

University Optics: 25mm MK-70, 32mm MK-80 and 40mm MK-70 Nagler Killers?

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More 2" Widefield
Eyepieces?

Yep.

The good folks at Helix (Tim Hagan) sent us several of the UO 2" eyepieces to try – the 24mm Mk 70, 30mm MK80 and the 40mm MK70. These eyepieces are called Konig's, but evidently bear little resemblance to the original Konig which was a three element ,50 deg AFOV design introduced in 1915. Questions of lineage aside, these are high quality eyepieces.



The MK 70's belong to the same family and share some characteristics; threaded top and bottom for 2" filters, very high throughput and a 70 degree AFOV for starters. Both represent solid values.

The MK80 is a slightly different beast. Sporting one less optical element, and a 10 deg larger AFOV, I also found the 32mm MK80 to be a more physically impressive and immersive eyepiece while being less intrusive than the MK70's.

The coatings on all three eyepieces are very nice – indeed, UO touts both the 40mm and 32mm eyepieces as being Fully Multi-Coated, while they say the 25mm is Multi-Coated. The internals (threads and lens edges) are extremely well blackened, and the interior of the eyepieces eat light. Although internal reflections are

UO MK-70/MK-80 Hots	UO MK-70/MK-80 Nots
<ul style="list-style-type: none">• Reasonable Price• Excellent performance in slow scopes• MK80 provides a wonderful spacewalk experience	<ul style="list-style-type: none">• Poor edge performance in fast scopes (astigmatic)• 40 and 32 are problematic with certain paracorrs

not an issue with these eyepieces, I did occasionally catch a reflection off the eye lens due to neighboring street lights.

Physically these are all rather large eyepieces being about the same size as a pop can - around 100-110mm in height, and 61mm in diameter. All three have safety undercuts and a rubber hand grip.

All three have a rather different rubber eye guard available - it's similar to the snap on dew shield you would find on a camera lens. It's a hard rubber, and I found that I generally never used it as I found it a bit cumbersome. I should probably note that the eye guard has to be removed in order to use the eyepiece end caps. It comes standard on the 32mm, but also works on the other two.

Before I get started on the review proper, let me give you a rundown on some of the telescopes these eyepieces saw use in. My personal scopes (not counting whatever happens to be floating around the house for review at the time) are currently f4.5, f5 and f8.6. I've also tried the UO's (25, 32 and 40) at f6 and f7. Tim was kind (and patient) enough to let me have these for an extended period of time, and thus they saw use in a plethora of telescopes. As a result I got a pretty good idea how they performed across the board.

The 2" - 25mm MK-70



25mm MK-70 Stats:

- 70 degree AFOV
- Multi-Coated
- 7 elements
- Field Stop: 29mm
- Eye Lens: 24.5mm
- Weight: 13.2 oz
- Price: \$195.95
- Exit Pupils f5 = 5, f7 = 3.6mm, f10 = 2.5

I grew particularly fond of the 25mm MK70. It gave a nice bright image that matched my preferred exit pupil for low power viewing with several of my telescopes from my semi-rural site. In the longer scopes it performed quite well. While it wasn't quite pinpoint sharp to the edge of the field in my f8.6, I found generally found it unobjectionable for typical (non-critical) observing.

In my faster telescopes, I tried the 25mm both with and without paracorr. It didn't help (much). In these eyepieces, the dominant aberration seems to be progressively worsening

off axis astigmatism. At f4.5, the 25mm was only sharp in the central 50% or so of the FOV – at f6, this improved significantly.

As compared to other eyepieces:

It's not as sharp to the edges as a Pan 24 in a faster scope, but throughput and on axis resolution seem similar. The 24 Pan also has a bit of pincushion, but I've only found this to be a minor issue during the day, and never at night. The Pan also has the advantage of being a 1.25" eyepiece – especially nice if you are into binoviewing or have a scope that's limited to a 1.25" focuser.

I also had the opportunity to compare this eyepiece to the Meade 24.5 SWA. The 25mm MK-70 was superior in nearly every regard. The UO showed less off axis aberrations at similar focal lengths, and had noticeably higher throughput. The only advantage the Meade had was that, similar to the 24 Panoptic, it's a 1.25" eyepiece.

The 2" – 40mm MK-70



40mm MK-70 Stats:

- 40mm focal length
- 70 degree AFOV
- Multi Coated
- 7 elements
- Field Stop: ~45mm
- Eye Lens: ~39mm
- Weight: 18.4 oz
- Price: \$225.95
- Exit pupils: f5 = 8mm, f7= 5.7, f10= 4mm

This eyepiece is the natural extension of the 25mm, and performs similarly. Again, I found the dominant aberration to be off axis astigmatism which grew progressively worse the further you moved from the central axis. While I found it offensive at f4.5, I deemed it acceptable at f6. I found the astigmatism to

swamp the coma inherent in the fast mirror, and the paracorr did little to correct the eyepiece aberrations. On the other hand the paracorr did cause some vignetting, and resulted in an increased incident of spherical aberration of the exit pupil. In short, this eyepiece did not react well with my paracorr - not at all.

On the plus side, it's very light weight, and has excellent contrast and on axis sharpness. If you are looking for a finder eyepiece for a large dob, and are worried about balance problems, this might be an eyepiece to consider. The only thing that would hold me back is its performance at fast focal ratios. On the other hand, if you have a large SCT or

longer focal length refractor and are looking for a low power wide field eyepiece – this would be an excellent choice.

As compared to other eyepieces:

Compared to the Pan 35, I found the 40mm to have brighter images (as expected, possibly/probably due in part to the focal length difference), less pincushion distortion, and a wider true field of view. As a dob user, I feel one of it's most significant advantages is its lighter weight. On the other hand, it has much poorer edge correction, suffering largely from astigmatism – at f4.5, I found only the inner 40-50% acceptable in terms of sharpness. I would like to note that as with the 25mm, the useable field increased as you increased the focal length of the telescope. At f8.6, I found performance to be very nice – while not pinpoint to the edges, I found the majority of the field to be acceptable.

The 2" - 32mm MK-80



32mm MK 80 Stats:

- 80 degree AFOV
- Multi Coated
- 6 elements
- Field Stop: 46.4mm
- Eye Lens: ~45mm
- Weight: 16.4 oz
- Price: \$295.95
- Exit Pupils: f5 = 6mm, f7 = 4.3, f10 = 3mm

The 30mm MK80 is an interesting eyepiece. Some reports say it's a remake of the classic UO Widescan, but I couldn't find anything definitive one way or the other in that regard.

In longer scopes, this is a wonderful eyepiece. If you are looking for immersion, the best an eyepiece can do is "get out of the way" and this one does that as well or better than most of the other eyepieces on the market.

However, it's down fall lies (like the others) in it's correction on fast scopes. Like the MK-70's, the dominant aberration is astigmatism that progressively worsens the further you move off axis. At f4.5, I found only the central 40% or so to be really sharp but the image degradation didn't become overly objectionable until around 70% or so. Again, there was a marked improvement at f6 and slower. While I didn't experience as much vignetting with the Paracorr as the 40mm did, I did find it's use with the Paracorr to increase my incidence of kidney bean – eye placement became very critical.

Contrast and throughput were exceptional, and in this regard it compares well to any other eyepiece on the market.

As compared to the 30mm BW Optik: To be blunt, the 32mm MK-80 is superior in everything but price. Optically, they are similar in terms of field performance, but the fit and finish, as well as the coatings ensure that the MK80 comes out ahead in contrast and suppression of internal reflections.

The 30mm was my favorite eyepiece of the set. I found it to perform passably well at f6, and extremely well at f8.6.

Conclusions and Summary

There's been a lot of discussion about these being "Nagler Killers" across various groups on the net. Indeed University Optics even touts this on their web page when they say: *"Termed the "31mm Killer" by a respected optical expert, this new 32mm Konig MK-80 once again proves you don't have to spend \$600 on a (sic) eyepiece to experience quality panoramic views of the heavens."*

Would I call these Nagler killers?

No.

In longer scopes, they certainly perform well enough to be a very attractive alternative, but where Naglers and Panoptics excel is in their performance on the fast optics so popular in monster dobs.

When designing eyepieces, it's been said you have to pick your aberrations. If you look at the Panoptics for example, Al Nagler choose to trade pincushion for edge of field sharpness. There's not much that will equal the views through a longer focal length Nagler, Pentax or Panoptic on a fast scope.

Would I agree that you don't need to spend \$600 on an eyepiece to experience quality panoramic views of the heavens?

Yes. With a couple of caveats.

If you have a fast scope and demand superior edge correction, and an ultrawide field of view, there's really not much out there that competes with the aforementioned eyepieces. If you have a moderate to slow scope, and are willing to put up with some edge of field crud, or a smaller field of view, then – the MK series will serve you quite well.

So, what's the bottom line? What would I recommend?

Any eyepiece recommendation is a very personal thing – it's highly dependent on your telescope, your site, your own vision and your personal preferences. Whether you like

these or not will depend on your individual scope, your personal visual accommodation (the ability of your eye to automatically refocus – this helps compensate for a curved field – like so many things, younger folks have a greater range of accommodation than older) and your tolerance for off axis astigmatic aberrations.

With that in mind, here are my personal recommendations:

At f6 and below, I'd give these a very qualified recommendation – it really depends on what you are looking for, what you expect, and just how fast your scope is. I'd strongly recommend you try before you buy, or that you buy from a dealer that will accept returns. Personally, I wouldn't purchase these for my f5 and faster scopes, but your mileage may vary.

It's at f8 and longer, in my opinion, that these eyepieces really shine.

In my f8.6 4" APO, the 32mm was, quite simply, a wonderful eyepiece. It delivered excellent on axis sharpness, acceptable off axis performance, nice wide true and apparent fields of view, and contrasty images with few internal reflections. In use, I found it to provide an ideal "spacewalk" experience. The eyepiece and telescope simply disappeared and I felt as if I were floating in space. If I could pick just one from the set, it would be the 32mm.

The 40mm makes a nice lowest power finder eyepiece, yet has enough contrast and transmission to make it a great one for scanning the Milky Way.

Assuming you have a longer focal length telescope, I'd probably opt for a) both the 25mm and 40mm or b) just the 32mm depending on your setup. I find the magnification too similar in the 32 and 25mm, and the true field similar on the 32 and 40mm.

University Optics has spent many years bringing high quality affordable eyepieces to the amateur astronomer. The MK-70's and MK-80's continue that tradition.

Available From: *Helix-Mfg*
Gibsonia Pa
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