

William Optics ZenithStar 80

[Tom Trusock](#) – 5/05



Would you believe that I'm looking at 80mm refractors again?

Me either.

After the ED80, the 4 way shootout and the WO ED Triplet, I thought I was sated – at least a bit. Then Mike from Astronomics offered to ship me a William Optics ZenithStar 80. I didn't even hesitate. How could I?

You'd think someone who owns a 4" apo, an 18" reflector and various other scopes in between probably wouldn't be too interested in an 80mm class achro, right? Wrong! In my opinion, apo or achro, an 80mm refractor is one scope that should be in everyone's arsenal.

As a dedicated visual observer, it's mainly refractors and reflectors that interest me. For most types of observing, I find reflectors offer the most bang for the buck, but I'm unable to resist a small refractor.

Optical quality is very important in an astronomical instrument, but make no mistake - If you are talking only in terms of what you can see with a given telescope – aperture wins. And significant aperture wins significantly. Nearly any of the inexpensive 8” reflectors on the market should outperform any 80 mm scope. An 8” reflector will go deeper (let you see fainter objects) and show you more detail – if the proper strictures are observed.

So if bigger is better, why do refractors command such a following?

Let’s consider the advantages of an 80mm refractor:

- Portability – an 80mm scope is FAR more portable than most of the 8” refractors on the market. They say the best scope is the one you use most often, and while I’d never be without at least an 8” dob, I have to admit it would be very tough to part with a small refractor as well.
- Quick cool down times – doublets especially are great for those quick peeks. Many’s the night I’ve gotten home from work late and didn’t want to take the time for the newt to cool down. Refractors (especially the doublets with well designed lens cells) are usually ready for deep sky immediately, and lunar and planetary in short order.
- Reduced need for collimation – no need to tweak collimation before the beginning of every session – most refractors will never need to be collimated by the end user, and should even put up with a moderate amount of abuse without many issues.

While a small quality apo may stretch the budget, small achros are far more reasonably priced, and make a great compliment to a larger reflector. Their small size and light weight helps ensure that you take them with you when traveling. Little refractors provide sharp, wide fields of view for those immense clusters and do well for ole luna and the planets too. If you haven’t scanned the summer milky way with a wide field scope, you don’t know what you are missing out on.

Personally, I happen to think that every amateur needs (at least) two telescopes – a large light bucket, and a small refractor. Think of them as different kinds of fishing tackle. You’ll catch different things with each, but both are great ways to pass the time.

In this article, I take a look at one of the more popular 80mm achros on the market today – the William Optics ZenithStar 80.

William Optics ZenithStar 80

Price \$399

Focal Length: 480mm

Aperture: **Sample 1** - 80 (advertised), 72-74mm Effective (approximation), **Sample 2** – 78-80mm Effective

Weight: 5.3 lbs

Focal Ratio: f6 (**Sample 2**), f6.5 (**Sample 1**)

Highest Typical Effective Power: 120x-160x

Focuser: 2" Crayford w/ rotate able back

ZenithStar 80	
HOTS	NOTS
<ul style="list-style-type: none">• Lightweight• Top Notch Mechanics• Crayford Focuser• Anodized OTA• Compression Ring Fittings• 2" Focuser	<ul style="list-style-type: none">• Some Optical Vignetting on early models• Lens can't be collimated by end user• No elegant way to mount an RDF

This is a jet black glossy anodized optical tube assembly that's offset beautifully by it's golden trim and slide on lens cap. This little piece of art comes complete with it's own briefcase style carrying case, 1.25" to 2" compression ring adapter, and L mounting bracket (with 2 1/4-20 holes) for mounting on standard camera tripods. The L bracket now comes with cork on the bottom, and is removable if you want to use the scope with a set of rings instead (not supplied).

The crayford focuser is very smooth, noticeably smoother most typical rack and pinion type focusers. It is adjustable and lockable. In addition, the entire focuser back rotates – a boon for the astrophotographer, but less so for the visual observer as one can always rotate the star diagonal. The dew shield retracts, reducing the overall length of the tube for storage and travel. Compression ring fittings are found throughout.



The ZenithStar 80 is a gorgeous little telescope, that gives a very high impression of quality. The glossy anodizing (and yes, it IS anodizing) means no paint – and no paint means no paint chips. While it's a prettier finish than traditional paint or enamel, I'm not completely convinced it's tougher. It's probably close enough that makes no difference however. The one obvious down side is that it is so smooth, it shows fingerprints very easily. You'll want to keep a small polishing cloth on hand. Suffice it to say, I found the mechanics and fit and finish top notch as good as those found in telescopes many times the ZS80's meager price.

The overall light weight of the telescope and included L-bracket means it couples fairly well with just about any lightweight mount and tripod – even mounting on a medium weight photo / video tripod in a pinch – a bonus for travelers who wish to go as light as possible.



Excellent coatings

The optics consist of an achromatic cemented doublet and there is no provision for adjustment or collimation of the lens in the cell.

This means that if the scope is miscollimated, there's a good chance it will have to go back to the dealer or factory. Fortunately, it's been my experience that refractors are fairly durable, and very slight miscollimation isn't often that big of a deal.

That being said, the first ZS80 I was sent was rather severely out of collimation. (DOH!) I contacted Astronomics and exchanged it for another unit. Star tests on the second showed it to be much better – still

not quite perfect, but overall it was good enough that I judged that it to have a negligible effect on performance.

You may have noted that I approximated the effective aperture of the first samples as somewhere around 72-74mm. (Before I go any further, I'd like to note that this has been fixed in current telescopes – but we'll get to that later.) The reduced aperture was due to the rather unique baffle system WO chose to employ. Traditional baffles – or knife edged baffles – are typically simply thin strips of metal inside the OTA that do not impinge into the light path, but are strategically placed to block incidental light in order to increase contrast. Another common method of baffling is to use a special type of flocking paper (resembling blackened sand paper) instead of the knife edged baffles. Although some pundits prefer the traditional method, it's been my experience that this sandpaper approach also works well. With this scope, WO is using a different system entirely. The baffle is an internally ridged cone that attaches to the lens cell itself – serving the dual purpose of the lens cell retaining ring and baffle. It's this light baffle cone that impinged on the light cone and thus reduced the effective aperture.



The ZenithStar 80's baffle system also serves as a lens retaining ring, and was the cause of the vignetting. On the left, the "fixed" baffle (note the extension tube), on the right, the older one that created the vignetting problem – both are shown attached to the lens cell.

After discovering this in my initial testing, I e-mailed William Yang of William Optics, and am happy to say the problem's been corrected. Mr Yang now reports the clear aperture of the ZS80 in their runs is currently around 78mm, and my measurements (~80mm) confirm this. The solution was simplicity itself – an addition of an extension on the existing baffle means the baffle does not stop down as quickly and thus does not intrude into the optical path. The fix is easy to install and available from William Optics – contact them or your dealer for more information.

Optics

First off, let me start by saying this is an achromat, and thus shows false color – if it's intrusive / significant or not is partly a personal issue, and partly dependent on your target selection. As with anything, personal tolerances and experience with other telescopes will play a large hand.

The scope took magnification well and effectively topped out around 120x + on the moon and planets before the image began to breakdown (this was largely due to intrusive



The ZS 80 features a standard rotatable focuser

amounts of false color). You certainly could have pushed it higher, however, it's my opinion that you really don't gain much. The optics had the definite snap to focus that is typical of a good telescope, and star tests showed it to possess acceptable optics for a unit in this price class. After some side by side comparisons with the WO ED Triplet, it's was obvious where the benefit of an apo lay - the moon and planets. For wide field viewing, and casual lunar and planetary work, either Apo or Achromat delivers fine images - and in my opinion, that is what this little achromat is really designed for.

Other Thoughts

One minor fault of the ZenithStar is the lack of an elegant way to mount an RDF. It's such a beautiful telescope, I cringe at the thought of mounting it on the OTA with sticky tape, but there's currently no other recourse – at least that I'm aware of.

I had opportunity to work with William Optics over the course of this article, and frankly, they impressed me. Both David and William Yang are driven young men who have set out to make a mark for themselves – and I have little doubt they will.

I found them to be very good when it came to technical support and communications, for the most part both returned e-mails quite promptly, and as a customer there would have little doubt that they would do their best to ensure my satisfaction. I had a very positive experience overall.

Bottom line?

For the advanced amateur, the one drawback may be its lens design – the fact that it's a cemented achromatic doublet means that if it's out of collimation – it's out. Contact WO or your dealer for replacement. And yet, I think there are certain advantages to this approach as well. As a cemented doublet, it's impossible for the lenses to go out of collimation with respect to each other – no matter how much banging around it takes. This is one less source of potential problems, and I think that given its target market, it was an excellent choice.



For the beginner or traveler, this is a nearly perfect small achromat. The optics are more than acceptable given its modest cost. And as for the rest; lightweight and portable, the fit and finish are fantastic – equal to scopes costing several times its price. This makes an excellent introductory refractor for someone wanting to dip their toe into that pool, and comes close to being the ultimate travel telescope for the more advanced amateur looking for an option that won't break the bank.

Available from :

Astronomics (among others)
<http://www.astronomics.com>

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