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[Home](#) / **CN Report: The UWAN Eyepieces**

by Tom Trusock 04/09/06 | [Email Author](#)

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## 28, 16, 7, and 4mm UWAN Eyepieces - William Optics

Tom Trusock 4/06



*Has AI Nagler finally got some competition?*

Those of you who've been reading my reviews for a while know that I'm an eyepiece junkie! I'm always looking for that perfect eyepiece. Well, the Tele Vue eyepieces come as close to anything I've ever found, but they have one rather apparent drawback?they aren't cheap. If you've ever seen the blem line at NEAF, you'll begin to appreciate what amateurs will do in order to save a few bucks off a Nagler (or three).

Ironically, in my opinion, it was the introduction of the Tele Vue Naglers that helped to spark the dobsonian revolution?those gorgeous well correct wide fields finally enabled amateurs to own a large, fast telescope without many of the optical aberrations inherent in the system. Tele Vue's motto has been 'the eyepiece is the telescope.' In fact, for some of us?those with multiple scopes?they are the more important half. I may only use certain telescopes a few nights a year?but the eyepieces? They get used every time I go out.

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It's all about the spacewalk experience. As defined that with the Nagler t1. Amateurs had never seen anything like them before. An eyepiece so immersive it was like you were falling out a window. For the first time, it felt like you were part of the scene, not simply observing it from afar. I remember my first look through a Nagler. It definitely had an impact on my pocket book.

It's no small wonder that amateurs tend to snap them up in droves.

28mm UWAN	16mm UWAN
Weight - 2lbs 3.2 oz (w/ caps)	Weight - 9 oz
Field Stop ~43mm measured (43.5 stated)	Field Stop ~25mm measured (28.6mm stated)
Eye lens diameter ~27mm	Eye Lens Diameter ~21mm
AFOV 82 deg (stated)	AFOV 82 Deg (stated)
6 Elements in 4 groups	7 elements in 4 groups
18mm eye relief (stated)	12mm Eye Relief (stated)
Barrel Size 2.25" Price \$398	Barrel Size 1.25" Price \$238
7mm UWAN	4mm UWAN
Weight - 8.2 oz	Weight - 8 oz
Field Stop ~14mm measured (25.8mm stated)	Field Stop ~7mm (24.5mm stated)
Eye Lens Diameter ~20mm	Eye Lens Diameter ~16mm
AFOV 82 Deg (stated)	AFOV 82 Deg (stated)
7 elements in 4 groups	7 elements in 4 groups
12mm Eye Relief (stated)	12mm Eye Relief (stated)
Barrel Size 1.25" Price \$198	Barrel Size 1.25" Price \$198

Since that first Nagler, different ultra wides have come and gone as many manufacturers have tried to capitalize on the new market in immersive eyepieces.

Before I get pounced on by the Pentax lovers for proclaiming AI's progeny King of the Hill, let me define the class of eyepieces I'm looking at. In my opinion, there are two distinct classes of wide field eyepieces: those in the 65-70 deg AFOV camp, and those in the 80 deg plus arena. The 65-70's are super wides, while the 80 plus we'll put in the ultra wide camp. Thus Pentax had their XL (65 AFOV) and currently offers their XW (70 AFOV). There is no doubt these are excellent eyepieces, but by my admittedly somewhat arbitrary definition, their AFOV puts them in the super wide class, a step below the Naglers in apparent field size, so for this article, I'm not considering them as competitors to the Naglers.

So let's take a quick look at the ultrawide arena.

There have been some real exotics on the market. The Leitz 30mm (88 deg afov) is one example. You think \$600 for a Nagler 31 is high? I've seen samples of the Leitz go for over \$1500.

Then we have the Japanese Widescan III, the Speers Walers, not to mention the Meade 4 and 5k.

And of course there have been the cheaper knock offs. Everyone wants that spacewalk experience, but not everyone can pay \$300 or more for an eyepiece. In recent years, we've seen a deluge of Widescan II clones hit the market. These tend to perform acceptably well at longer focal lengths, but simply can't touch the Naglers in faster telescopes where the design has problems dealing with steep light cones. And in terms of fit and finish? Well...

No, in my opinion, the only real competition Tele Vue has had in the ultra wide field department has come from Meade, with their series 4000 UWAs. The 14 and 8.8mm in particular were quite possibly the two best eyepieces to ever come out of Irvine, CA. Meade achieved parity until the introduction of the t5s and t6s. They had a real shot at Tele Vue again when they released the 5k UWAs last year, but lack of attention to a few minor (yet crucial) details took them out of the running, at least in certain focal lengths.

Now there is additional competition starting up the hill. TMB has a new series coming out, the Paragons. They will be headed to market a little later this year, and are coming in a couple of different flavors. A super wide that's in the Pentax/Panoptic field of view class, and an ultra wide that's in the Nagler class. The 40mm Paragon in particular sounds very interesting. I've heard details concerning the spot size both on axis, and at the edge of field. If that plays out in the real world like they think it will - they are going to have a heck of an eyepiece. But they aren't the only ones on the horizon. In fact, one competitor is already here.

Optical Mechanics  
Particle Wave  
Technologies  
Pier-Tech  
ScopeGuard Cases  
Scope'n'Skies  
Scopes4rent  
ScopeStuff  
Shoestring  
Astronomy  
Software Bisque  
Starbuckets  
Starmaster  
Stellar Optical  
Stellarvue  
Sun River Nature  
Center  
Telescope Solutions  
Tele Vue  
Teeter's Telescopes  
Telescope  
Warehouse  
Think Astronomy  
TeleTrade  
TMB Optical  
Tscopes  
Ultra Darklight  
University Optics  
Walt's Observing  
Chairs  
William Optics  
Woden Optics



*Top Row Left to Right: UWAN 4, UWAN 7, UWAN 16, UWAN 28  
Bottom Row Left to Right: Burgess / TMB 4mm, Nagler 7mm t6,  
Nagler 16mm t5, Nagler 26mm t5 (w/ Dioptrx)*

William Optics has a small line of ultra wide eyepieces that has been out for a few months, and are slowly gathering steam in the amateur community. Named the UWANs (Ultra Wide ANgle), their prices are about 2/3 that of the comparable focal length Naglers. Their line currently offers 4 focal lengths, and is somewhat tailored to their refractors in that regard. The biggest and most expensive in their line up would have to be their 28mm UWAN - The Beast. This monster tops the scales at over 2lbs and just dwarfs the others in the series, the 16mm, 7mm and 4mm. WO• been around for about 10 years now, and they have lately been concentrating in making a dent in the mid-level refractor market. They have branched off into a number of accessories ?but their only other line of eyepieces are the SWANs (SuperWide ANgle). While they represent a decent value for the price, they aren• in the same league as the Panoptics or the Pentaxes. Thus I suspect most amateurs probably weren• initially expecting much more out of the UWANs. I know I wasn•.

That is, until I had a chance to look through one.

William Optics showed the 28mm prototype at NEAF last year, and while NEAF isn• exactly conducive to testing new gear (at least night time gear), I did get a chance to look through it in the daylight, and bluntly ?I was impressed. So when I was contacted and asked if I• be interested in doing a review of the line, I jumped at the chance. I was quite anxious to find out how these compared to my long time favorites, those undisputed kings of the wide field hill, the Tele Vue Naglers.

### **Test Equipment**

William Optics shipped the complete set to me in late December and since then I•e had a chance to test them in a variety of telescopes. I•I tell you up front they told me they designed them with their refractors in mind, and they hadn• actually tested them in fast dobs ?so I guess neither one of us really knew what to expect. But I• getting a bit ahead of myself here.

About the same time the UWANs showed up (or prior to that), they also shipped me a ZS105 triplet apo, a 66 SD and 66 ED triplet ?all for review / evaluation, so I was able to test the UWAN• in those in addition to my own telescopes. I also own a couple other scopes (66mm doublet, 80mm FD, 102mm TV102, 102mm FS102NSV) and had a few telescopes in for review during this time frame - a 10?DBA Certified, and the new Meade 12 inch LightBridge from Astronomics. If you're keeping track, this means they were tested at f5, f5.9, f7, f8 and f8.6 - for starters. But there was one scope in particular, one that I was most interested in getting them in, my 18? Obsession. At f4.5, this was the biggest torture test I could throw at the line. How• they fare? We•I get there?br>



*Field lens - Left to Right - 4mm UWAN, 7mm UWAN, 16mm UWAN, 28mm UWAN*

Since the Naglers are the de facto kings of the ultrawides, it seemed only right to gauge the UWANs performance by the equivalent focal length Tele Vue or as close as I could get. I tested the 28mm UWAN against the 26mm Nagler t5, the 16mm UWAN against the 16mm t5, the 7mm UWAN against the 7mm t6, but for the 4mm I was left in a quandary as there is no exact Nagler match. Even a minor difference in focal lengths can have a large effect higher magnifications make the background darker and thus increase apparent contrast (another reason that amateurs love Naglers they give you the same field of view as a lower powered eyepiece, but the advantages of a smaller exit pupil and higher magnifications). Obviously, these effects are more pronounced with shorter focal length eyepieces. I felt comfortable comparing the 28 to the 26 Nagler, as at low powers differences in focal lengths aren't typically a huge issue in performance, but I wouldn't have felt comfortable comparing the 4mm to the 3.5mm t6. Thus, I compared the on-axis performance to a number of other 4mm eyepieces I have the 4mm Supermono, the 4mm Planetary and the Nagler 3-6 zoom (at the 4mm setting).

Now that you know the test setups and my basis for comparison lets take a look at the eyepieces themselves.

### **UWANS Physical Impressions**

The 1.25" UWANS are all listed as having 7 elements in 4 groups, and the sole 2" entry sports 6 elements in 4 groups. While this is quite comparable to other wide field designs on the market, they feature some unique design options instead of a safety undercut or recess they have a taper at the base of the 1.25" or 2" barrel that serves the same purpose, but eliminates frustration. I don't know about you, but that undercut (while I admit it saved me from dropping an eyepiece every now and then) can occasionally be a real pain when used with a compression ring holder. This new barrel design corrects that.



*Note the tapered barrel*

The barrels, unlike most of the eyepieces on the market today are anodized black, not chrome. Many barrels are chromed and then painted on the inside. It's not uncommon with less expensive eyepieces to have an, umm, somewhat sloppy paint job and thus increasing the chance for internal reflections. With no chrome even at the

edge of the barrel, it minimizes a potential source for reflections. Finally, the twist up eyecup is unique. I've looked at hundreds of eyepieces and never seen one quite like it to date. On the smaller eyepieces it works quite well. On the 28mm, some users have reported problems. They haven't been able to get their faces in close enough for their comfort without the eye guard being all the way down. I've experienced no such issues.

The 28mm (The Beast) is a spectacular and physically imposing specimen. Weighing in at over 2lbs, it's one of the largest and heaviest eyepieces on the market today, and stands head and shoulders over the rest of the crowd in terms of pure physical presence. As to balance issues? Let me be blunt. If you expect to use The Beast in a dob, you WILL need to take it's weight into consideration. None of the other UWANs were heavy enough to create balance issues in any of the tested setups.

In general coatings looked very good with no noticable blemishes or irregularities. Fit and finish is first rate. These are beautiful eyepieces. There is one minor issue that has been drawn to my attention, and I feel I should note: After some use, there was a minor amount of discoloration which appeared on the top of the eyepiece near the eyecup, but for the most part, in general use was not all that noticeable. You can pick it out in the photos above when the eyepieces are under direct lighting. There was no sign of significant amount of grease, like has been seen on other recently released ultra wide angle eyepieces.

The rest of the series may seem a bit on the large size if you are used to plossls, but they are very comparable to their Nagler counterparts. They were not heavy enough to cause any balance issues.

#### **General UWAN Line notes:**

In all of the eyepieces, I found on axis performance to be good to excellent in terms of general contrast and resolution. The eyepieces did have some slight tendency for blackout, but adjusting the eyecup let me position my eye in the proper spot every time and effectively cured that issue. There was some minor light scatter noticeable in the shorter focal length UWANs ?especially when critically compared to the Naglers, but in general it was not a major concern, and I doubt many users would be able to pick it up unless they compared the two lines side by side. I didn't really pick up on any significant differences in light transmission.

There was no signs of dust or scratches on the lenses and contrast was excellent. There were no pillars of light / flares, like I've seen lately in the shorter focal length Meade 5k and the initial releases of the Burgess TMB Planetaries. (I should note here that Burgess has addressed that issue in the 4, 6 and 9's by replacing the retaining ring.)

There is a minor amount of pincushion in the UWAN line, although it's nothing that I'd judge objectionable at night. The largest amount seems to be in the 16mm. All four showed a blue "Ring of Fire" effect (lateral chromatic aberration appearing at the extreme edge of the field of view, generally only noticable on Luna or during daylight viewing). This "Ring of Fire" was most noticable in the 28, and least in the 7 and 4mm (perhaps because these generated smaller exit pupils and the view was dimmer overall). They were very similar to the comparison Naglers in this regard.

In the 16mm and 7mm, I noted a very minor internal reflection (due to glare) when viewing Luna. This was not in evidence at any other time or any other target, and I didn't judge it objectionable. It was absent from the comparable Naglers.

Barlowing the 16 and 7mm UWANs with a Tele Vue 2x barlow increased blackout to uncomfortable levels. The effect was similar to the comparable Naglers. I did note that the internal reflection in the 16mm UWAN was much more noticable when barlowed. When I barlowed the 16mm t5 Nagler, I found the "Ring of Fire" effect much more pronounced - and far more than in the comparable UWAN. To be honest, I don't often barlow, and don't really care for it. The UWAN line is almost designed in such a way as to be useless to a standard 2x barlow as the focal lengths are nearly in steps of 2 as it is. I did not bother to barlow the 4mm as a 2mm eyepiece was a little too much magnification for my test scopes.

Fit and finish is first rate on these eyepieces, on a par with Tele Vue and Pentax, and a step above the Meades. Although the eyecup twists to adjust, (and there is a minor discoloration apparent on the top surface in some of the directly lighted photos as discussed above) there's no sign of significant amounts of grease or other contaminants on the eyepiece which might possibly get smeared around during a night of observing. The eyeguard moves very smoothly, and does not appear to freeze solid during bouts of extreme cold weather - I found it did get a bit stiff when exposed over an extended period of time to temperatures significantly below freezing, but I judged it not to affect the use of the eyepiece - nor was it as bad as some others I've seen.



*Twist up eyecup - fully extended. When retracted it's flush with the top of the eyepiece*

Ergonomically, I actually rate these a step above the comparison Naglers. The twist up eyecup is a very nice feature.

#### **Evaluations in Medium Speed Scopes:**

In most of the wide field eyepieces I've tested, f6 to f7 seems to be the breaking point. While performance is generally acceptable at these ratios, it's not typically sharp to the edge. This was emphatically not the case with the UWANs. In everything I threw them in everything at and above this, they were all sharp to the edge.



*16mm UWAN, 16mm Nagler t5*

And now, story time. One evening I was comparing the 16mm t5 Nagler to the 16mm UWAN in one of the 4?apos I had on hand. I got called away from the scope for a few minutes came back and resumed my comparison. As always, I found myself extremely impressed with the edge to edge performance of the Nagler, fairly flat field, little scatter and just great overall performance. I spent several minutes staring at the target (M51), and then decided to reach for the UWAN to compare. I spent an increasingly frantic 10 minutes searching for the UWAN in my eyepiece case, around my table, and in the house. My panic peaking, I decided to take one more look in my case when I found not the 16mm UWAN that I was looking for - but the 16mmt5 Nagler. For a minute I was confused, thinking perhaps my 16t5 had budded. My eyebrows raised, I turned to the scope to discover the irrefutable truth. What I had spent the last 15 minutes looking through was not the Nagler, but the UWAN. In years of reviewing and comparing eyepieces I've never done that before. Swapping the eyepieces revealed the answer; at that focal length, performance was so close I simply couldn't tell the difference between the two.



7mm Nagler t6, 7mm UWAN

The 7mm UWAN showed a bit more scatter than its t6 counterpart. I don't know if this was due to coatings, surfaces or something else entirely, but it was fairly minor and really only noticeable on planets. In terms of blackout I found the UWAN to be slightly better than the Nagler, largely because its adjustable eyecup allowed me to position my eye a bit better. In terms of pincushion or lack thereof I found them to be extremely similar. This held pretty true for most of the line.



4mm UWAN, 4mm Burgess / TMB  
3-6 Nagler Zoom, 4mm Supermono

The 4mm was a wonderful performer. It lacked the sheer contrast of the Supermono, but the Supermono is a three element 30 deg dedicated planetary eyepiece, so that's hardly a fair comparison. Performance was on a par with the both the Burgess/TMB 4mm and the 3-6 Nagler zoom at the 4mm setting. The 4mm UWAN had slightly more scatter than the zoom, but presented a far larger and more immersive view than any of its competitors. For use on an undriven mount, it would be my first choice.

The biggest problem with ultra wide field eyepieces shows up in steeper light cones (faster telescopes) as the dominant aberration is usually progressively worsening off-axis astigmatism. With that in mind, I was very curious to see how these would do at f5 and below.

#### Faster Scopes and Other Notes

When I plugged these into the dobs (at f5 and faster), I figured I'd start to see some image breakdown towards the edges. But for the most part, I was wrong. At f5, to my eyes, the dominant aberration in the 28, 7 and 4 was coma induced by the telescope. Using a Paracorr (which improves the diffraction limited field by a factor of 36) effectively erased this issue. This remained true for these eyepieces even at f4.5. (As a side effect I should note that the Paracorr also increases the effective focal length of the telescope by some 15%.)

I have an older Paracorr to which I've added the tunable top. Back when, they only offered one model which could be used for both visual and photographic applications. Today, they offer two ? largely because the 41 Pano and 31 Nagler will vignette slightly when used with the older model. I can say from experience that this is true. My widest field eyepiece is a Tele Vue 40mm Widefield (a precursor to the Panoptic line), and this definitely shows vignetting when I use it with my Paracorr.

In the photographic/older Paracorr (converted to visual use), the 26mm Nagler shows no visible vignetting, while the 28mm showed a very minimal amount (only the last few percentage points of the field). I'd judge it

unobjectionable, and it's a complete non-issue if you are using a modern visual Paracorr.



**26 T5 Nagler w/ Dioptrex, 28mm Uwan**

The 26t5 had a couple of other advantages over the 28mm UWAN. Firstly - going by some of the reports on various forums, some users find the eyecup too wide on the UWAN, and thus difficult to get their eye into. This was not an issue for me. Secondly if you need to correct for any astigmatism (or expect to have the need down the road) you should probably look harder at the 26t5 as it can be fitted with the Tele Vue Dioptrex. I have a very minor amount (.25 diopters) of astigmatism that begins to show up when I use eyepieces of around 26mm focal length and longer. As I don't wear glasses (my eyesight is 20/13 in one eye, and 20/15 in the other, and my daytime astigmatism is basically nil) I tend prefer the view through the Dioptrex corrected 26.

The 28, 7 and 4 were extremely competitive eyepieces even in the fast (f4.5) Obsession with edge sharpness on a par with the Naglers, showing good contrast but perhaps a bit more scatter. They performed quite well on deep sky, Lunar and planetary. I did note a minor amount of field curvature, perhaps most noticeable in the 28mm, but I suspect most individuals' eyes will probably accommodate it with few problems.

Taking an in-depth look at the 16mm I found things were a little different than I had expected given the performance of the other eyepieces. At native focal lengths of f5 and above I thought performance was quite good. As I went faster, the eyepiece began to show some hints of astigmatism at the edges, but only in the very last few percentage points of the AFOV. At f4.5, I estimate astigmatism affected the last 15-20% of the field of view, really only becoming objectionable in the last 5%.

While I couldn't tell the difference between them in longer scopes, at f4.5 the 16t5 was clearly superior in edge correction.

### Summary

There is no denying that Tele Vue has a much larger selection of focal lengths and designs. The t4 offer more eye relief, and AI has nearly everyone beat on sheer volume; the t6 alone have over twice as many eyepieces to choose from, and they only cover the lower half of the UWAN range.

I took the liberty of asking William Yang if more UWANS were in the works. His reply? They had the designs done, but compared to some other things his company has on the table these are rather expensive to produce. In other words ?if these sell ?we'll probably have more offerings down the road, but there don't appear to be any immediate plans to produce additional focal lengths.

Eyepieces are a very personal choice, and how they perform is heavily dependent on your telescope, your viewing conditions and your eyes. If at all possible, I'd recommend you get out and give these a try to see how they perform for you, but overall, I'm impressed with the current WO UWAN offerings. I felt the 28, 7 and 4mm in particular show excellent performance in fast telescopes. Even the 16mm had very good performance when used in scopes at f5 and slower.

So by now, the question naturally comes. Have they knocked TeleVue off the top of the ultra wide mountain?

For sheer performance ?not quite. However, in that market, I'd personally put them in at a very solid second. And runner up is a heck of a place to be.

For value ?well, it's a bit of a different story. On one hand, there's a part of me that says if you're paying this much already, just pay the extra and get the best optically that you can. On the other hand, you can buy three of these for the cost of two Naglers, and for the most part I thought performance was very close.

For many people the bottom line comes in terms of price vs performance, and in my mind, these are the current undisputed bang for the buck in the ultra wide arena. In this they are a definite competitor to Tele Vue, and surpass many (if not all) of the other ultra wide eyepieces I've had the pleasure of using.

Price aside, very few ultra wide eyepieces come this close to the King of the Hill. In many cases ?doing side by sides ?I could hardly tell the UWANs and the Naglers apart. In others, I could still see some advantages left to the Naglers. If you're looking for an ultra wide eyepiece and if you crave that immersive spacewalk experience, then these are definitely worth your consideration.

Do yourself a favor and try and grab a look through these at a star party. For 2/3 the cost of a comparable Nagler ?these are a heck of a bang for the buck. As a matter of fact, if you happen to make it to any star parties I do, look me up and I'll loan you one. I think I'm going to hang onto these for a bit.

The times, they are a changing.

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