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## Classic UO Orthos vs HD UO Orthos

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It's time for some true confessions.

Hello, my name is Tom, and I am a wide field junky. Yes, I am addicted to wide field eyepieces. My mantra used to be, the wider the better. For a while, Konigs and other simple designs kept me happy, but eventually I got tired of the seagulls and started dropping the cash for the expensive, "flat to the edge" eyepieces. Cost meant little. I got so I'd sell anything to support my habit. I had to have the rush. I had to have that "you are there" feeling I thought only super wide eyepieces could provide. You know what I am talking about - that feeling of floating in space, staring out the bridge of your own personal starship; this was what I sought. Like many amateur astronomers, I suppose I'm classed by those who know me as something of a frustrated astronaut.

But to my fellow wide field junkies, I'm here today to tell you there is hope. Today, I'm at 45 degrees and I've come to realize how important simple eyepieces can be. I'm happy. I've reached a balance. Thanks to friends from New York and Chicago, I was inducted into the Secret Society of the Simple Eyepieces (4 elements or less please). Any SSSE member can

tell you that while those 82 degree field of views are impressive, they come with a price; more light robbing lens elements. The SSSE tenets hold the fewer lens elements, the less scatter, and (generally) the greater throughput. They further teach that simple eyepieces tend to cost far less, and thus become particularly attractive when you are on a budget.

Even if you are still a hopeless wide field junky, with the Martian opposition coming up, you may still want to give these two sets of eyepieces a look. In this article I'll take a look at the old standard UO / Circle-T / KK orthos, and the new kid on the block, the UO HD orthos.



*12.5mm, 9mm and 7mm Classic UO Orthos*

### **Classic University Optics Abbe Orthoscopic**

One of the absolute best values in eyepieces today, these orthos have remained unchanged for years, and with good reason. They deliver exceptional performance and value. They have been available from many different vendors in the United States and abroad, they are manufactured by Kokusai Kohki in Japan, and found under the Circle-T, Pocono and UO name plate to name just a few. Kokusai Kohki does sell them direct to the public (there are some restrictions, check with them for details) and if you want to buy 25 or more of the same focal length, you can even have your own engraving done. These are available in both 1.25 and .965 inch size at the following focal lengths: 4mm, 5mm, 6mm, 7mm, 9mm, 12.5mm, 18mm, and 25mm. They weigh from 65 – 95 grams for the 1.25 eyepieces. Apparent field of view is around 45 degrees while eye relief is somewhere around 75-80% of the focal length. The eye lens is multicoated, while all other lenses have a single coating of magnesium fluoride. These eyepieces are not par-focal, but are threaded for filters. The size of the eye lens is proportional to the focal length of the eyepiece. For simplicity, I'll refer to these as Classics throughout the remainder of the article.

Excellent throughput and resolution, coupled with a very low price (\$40 - \$60) has made these eyepieces attractive for years. The only complaints that I've ever heard of have been related to lack of eye guards, the fact they aren't par-focal, and more seriously, internal reflections off bright objects (mainly Jupiter) if you catch them at the right angle.



*12mm. 9mm and 7mm HD's from left to right*

### **University Optics HD Abbe Orthoscopic**

University Optics heard these complaints and responded with the HD Abbe Orthoscopic. This line is not intended to replace the classic orthos, but to provide an alternative that uses the latest broadband coatings on all air to glass surfaces. They claim to be par-focal, and in use I found that while they were close, a slight refocusing was often needed. They also added a safety undercut on the barrel, and now send the eyepiece with a winged eye guard and bolt case. The size of the eye lens is again proportional to the focal length of the eyepiece.

They are available in 5mm, 6mm, 7mm, 9mm, 12.5mm, and 18mm and weigh approximately the same as the Classics. They are a little larger.

Advertising tells us that the HD stands for high definition, but some observers have wondered how better coatings yields increased definition over the traditional design. The price is \$80 per eyepiece.

Are the new HDs worth the extra cost? CloudyNights.com set out to find out.

Scrounging amongst ourselves, we managed to locate a representative sample of the KK

orthos and ordered three of the new HDs in similar focal lengths from [Helix Manufacturing](#). We chose to look at three focal lengths that would maintain a decent amount of eye relief, yet provide enough magnification to be useful on many scopes, while not overpowering them. We chose the 7mm, 9mm and 12.5mm class (the HD was of necessity a 12mm), and tested them in a variety of scopes over several different nights. At one point I set up a blind test, and asked another observer to give me a hand. To make things a little more interesting, I also decided to compare them to the Nagler zoom, a 7mm type 1 Nagler, a 9mm type 1 Nagler and a 13mm t6 Nagler.

In addition to the eyepieces, the equipment used for testing included; a 10" f7.5 reflector, an 8" f6 reflector, a 4" f8.6 APO refractor, and a 70mm f6.8 ED refractor. The solar testing was done using the 70mm f6.8 with a Baader solar filter. While the HD's were only used in monomode, I've used the Classics in my binoviewer for a while now, and been quite happy with their performance. All comparisons were done in monomode. During testing, seeing ranged from Pickering 1 to Pickering 8, with most nights running around Pickering 5 at my sight in Michigan's thumb.

Both the HDs and Classics were sharp to the edge and yielded high contrast. They had equally flat fields, with extremely minor amounts of pincushion. Lateral color was, for the most part, nonexistent. The coatings were more obvious to the naked eye on the HDs. Scatter was less of a factor on the HDs, and they had slightly greater transmission and throughput. Both sets of eyepieces gave a very true to life rendition of the scene and rendered colors quite well, both in daytime and at night.

With these eyepieces, balance was only an issue when switching from an extremely heavy eyepiece to one of these lightweights.

And now, lets get down to brass tacks.

## **Performance**

### **Double Stars**

Generally I felt the HDs were superior in this category because I observed slightly less scatter on brighter multiples, and felt the HDs allowed for a little cleaner separation. The gentleman I was observing with felt the Classics had an edge because the volcano tops are more ergonomic and comfortable to use, so he was willing to look longer and push the magnification higher. He did not feel the scatter was an issue on most doubles.

Winner: TIE

### **Lunar, Planetary and Solar**

On the best nights, we both agreed that the HDs won by a nose (and a small nose at that). They seemed to snap to focus a little easier, gave slightly less scatter and a slightly cleaner image. There was somewhat more detail visible inside Jupiter's clouds bands with the HDs. Internal reflections, a sometime problem in the Classics, seems much less of an issue in the HDs.

It was a virtual tie on Sol, with a slight edge going to the HDs when conditions permitted.

As a side note, the first A to B comparisons on Jupiter and Luna left me wondering if the Classics were clean. Compared to the HDs, they just seemed, well, a little dirty. An in-depth inspection revealed that they were indeed clean. Cleaning them anyway didn't help. I took this as a first hand example of the superior coatings on the HDs and their role in the reduction of scattered light.

Compared to the Nagler Zoom, the Classics were on a par for on axis sharpness, while the HDs were the smallest step up.

Winner: HD

## **Deep Sky Objects**

There was very little difference between the HDs and Classics. The HDs had (perhaps) ever so slightly greater throughput, but the volcano tops of the Classics made them more comfortable to use. Both lines worked quite well on DSOs, their simpler designs giving them noticeably greater throughput than the 7mm and 9mm t1 Naglers. Both were also slightly sharper than the 7mm and 9mm t1 Naglers in regards to on axis performance on globulars as well, with a very slight edge going to the HD's.

Both lines were, at least, on a par for on axis sharpness and transmission with the 13mm t6 Nagler.

Winner: TIE

## **Ergonomics and Ease of Use**

With the fairly short eye relief inherent in the orthoscopic design, the volcano tops of the Classics allow the observer to fit the eyepiece into the eye socket a little better, and thereby give a little more room while viewing. The HDs are reputed to be par-focal. Use showed that they were close, but there was a little refocusing necessary to achieve best focus.

Winner: Classic (barely)

## **Fit, Finish and Accessories**

Both are high quality products and there is nothing shabby about production or fit and finish on these eyepieces. The HDs have a safety undercut on the barrel. Some people like those, some people don't. I'm neutral. The HDs come with a bolt case and eye guards. You can buy eye guards (the winged type are highly recommended for binoviewing) and bolt cases for the Classics, but they don't come with them. The fit and finish seems slightly more polished on the HDs. Both are threaded for filters.

Winner: HD

## **Value**

I agonized about this one for a while, and discussed with another observer exactly how to approach this topic. Finally, I came to understand that it really depends on how much you pay for the eyepieces. If you can get the Classics for \$40 - \$45, then in my opinion, they are the superior value. The performance differences are very tiny on most objects. If you can pick up two Classics for the cost of one HD, well, that speaks for itself, especially if you own a binoviewer. If you are paying \$55-\$60 for the Classics, then it becomes a different story and in my opinion, for only a \$20 difference, the HDs become the better buy.

Winner: Tie

## **Summary and Conclusions**

Amateur astronomers (myself included) often make an art form out of splitting hairs in regards to optics. Many can and often do spend hours debating the benefits of a particular scope, eyepiece or combination of the two, frequently harping on one extremely small point. While there most certainly are differences in equipment, when you have good equipment, the differences tend to get blown out of proportion simply because they are dwelt on.

With this in mind, I'll say that the optical differences between the Classics and the HDs are very subtle. It took nights of good seeing and patience often to even tell the difference between the two. On at least two separate occasions, I could not tell which view I preferred. On one particular evening, I could not even choose between the orthos or the Naglers (t1, t6 or zoom). The differences were that subtle.

On the other hand, when the seeing was good, the differences became more evident.

Either the Classics or the HDs are easily a step up from many of the inexpensive plossls on the market today.

If you have been keeping track, you can see that out of the seven categories that the eyepieces were rated in, there were three ties (Performance: Doubles, Performance: DSOs, and Value), the HD's won two (Performance: Lunar, Planetary and Solar, and Fit, Finish and Accessories), and the Classics won one (Ergonomics).

Of all the categories, the potential buyer will have to determine what ones are the most important to them. Personally, I think that orthoscopic eyepieces are best suited for lunar and planetary work, and if that is your interest, then the new HDs are a step up from the Classics.

For many years, if you were looking for the best possible performance at the lowest possible price, it was hard to imagine anyone beating the Classic UO Ortho. Well, it looks like someone finally has.

Tom Trusock

*While still a fan of eyepieces which require compound eyes to truly appreciate, Tom has acquired a new understanding for ones with fewer elements, however straw like the FOV may be*

#### **Addendum 6/24/03:**

Helix informs me that the bolt cases are not standard with the HD's, but are an extra they provide. Just a reminder that when you buy, be sure you know exactly what you are getting.