

William's Optics SWAN WIDE FIELD EYEPIECES



9mm, 15mm, and 20mm: \$78
25mm, 33mm, and 40mm: \$118

A number of eyepiece manufacturers have been pushing some of the limits of eyepiece design to obtain increased fields of view with varying degrees of success. This emphasis has now penetrated into the under \$250 market, resulting in eyepieces which do provide the field but can be something of a compromise in terms of outer field performance. Williams Optics had introduced its new Swan series of six wide field (70 and 72 degree apparent field) eyepieces in hopes of capturing at least part of this market.

Product Description:

The Swans are 5-element designs with apparent fields larger than that provided by some Erfles. The 5-element number has become quite popular with eyepieces like the Wide Scans, GSO Superviews, etc. so it was no surprise that someone else would take a crack at trying another variation. The series starts out with a rather small 9mm model in 1.25", and adds the 15mm and 20mm models before switching to a 2" format for the 25mm, 33mm, and 40mm units. Each eyepiece is basically a black cylinder with white band trim and markings with a nice built-in foldable eye cup which, except for the 9mm, positions the eye in the correct place for a good view. These eyepieces also have a knurled rubberized band on the outside of the eyepiece near the middle for better grip action (except again for the 9mm version which is just a metal barrel light enough so that it probably doesn't need a grip section). They appear to be solidly built, with no rattling or looseness. Each eyepiece is also threaded for filters.

Below are the measured specifications for each of the Swan eyepieces. F.L. is the listed focal length of the eyepiece and AFOV is the measured Apparent Field of View of the eyepiece. EFSD is the measured eyepiece field stop diameter (useful for determining the true field the eyepiece will yield on the sky: $TFOV = 57.3 * EFSD / TFL$, where TFL is the telescope's focal length). Eye relief is the approximate maximum distance from the front of the eyeball to the eye lens of the eyepiece at a point where the observer can still clearly see the entire eyepiece field stop or the edges of the eyepiece field of view.

Measured Specifications:

F.L.	AFOV	EFSD	Eye Relief	Dimensions	Mass
9mm	72 deg.	13mm	8mm	1.750" x 1.375"	60g
15mm	72 deg.	19mm	10mm	2.125" x 1.375"	80g
20mm	72 deg.	26mm	10mm	2.500" x 1.375"	90g
25mm	72 deg.	33mm	18mm	3.500" x 2.250"	310g
33mm	72 deg.	41mm	20mm	4.250" x 2.250"	380g
40mm	70 deg.	46mm	23mm	4.750" x 2.500"	550g

The measured apparent fields were basically the same as that quoted by the manufacturer, which was a pleasant surprise. However, the Eye Relief was a bit less than the William's figures, especially in the 1.25" designs. In fact, to see all of the field of view in the 9mm required me to jam my eye into the eye cup and press inward somewhat to reduce the distance between the eye and the 9mm's eye lens. The 10mm eye relief of the 15mm and 20mm models was comfortable for non-glasses use, especially using the eye cup. With the eye cup folded down, I could press my glasses against the three 2" barrel eyepieces (the 25mm, 33mm and 40mm) and just barely see the entire field, although with slight movement, I would frequently not see small portions of the field edges. Thus, the 1.25" Swan eyepieces would not provide full-field for those who need to use glasses a lot, and the 2" eyepieces would be marginal for glasses use. All the optical surfaces appear to be properly coated and the manufacturer indicates they are fully multi coated. The weight of the eyepieces is in-line with many comparable units if not just a bit lighter. For comparison, my 30mm WideScan III eyepiece has a mass of 475g and my Meade 14mm Ultrawide has a mass of 670g.



PERFORMANCE :

I tested these eyepieces in my NexStar 9.25GPS Schmidt-Cassegrain and my SkyView Pro 100mm f/6 refractor. On the whole, they provided fair to good performance (especially for the price), and there were a few surprises. However, the designs appear to be "pushed" a little too much to obtain that extra field. Like so many other eyepieces in this class, the performance well off-axis was not as good as in the more complex (and expensive) designs like the Panoptics, so the old adage, "You get what you pay for" continues to be valid here. On and near on-axis performance was good, but in the outer third of the field of view, image quality began to go downhill (sometimes fairly noticeably), especially in the shorter f/ratio instruments. The major aberrations present off-axis were the usual astigmatism and some field curvature, although quite frankly, I have seen far worse performance than that shown by the Swans, as typically, between 2/3rds and 3/4ths of the field tended to be fairly good. Some slight barrel distortion was also seen, but it was no more than is often shown in Plossls. Chromatic aberration was fairly well controlled, with only a little lateral color at field edges for some of the Swans. Each eyepiece had its own strong and weak performance points, so it might be useful to discuss each unit separately.

9mm SWAN:

This one is definitely the "runt of the litter", as it was not only the smallest eyepiece of the series but the one with the most problems. The eye relief just wasn't quite as long as it needs to be, being more typical of the short focal length planetary eyepieces rather than a wide-field one. To see its full 72 degree apparent field might require removing the rubber eye cup or at least trimming it back. The optics also showed a small amount of debris or perhaps a few minor scratches in between the lenses when the

eyepiece was held up to to the light, although this was not much of a factor when used in the telescope. The field stop also had a visible "bump" on one edge which was small but was visible when using the eyepiece. In my SCT, the eyepiece showed a little astigmatism in the outer quarter of the field, which was a bit surprising considering that the eyepiece was being used in an f/10 optical system. This was clear evidence that the design had been pushed a bit more than perhaps would be optimal in a regular field eyepiece. In the 100mm f/6 refractor, the astigmatism grew especially towards the field edges, with perhaps only 2/3rds of the total field being reasonably sharp. The overall performance did not quite match that of an inexpensive 10mm Celestron Plossl even though the 9mm Swan did provide 1.63 times more true field of view. This eyepiece was also "haunted", as Jupiter would show a few faint ghosts of itself in the field. I did try the eyepiece in my Coronado PST, and it performed fairly well, but the limited eye relief was a bit of a problem for daytime use.

OVERALL RATING: FAIR

15mm SWAN:

The second shortest eyepiece in the series was better than the 9mm. The eye relief was about 10mm which made for a comfortable viewing location when using the built-in eye cup. The eyepiece did show some slight astigmatism in the f/10 SCT, but not as much as the 9mm had. In the 100mm f/6 refractor, astigmatism increased, but again not quite to the degree seen in the 9mm. I did not see the same degree of "haunting" that the 9mm had. When compared head-to-head with my 15mm Orion Ultrasopic (58.3 degree apparent field of view), at equal distances from the center of the field, the Ultrasopic had somewhat less astigmatism than the Swan did, although again, the Swan did provide about 32% more field of view. Given the choice between the two eyepieces, I would probably give the Orion Ultrasopic the nod, as the increase in field was not enough to compensate for the lesser performance.

OVERALL RATING: FAIR TO GOOD

20mm SWAN:

This one was as much better than the 15mm as the 15mm was better than the 9mm! It gave good overall performance, with just a slight bit of astigmatism near the field edges at f/10 and more in the outer field at f/6, although it wasn't exactly horrid. The coatings were good, and the images had good contrast. Indeed, my 20mm Celestron Plossl was not quite as good as the 20mm Swan, especially considering with the big 26mm field stop, I was gaining nearly 51% in the true field. It was no match for the 24mm Panoptic in terms of sharpness, but considering its low price, the 20mm Swan did hold its own.

OVERALL RATING: GOOD

25mm SWAN:

The smallest of the 2-inch barrel Swans, the 25mm was a fairly decent performer, although not outstanding by any means. The off-axis astigmatism was still present, but in addition, a small amount of field curvature was noted as well. The astigmatism was mild at f/10 but noticeably worse at f/6, resembling the amount seen in the 15mm Swan. Its large field stop diameter (33mm) gave it a nice wide field with good eye relief, making it somewhat pleasing to use. It was definitely a bit better than the 24.7mm Speers Waler, and performed perhaps close to but not quite as well as the 30mm WideScan III.

Again, the 24mm Panoptic noticeably outperformed the 25mm Swan, which I suppose is to be expected, as the 24 Pan costs almost 2.5 times as much. Since the 25mm Swan only provided a 22% gain in true field over the 24 Pan, for those considering the 25mm Swan, I still might recommend spending somewhat more for the 24mm Panoptic instead.

OVERALL RATING: FAIR TO GOOD

33mm SWAN:

This eyepiece did catch my eye, with the increase in true field rather stunning, especially in my 100mm f/6 refractor (3.9 degrees). The eye relief was good, but still somewhat marginal for glasses use. The eyepiece had noticeably better lateral color correction than my Wide Scan III (which has the thick "purple fringe" all the way around its field edges). Indeed, all of these eyepieces were better in the low amount of lateral color seen when compared to some other "budget" wide-field eyepieces. There was some astigmatism near the field edge at f/10 and it increased at f/6, but it was fairly tolerable with a good 75% of the field being fairly sharp and the rest not terribly bad. However, I did note a small amount of field curvature in addition to the astigmatism. The 33mm Swan might make a good wide-field choice for a longer focal length telescope or for casual viewing at f/6 and above. Again, this eyepiece can't compete with the more complex wide-field designs, but at its fairly modest price, no one should expect it to. I consider the 33mm to be the best of the series with the 20mm and 40mm Swans being very close seconds.

OVERALL RATING: GOOD

40mm SWAN:

The largest in this series, the 40mm is also one of the widest "budget" eyepieces I have yet seen, with a huge 46mm field stop (the same size as is found in the 41mm Panoptic and the Tele Vue 55mm Plossl). This is probably pretty close to as large a field stop as is possible in a 2-inch barrel eyepiece, and it provided a whopping 4.39 degree field on the sky in my 100mm f/6. Indeed, it also slightly bettered my 30mm Wide Scan III in my NexStar SCT, giving about a 1.1 degree field at only 59x. However, this eyepiece has a 70 degree apparent field of view at the eye lens, which is slightly smaller than that of the other Swans, but is comparable to the apparent fields of the Panoptics and Mk70 Konigs. The eyepiece did show noticeable outer field astigmatism and some field curvature at f/6, but again, nearly 75% of the field of view was fairly usable. There was also a bit more edge color than seen in the other Swans, but it was still much less than I see with the 30mm Wide Scan III. The eye relief was a bit better than in the 33mm, but again, glasses use would be marginal. This eyepiece might be the second best of the series, and again might make a fair wide-field eyepiece for locating deep-sky objects or casual wide-field viewing.

OVERALL RATING: GOOD

SUMMARY:

The Williams Optics Swan series is an interesting and potentially useful set of wide-field eyepieces. However, they definitely fall into the "budget" class, both in terms of cost and in terms of overall performance. If the user does not mind a little outer field astigmatism, the 20mm, 33mm, and 40mm models would be fairly good choices, especially for the price.

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