with the wavelength, is one of the data frequently used to characterize the glass used.

(2) The modulation transfer function or MTF: Function that characterizes the ability of the optical system to restore contrast according to the fineness of the details of the object. It is used to evaluate the quality of an optical system



The **2,8 inch focuser** is particularly elegant and in addition to the features that have been present for several years (1/10 dual speed rack and pinion (very smooth and precise), standard camera rotator, focusing vernier graduated in mm, focus locking wheel) it is completed with a high precision scale engraved on the focuser tube with a mark present on the camera rotator, two finder bases very useful for mounting a finder but especially for mounting equipment used today with new imaging setups: control boxes, guide scope, ... The upper face is decorated with a thick logo inserted in a machined housing.

Fig.4



The body integrates the fifth lens and seems to be an integral part of the tube by taking up the metallic gray finish. The output of the camera rotator has an M76x1 thread in order to mount three adapters (supplied as standard) superbly machined: M48x0.75 – M54x0.75 – M68x1 (Fig.4) covering all camera formats which is a plus. Too often the rear adapters of refractors supporting full format are fitted with an M48 output which causes vignetting. Threads are present on the body of the rack compatible with most motorized focusers on the market: ZWO, Toup Tek, astroasis, QHY CCD, Pegasus, Ioptron (Fig.5).

Fig.5



**NB:** For full format, in order to maximize the luminous flux, the ideal would be to have the largest possible output with filters sized so as not to create any loss of light. Common filters have a diameter of 2 inches without counting the M48 threaded body. They must therefore be placed as close as possible to the sensor, which is not always possible and despite this, vignetting is inevitable. Easy to see, but the entire chain of accessories must be resized accordingly and as soon as the format of some of these accessories (especially those of the filters) is increased, the prices soar!

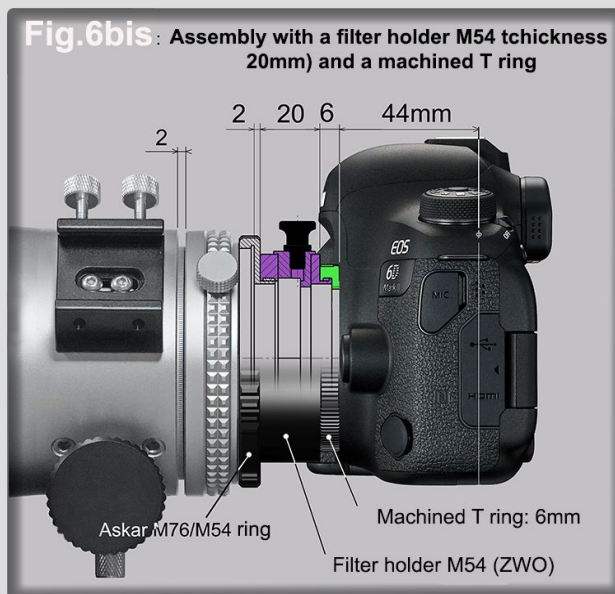


The focusing travel is 32mm, sufficient to mount a camera with a filter wheel or a filter holder and an off axis guider. With this configuration the focuser is close to the middle of its travel. If you want to opt for a guide scope (without an off axis guider) you will have to mount an extension ring that compensates the thickness of the off axis guider, otherwise you will not be able to focus. Fortunately, the substantial margin allows you to mount rings between 6mm and 25mm thickness. For those equipped with a camera and a T2 ring (55mm backfocus) there is no problem, the sleeve is a little more than halfway through its travel (17mm).

**The rings**, much less massive than on the FRA range, are trapezoidal in shape, the faces of which have multiple threads allowing the fixing of small plates or guide accessories. The upper part has a dovetail machined in the mass with two fixing screws to mount an optional carrying handle or any other accessory (Fig.6). This handle will very quickly become indispensable because the rings are very close to the tube, gripping is not easy and could drag the tube to the ground. Two eyelet screws allow the rings to be opened and closed easily and safely. The whole is very aesthetic with a logo affixed to the upper face at the bottom of the groove.



If you want to add a filter holder, very practical and often essential, you will not be able to reach the MAP. This problem would be solved by making the focuser 4 to 6 millimeters shorter with a sleeve that is as long. A trick to get around this is to reduce the thickness of the T2 ring by 4 to 5mm (maximum) by machining. You should not machine more at the risk of running out of material! You also need to realise a M54 thread for the filter holder. There will be approx. 2mm of travel left with the focuser, sufficient to be able to do the MAP when a filter is mounted. Schematic diagram visible on (Fig.6bis). A word on the carrying handle, which is superbly finished. Its dovetail has a lateral groove allowing the tightening screw to block it to prevent any risk of slipping. A thumbscrew allows it to be pressed against the bottom of the dovetail integrated into the upper ring.



The SQA is an astrograph, there is no output at the 50.8mm sleeve to make visual. The fifth lens, positioned at 40mm from the rear face of the camera rotator, does not allow the use of 31.75 and 50.8mm diagonal mirrors. In any case, making visual with very open refractors is not in their DNA. I still had an adapter made with an M76x1 thread to mount it on the camera rotator with an output at the 50.8mm sleeve. With this one we can use 31.75mm eyepieces (with reducing ring) and 50.8mm without diagonal mirror. In order for the MAP to be possible its length must be 60mm. The test was done with Vixen LV and Pentax XW eyepieces, it is not sure that this is the case for all brands.



## Photographic report

Mounts : 10 Micron GM2000 HPS, ZWO AM5

Camera: ZWO Asi 6200 MC Pro

Softwares : Siril, Photoshop, CCD Inspector, MaximDL

Sky quality : Good, fairly clear sky SQM = 20,65

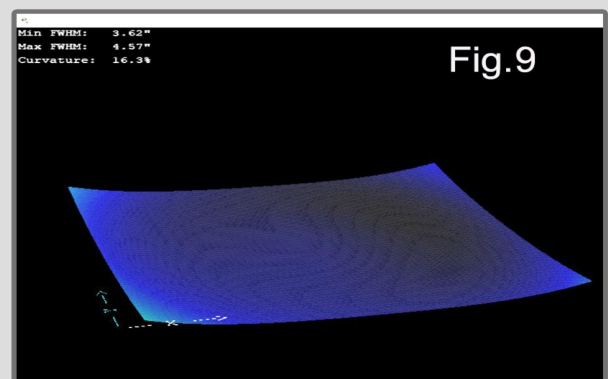
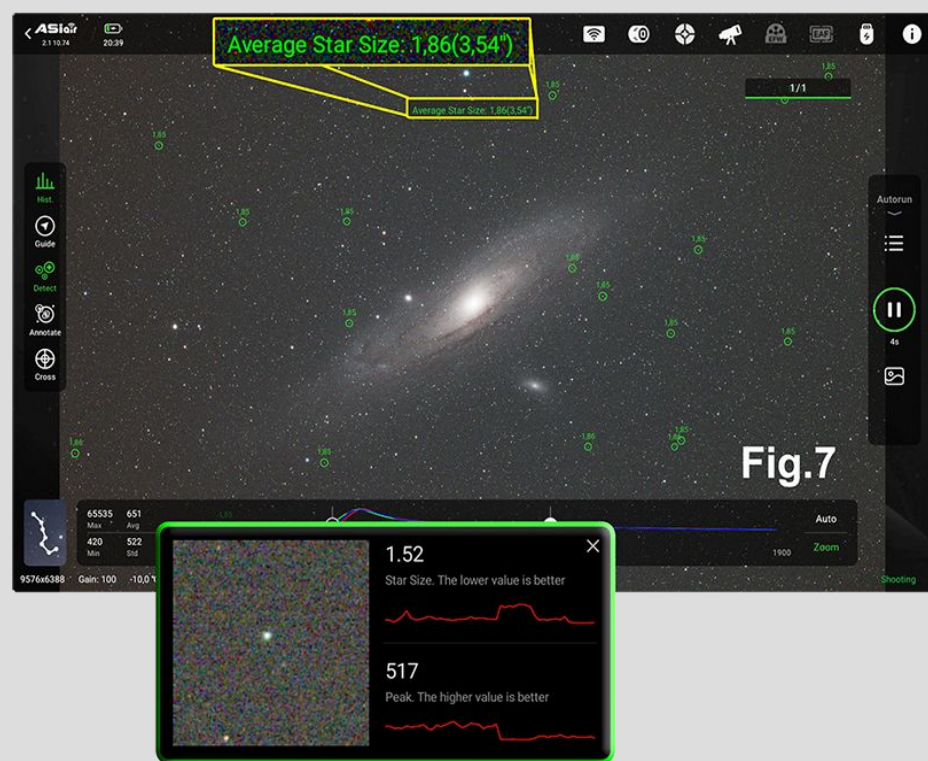
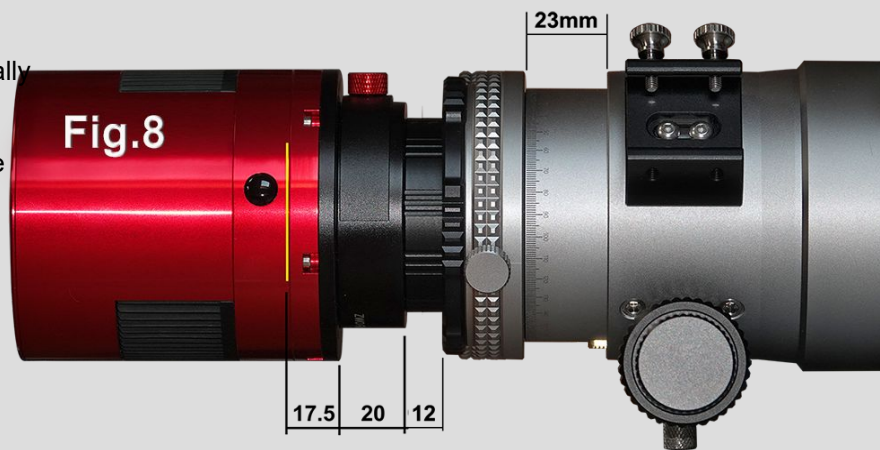


It is time to move on to the test on the sky. All the instrumentation necessary for taking photos was mounted during the day allowing the entire configuration to be up to temperature during the night. The camera used is the Asi 6200 MC Pro from ZWO with the V2 M54 filter holder and a 12mm thick connecting ring. With this configuration the eyepiece holder is extended by 23mm (Fig.8)

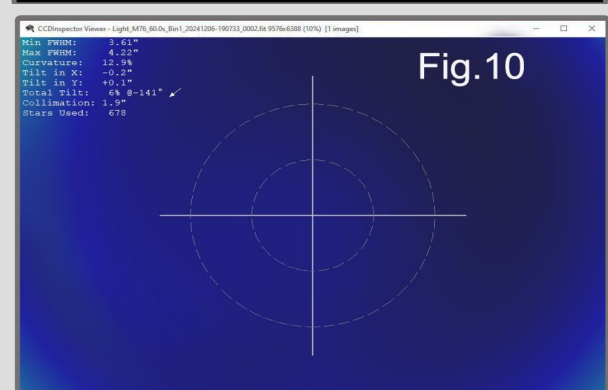
*The Canon 6DII camera was mounted with the Askar M54 ring only to show the position of the eyepiece holder when the MAP is reached (Fig.8bis).*

Ambient temperature stabilized at  $-2^{\circ}$ . The tube is pointed near the zenith and the focus is done manually with the help of the application of the AsiAir in focus mode. The star size recorded is very fine 1.52 pixels (2.89"). There is little turbulence, the variation of the star size is quite stable. Pointing at a Messier object (M31) before its passage at the meridian. 300S exposure with a gain of 100 and a camera temperature of  $-10^{\circ}$ .

The star size obtained is 3.54" (Fig.7). When zooming in on the image, what is remarkable is the flatness of the field where the stars on the periphery have exactly the same size as in the center. The images obtained were also viewed with MaximDL and Asi viewer.



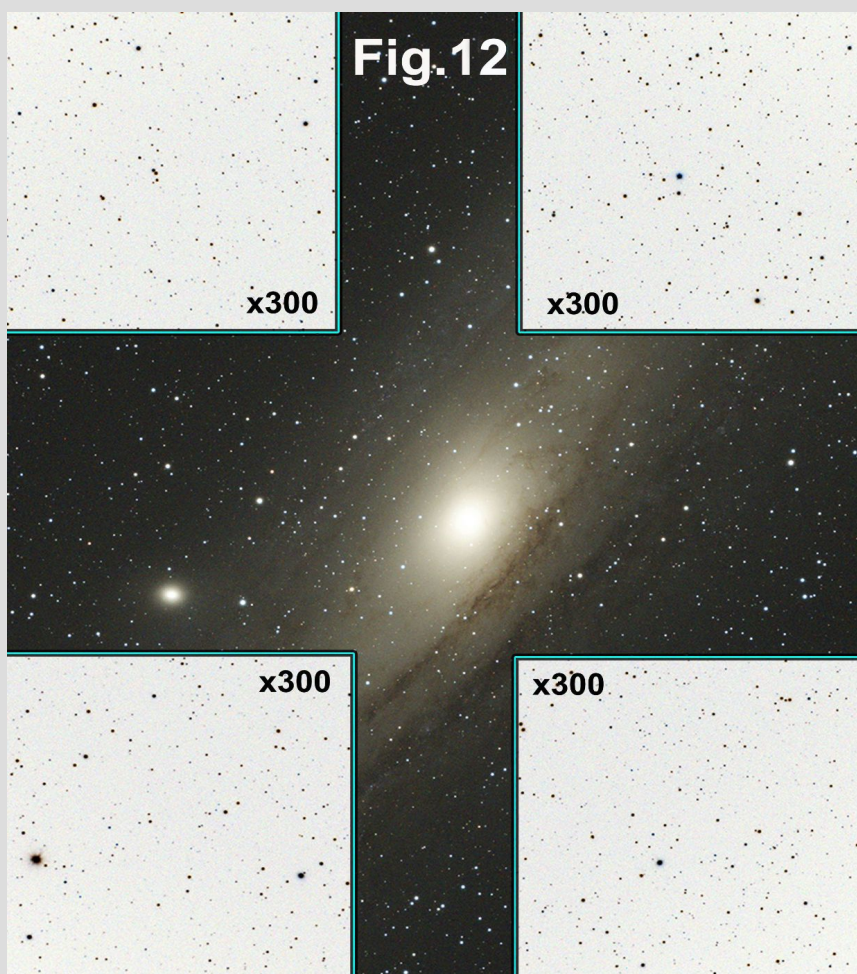
The analysis of the field curvature (Fig.9) and (Fig.10) was done on a uniform star field and not on M31. It is excellent for such an "open" astrograph: 13%. This essential characteristic confirms the image quality during the visual analysis when zooming in: very homogeneous field with stars of similar sizes. We note a vignetting (Fig.11) which does not exceed 16% perfectly concentric which we will very easily remove with the taking of flats. This vignetting corresponds to the specifications given by Askar on their site in the form of a table "Relative illumination"



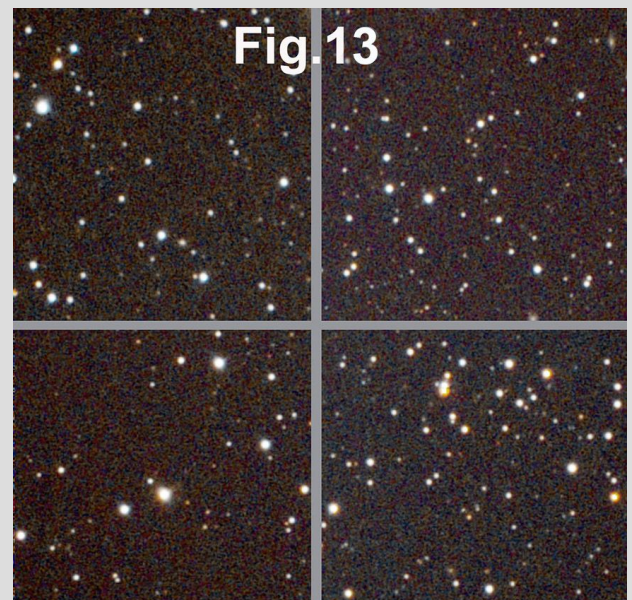




**Fig.11**  
This image representing NGC 7000 clearly shows the vast field encompassed by the SQA as well as the very discreet vignetting on the edges.,Ten minute expose with IDAS NBZ filter where only the contrast has been increased to show this vignetting. You can notice that the image is fully usable



In (Fig.12) a 300% zoom has been applied in each of the angles which shows perfectly round stars with very low chromatism (lower than on the Askar FRA500). Very strong zoom (each square is 3x3mm) in each of the angles on a 300s raw photo (Fig.13) in order to visualize the residual chromatism: it is quite remarkable!



After extraction of the layers on MaximDI and analysis with CCD Inspector the star size is substantially the same which confirms the excellent correction of the chromatism. The results are visible on (Fig.14) and (14bis)

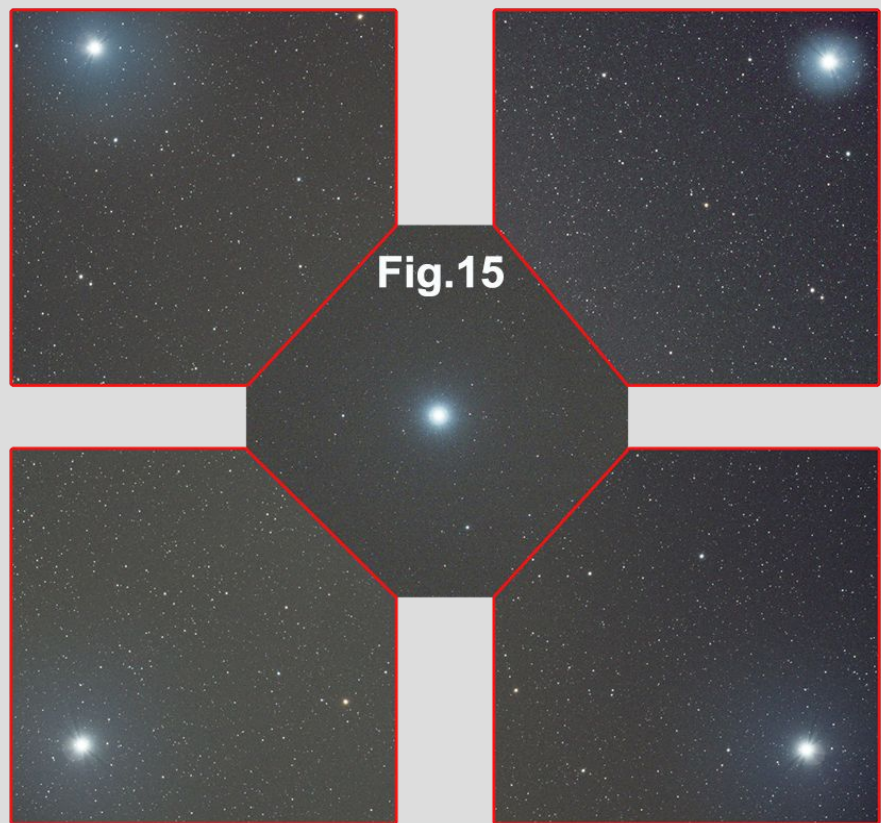
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	M76 G.fit	3.58"	4	818	18.90		12/06/24 19:05:29
	M76 B.fit	3.66"	4	685	23.77		12/06/24 19:05:29
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Measure	M76 B2.fit	3.66"	4	685	23.77		12/06/24 19:05:29
	M76 R3.fit	3.54"	3	730	19.88		12/06/24 19:07:33
	M76 G3.fit	3.56"	4	819	18.68		12/06/24 19:07:33
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	M76 G4.fit	3.60"	4	820	18.98		12/06/24 19:08:35
	M76 B4.fit	3.64"	4	685	24.31		12/06/24 19:08:35
1 / 15	M76 R5.fit	3.54"	4	732	19.89		12/06/24 19:09:37
	M76 G5.fit	3.59"	4	820	18.89		12/06/24 19:09:37
	M76 B5.fit	3.64"	5	685	24.40		12/06/24 19:09:37

Fig.14	FWHM	Pixels	pixel size sensor Asi 6200	Star size microns
RED	3.54	2.06	3,76μ	7,75
GREEN	3,56	2.07		7,78
BLUE	3.66	2.13		8,0



Pointing at a very bright star, in this case Vega, to detect possible reflections. This test is very important here with a refractor open at 4.8. The luminous flux passing through the optics will highlight the slightest reflection. When photographing a large field, there is a good chance of having one or more stars of high magnitude on the sensor and which are not necessarily in the center causing inevitable halos, for example: IC63 (the ghost nebula) or IC 2118 (the witch's head nebula). The star was placed in the center then in each of the four corners with exposures of 60s. The result obtained is excellent: Very weak off-center halos, no flare (1) at most egrets whose diffraction is more important (Fig.15). The difference in the sky background is due to thin high-altitude clouds that have invited themselves without being invited!

After mounting an Antlia Triband RGB ultra V2 filter and redoing the MAP, I launch the Asiatic acquisition with 24 poses of 300s.



1 Flare is an optical phenomenon that occurs when light enters a lens directly and diffracts through the various elements of the lens. This diffraction causes a veil of light on photos, which can even lead to the formation of colored halos or circles. This phenomenon is caused by the reflection and diffraction of light on the lenses. It occurs when an intense light source is directly in the field of view or out of the field (in the immediate vicinity).







M45: 36 exposures of 300s without filter

## Conclusions

At the risk of repeating myself, Chinese equipment has progressed exponentially in terms of quality. The services are equivalent to the most famous brands with much more affordable prices. The FRA range has also won over many enthusiasts with its very good optical quality. The SQA goes a step further by delivering even sharper images (smaller star size and better controlled chromatism). It is very difficult to fault it and the test I was able to do literally gave me pleasure. The 408mm focal length with an F/D ratio of 4.8 is fully usable without the use of a reducer which add lenses and often degrades images on the edges of the field. It would be interesting to use a larger sensor than the full format because I suspect that it would be usable! The sale price is a little higher than the FRA 500, expect between 2575 and 2800 euros depending on the different dealers. (add eighty euros for the handle). The SQA range currently includes three models: SQA 55 – SQA85 – SQA106 with prices ranging from 1000 to 4000 euros.

To return to the length of the dew shield, the SQA is not an isolated case because this is generalized on a large number of refractors dedicated to the wide field or not, certainly for a concern of compactness and therefore transportability. We can cite the SW Esprit 100 which deviates from the rule with a 155mm dew shield. Let's not be offended, the interior is covered with felt and due to the installation of a heating resistor set at 50%, I did not have any dew deposit on the front lens despite the cold test nights with a high humidity level and the tube pointed near the meridian for more than 3 hours!

Find all the specifications on the site : [Jiaxing Sharpstar Optical Instrument Co., Ltd.](#) [Askar](#) [Sharpstar](#)

Thanks to Teleskop-Service for the loan of the equipment



- \_ Excellent optical quality
- \_ Flat field on the full format with stars pitted right to the edges
- \_ Excellent chromatism correction
- \_ Mechanical construction and finishing exemplary
- \_ Very competitive price
- \_ Rings removable without Allen keys
- \_ Focuser without play with smooth adjustment
- \_ Reduced weight and size
- \_ Quality case in reinforced nylon with preformed foams



- \_ Short dew shield
- \_ Optional carrying handle