

# VIXEN VSD100F3.8 OTA FAQ

## Q1: What is VSD100F/3.8 optical tube assembly?

A1: The VSD100F3.8 is an astrograph that is designed for prime focus photography of nebulae and star clusters. The innovative lens design of the VSD100F3.8 completely eliminates optical aberrations including blue halo (a violet tint in chromatic aberration) in spite of its surprisingly fast F/3.8 focal ratio. The star images are as small as 15 microns around the very edge of a 70mm image circle with excellent field flatness. The VSD100F/3.8 produces extremely high quality images that are required for digital imaging. It can be converted to a 300mm F3 or 600mm F6 system with use of an optional focal reducer or tele-extender.

## Q2: What are specific features of the VSD100F3.8 optics?

A2: Its sophisticated design is all for digital imaging. The unit employs a 5-element 5-group lens design in which an SD lens is set in the front of the group and an ED lens is set in the rear of the group. The blue halos around stars, that are hard to reduce with a 4-element 4-group lens design, are corrected successfully. In addition, astigmatism and coma aberration are corrected to an extremely high level of image quality. An improved Strehl intensity by approximately 10% as compared to the 4-element 4-group lens design results in increasing the visibility of faint stars.

The new AS coating has been developed to meet the characteristics of each lens element and thus it avoids the deterioration of image contrast due to the increase of lens elements. It achieves 99.9% light transmission per lens surface and offers extremely high contrast images without ghost and without flare.

## Q3: How large is image circle in diameter?

A3: The image circle differs on the size of an imaging device.

70mm with a 645 format camera (56mmx41.5mm) 60% illuminated.

55mm with a 645D format camera (44mm x 33mm) 70% illuminated.

55mm with a 645D format combined with the tele-extender 61% illuminated.

44mm with a 35mm format combined with the focal reducer 71% illuminated.

## Q4: What is image circle?

A4: It shows the size in diameter of an imaging area appropriate for astrophotography.

Q5: What are necessary adapters for photography?

A5:

Equipment	Cameras (Image sensor sizes)	Adapters for Photography
VSD100F3.8 OTA only	645D digital camera	Pentax 645D Adapter*
	Full 35mm DSLR camera	Wide Photo Adapter 60mm and T-ring
	APS-C digital camera	Wide Photo Adapter 60mm and T-ring or T-ring only.
VSD100F3.8 OTA and Tele-Extender	645D digital camera	Pentax 645D Adapter*
	Full 35mm DSLR camera	Ring C (supplied with the OTA), Wide Photo Adapter 60mm and T-ring
	APS-C digital camera	Ring C, (supplied with the OTA), Wide Photo Adapter 60mm and T-ring or Ring C, Ring B plus T-ring only.
VSD100F3.8 OTA and Focal Reducer	Full 35mm DSLR camera	Wide Photo Adapter 60mm plus T-ring
	APS-C digital camera	Ring B (supplied with the OTA), Wide Photo Adapter 60mm and T-ring or Ring B plus T-ring only.

\*Not available from Vixen.

Q6: Can the VSD100F3.8 be used for visual observation?

A6: Yes. It can be used for visual observation but without the use of the focal reducers. The star diagonals have a long light pass and therefore the VSD100F3.8 will not reach focus if used with them.

Q7: Are finder scopes available on the VSD100F3.8?

A7: A dedicated finder bracket base is needed. This is sold separately. It will allow attachment of a Vixen 7x50mm XY finder scope or XY red dot finder on the VSD100F3.8.

Q8: What is AS coating?

A8: The AS coating is "Astro-Special" coating developed by Vixen to meet the characteristics of each lens element and avoids the deterioration of image

contrast perfectly for images without ghost and without flare.

#### Q9: What is Strehl intensity?

Q9: If rays of light from a pinpoint source are focused through optical instruments like lenses (hereafter called “lens”), the pinpoint image of light is diffused to some extent due to diffraction of light. It occurs even if the lens has no aberration. The lens with aberrations decreases the central brightness of light if focused due to increase in diffusion. The maximum central brightness is rated as 1 if the lens is free from aberration theoretically. The Strehl intensity shows the ratio of how the lens is deviated from the lens in theory. The closer to 100%, the smaller the lens shows the aberration.

#### Q10: What are MTF characteristics?

MTF is an abbreviation of Modulation Transfer Function and used as a criterion for evaluating characteristics of images produced at focal plane. It represents how the contrast in a captured image can be reproduced with high fidelity on the focal plane and it is translated by resolving a pattern of black and white bars lined up alternately at a regular interval. The MTF describes a curved line due to change of a lateral distance from the center of a lens. In the MTF, spatial frequencies of 10 line pairs per 10mm indicates contrast and spatial frequencies of 30 lines pairs per 10mm indicates resolution generally. If the value of the MTF is over 0.6, it is thought that the lens is good. If the value is more than 0.8, it means that the lens is excellent.

#### Q11: What is spatial frequency?

The spatial frequency is expressed by numbers of lines which is presented at regular intervals in a unit. Generally it is used to evaluate the performance of optics in the optical industry.

#### Q12: What are spot diagrams?

It defines rays of light radiated from the pinpoint source of light (the tracks of light rays). A bundle of light rays converges on the focal plane through the lens if each ray of light is traced. The spot diagram is a plotted diagram of the rays of light. The state of aberration is simulated and visualized to understand the presence of coma and spherical aberrations readily.

#### Q13: What is SD lens?

A13: It is a type of glass types similar to ED (extra-low dispersion) glass. The SD (Super ED) lens produces much better color correction than the ED lens.

Q14: By what millimeters should I draw out the drawtube to focus on the attached camera?

A14: Probably a distance of 24mm at 20 degrees Centigrade is a yardstick for finding a focus and you can start around there to focus. The focal point varies as the temperature changes. It is recommended that you determine an exact point in focus with the vernier and make a note of it and the temperature.

Q15: How much is a distance in millimeters from the end of the drawtube to the focal plain of a camera?

A15: It is about 116mm from the top of the rubber ring on the rear end of the focuser drawtube.

Q16: What is a recommendable maximum loading weight of the focuser?

A15: It is about 3 kilo grams (6.6 lbs).

Q17: Does VSD100F3.8 have adjustment screws to square the focuser?

A17: Yes. The VSD100F3.8 has squaring adjustment screws on the focuser to level the connection of a larger 645D format camera. The squaring adjustment will be unnecessary if you use a 35mm full format DSLR camera or a smaller one.

Q18: Does a dew heater affect the optical performance of the VSD100F3.8 when it is installed on the optical tube for antifogging?

A18: You should not begin your photography session until the optical tube gets equilibrium with the ambient temperature to avoid shift of a focal point caused by change of the temperature. The amount of time in getting temperature equilibrium depends on the specifications of the heater, state of installment and environment in which it is used. It is recommended that you test in advance.

Q19: Is a filter attachable to the VSD100F3.8?

A19: A 58mm filter thread is provided on one of the rings on the focuser. The filter may cause ghost images if attached.

Q20: How many millimeters is the travel of the drawtube?

A20: 35mm approximately.