

# Sky-Watcher Evostar 150ED

Review by: Daniel Mounsey

Over the course of the past 25 years, I've encountered a pretty vast number of vivid views of the solar system while comparing telescopes and I've kept a journal over that period. After you see so many images using various optical systems, you collect a visual archive or frame of reference from which to gauge other views. For this particular session the seeing started out at about a 7 and worked its way to an 8. This is where the planets remain pretty still with trifling air movement. The inversion layer was clearly visible below, over the LA basin and then the moisture kicked in. These were all tell-tale signs that the seeing would hold. Even atmospheric dispersion wasn't an issue worth bothering with even though we had corrective measures on tap to deal with it. If these Evostar's remain well figured like this, then I believe there's something special on the horizon at a very reasonable price.



Image: Evostar 150ED first light

Whenever I'm evaluating any telescope, I always look at the empirical evidence of the views. I sympathize with people who can't afford to shell out several thousand dollars on a premium brand refractor and maybe our experiences can shed some light. I told my observing buddy Derek Wong I would be bringing the Evostar over so we could take a closer look at it and share opinions with two other close observing buddies Hawk and Luigi. The glass in this sample and the others at Sky-Watcher are slightly improved over the original sample displayed at NEAF and

as such, are expected to remain so with these production units. When we went into this, we honestly didn't expect to see what we did, and we were all quite shocked to tell you the truth.

The scope settled down about an hour and a half after setup around sunset. We primarily switched between a 7mm t6 Nagler at 171x and a 5mm t6 Nagler at 240x for the tests. I suggest having a 5mm, 6mm and 7mm for planet viewing with this scope. Derek selected one of his premium Tak diagonals which worked superbly. As the optics settled in more with Jupiter, I was starting to get the sense that this was a really impressive refractor at any cost, even compared to premium scopes costing several times more. So, we decided to star test the scope. Even before I handed Derek a green filter, he could already start to tell the optical figure was indeed excellent. With the green filter inserted, the star test looked textbook with a very slight amount of under-correction which is exactly what I was hoping to see since the optics will only improve in this circumstance. There were no visible signs of unwanted zones, astigmatism, over-correction, nothing that stood out to any of us. This really stunned us all. Even in some premium optics you can find these little optical gremlins from time to time. I usually expect to at least see something worth mentioning, but that simply wasn't the case here.

I could even see the collimation looked excellent while I focused slightly in and out with Jupiter, another green flag. According to Skywatcher, there are several adjustable screws on the side of the cell. Checking collimation on a star with refractors is not always as easy as people may think, unlike an SCT. So, I usually use planets when the seeing is good and the telescope is reasonably acclimated to determine if collimation is an issue during observation. With regard to false color on Vega, when I ran the focus slightly back out, I could see a light greenish tint. In focus, you see some hints of violet on Vega and other bright stars more so at higher magnifications. The amount of color an observer sees may also be dependent on their age and sensitivity to color in the dark, but it's not that objectionable when the telescope was focused, especially while observing planets where it's mostly color free. The color correction on and around the globe of Jupiter looked superb and I'm pretty sensitive to false color. With Venus, you will see false color at night but remember that anyone who has experience viewing Venus knows that it's best viewed in broad daylight, which means false color will be far less noticeable.

All of us were very impressed. Jupiter had amazing surface detail and it was really tack sharp with surprisingly high contrast. Even our friends Hawk and Luigi were surprised, and both are owners of exquisite telescopes in their own right. The rusty looking GRS was vivid right at the edge of the globe as it was starting to make its ingress. The colors on the surface had beautiful rusts and pastel hues. There was an intricate network of surface features and the globe looked completely organic as if unhampered or hindered by anything distracting. I remember saying to the guys how impressed I was. I have a world class FS152 and I have to admit that it doesn't have much on this Evostar with planets and I've used it over a dozen years. With my Tak, the color on brighter stars at higher magnifications appear slightly more accurate in color correction through the FS152 but at several times the cost, it should. At lower magnification for objects such as star clusters though, the differences are even less noticeable. Most of you veteran observers who know me, know I've compared a countless number of refractors and

reflectors. The images of Jupiter we saw on this night were beautiful and right up there with some of the finest optical systems I've ever seen in this aperture class. Even with Saturn on the rise, at 240x we could easily see the Crepe ring. The Encke Minima was also visible in the middle of the A ring upon careful scrutiny. At one-point Derek even looked at us all and said... maybe we should set up the FC125 to see what happens. Derek's particular FC125 is my favorite 5" ever because the optical figure is truly world class and a very special specimen. We all knew though, there would not have been enough time to properly acclimate the FC125 and as a result, the comparison would not have been fair to the 5".

## **MECHANICS**

Mechanically, I'm pleased with this entire setup including the dual speed crayford focuser at this price point. It feels smooth and solid. For imaging, there's a DX model and it's the exact same telescope with a heavier duty rack & pinion focuser and Losmandy style D plate instead of a Vixen style plate on the standard model. The DX model is also heavier and as a result, should help the appearance of the balance point look more aesthetic. I did not have a finder attached on my sample, which would have added a bit of wanted back-weight. For visual work, the standard focuser is fine in my opinion. Regarding the weight of the OTA, I normally have to use three 11lb counterweights with my EM200 mount when using my FS152. With the Evostar, I only needed two counterweights. The OTA is rated at just over 20 lbs and feels considerably lighter than my FS152 and more like my loaded FS128. I think observers could do okay with mounts like the Losmandy GM8 or AVX just for visual work only. In my opinion, the hard case is a bit too large for practical transport but makes good as a storage case. I measured the dimensions at 55.5" x 11.5" x 15.5". It does allow plenty of space for accessories though. I suggest a soft case for more practical transport which is what I use for my FS152. Orion and Pacific Design soft cases are available. Another thing some observers may want is a compression ring adapter if they're concerned about the screws used in the visual-back. These compression ring adapters are available from other suppliers such as ScopeStuff at a reasonable cost.



Image: Evostar 150ED as it arrived in the case

The Evostar 150ED is one of the most controversial refractors right now because it was decided that the information about the glass would be undisclosed. Televue has never disclosed what type of glass they use either but maybe people figured because it's Televue, it doesn't matter. Okay, so let's talk about that. Seeing some trifling amounts of false color or false color in general by an observer is not necessarily an evaluation of a refractors performance and I can attest to that from 25 years of using, comparing, and evaluating countless refractors in the field side by side. The subject of false color is often misinterpreted because some observers don't understand why they're seeing it out of focus in the first place and often, incorrectly assume the optics must be inferior as a result. This is a big mistake I often see, particularly among beginners in the forums who read too deeply into these topics.

The ability to distinguish sharp contrast on the surfaces of planets in-focus and resolve fine, low contrast details is the real evaluation, but very seldom do people talk about this. Perhaps they're unable to observe for whatever their reasons are. I'm aware of the observing habits people have and I pay attention to them, even though they may not know it. If someone walks up to look through my telescope, I will sometimes ask them to take their time. If that person sits for 15 seconds, chances are they're really not really observing at all. Instead, what they're doing is just peeking. There's a huge difference between a person who peeks and a person who is observing. When you sit for good periods of time with your own telescope, scrutinizing a planet, your eyes and mind can pick up very elusive details that will often go unnoticed to a person just taking a peek, assuming the seeing allows for it. Even writing down some observational notes can help.

After spending more evenings with this Evostar 150ED by myself, I have been more impressed with its visual performance, particularly on deep sky objects such as star clusters, which look very much like they do in my Takahashi FS152. There are some amazing refractors out there, but this Evostar can put up one heck of a fight against other premium scopes and we certainly found that out quick. The smoothness of figure is remarkable, and it amazes me how high the contrast of the planets look through it after it's acclimated.

### **SO HOW DOES THE EVOSTAR 150ED REALLY COMPARE TO A PREMIUM ED REFRACTOR?**

This is what many people want to know. To put it to the test, we pulled out Hawk's world class TEC140 under reasonably good seeing using various magnifications while viewing Jupiter and Saturn. All of us took turns going back and forth. Everybody, myself included were scratching our heads. Incredibly, there really wasn't that much difference, in fact all of us had to wait for really good moments of seeing to make any solid decisions and even then, it was extremely close. Derek's daughter has young eyes and we asked her to take a look and offer her opinion. For a while she was liking the TEC140, then she went over to the Evostar and sat for a while and said.... I like this now! Then she went back to the TEC140 again and said she liked it just a bit more. In my opinion, the TEC140 had just a very slightly more refined image, but only under the steadiest moments. Even then, it wasn't by much, in fact Hawk who owns the TEC140 said multiple times that he couldn't even see much difference and certainly not three times the price difference. Saturn's globe is covered in a haze of ammonia ice crystals and as a result, has

dull surface contrast on the globe compared to Jupiter. In the TEC140, the globe appeared to yield just a tad more surface contrast, but the Crepe ring unquestionably appeared to yield a bit more contrast in the Evostar, probably because of the additional 10mm of aperture. Most of the time, the seeing caused more of a difference between the two scopes than the scopes themselves.



Image: Field comparison between the Evostar 150ED, TEC 140ED and Astro-Tech 130ED.

### **THE EVOSTAR VS OTHER REFRACTORS ON THE MARKET**

While you do your research, you will stumble on reviews of the APM 152ED and even a new triplet that is still questionable for a bit more money, but here's what you may not be aware of if this is all new to you. The APM 152ED was originally branded in the United States as the Lunt 152ED. This telescope is also part of my review site and was one of the earlier models which had a good, solid lens cell and as such, got a good review by BillP a very well-known reviewer and friend of mine. When the Lunt 152ED was launched, I was extremely excited because it was a chance to help others get into a 6" ED at a relatively affordable price! Unfortunately, because of quality control issues, a good number of samples I evaluated were out of collimation and there were other observers who also had to work through the issues with their samples as well. There were some observers who got some decent samples, but the quality control was still in question and I ran out of steam dealing with them. Not only that, but most of them had so much under-correction, they could not even produce a diffraction pattern on the outside of focus, even in green light after they acclimated for three hours in low deltas. Here is what should happen when you star test a refractor to check the spherical correction. Usually when a refractor is still acclimating, the star test will exhibit under-correction. There's more to it, but this basically causes the diffraction pattern to look fuzzier on the outside of focus. This is

completely normal for nearly all refractors and should be expected. As the optics acclimate, the star test will normally improve, and the diffraction pattern will slowly become more apparent outside of focus. Jet streams in the upper atmosphere can also wreak havoc as well as spherochromatism (use a green filter) and distort the outer rings while outside of focus. So, you have to be careful not to misjudge the optics prematurely.

The Lunt 152ED's never reached that point and remained in a severe state of under-correction permanently for several possible reasons. The result was scattered light around the planets, almost like a faint halo of light which compromised the surface contrast of the Moon and planets. Because of these issues and the fact that there really wasn't any way to properly repair them in the US, the remaining Lunt 152ED's were sent back overseas and rebranded under the APM 152ED name you now see today. What about these new triplets you hear about? Here's another thing you should know if you don't already. Triplets can be even more complex than doublets. Just because you have a triplet doesn't necessarily mean you will have better contrast. This is the big mistake I see beginners often make. I've evaluated plenty of highly color corrected triplets with low contrast, why? Because they can sometimes have unacceptable amounts of spherical aberration due to poor quality of optical figure. Also, what if they go out of collimation? You think collimating a doublet is hard? Wait till you try a triplet and ask yourself this question. Who will service them if they need servicing?

### **STILL CONFUSED BECAUSE OF ANALYSIS PARALYSIS?**

I can't believe the amount of detail beginners subject themselves to, it's incredible to see. It reminds me of that scene in the movie Stir Crazy where Gene Wilder and Richard prior try to use Karate chops to intimidate other jail-mates when they walk into the jail cell. People that are beginners get involved in these exchanges about spot diagrams, color index, color curves, MTF's, glass types etc. This is very technical and complex stuff that causes beginners to read too deeply on unexperienced eyes. There are really only a handful of people who truly understand the implications of these topics and how they may or may not manifest themselves in reality and even then you need to have experience using a telescope in the field to make any possible sense of it. It's just not as black & white as beginners think. The color correction for most ED refractors sold in today's market are quite good for enjoyable visual observation with most amateurs, relax. It's not like you're going to look in one refractor vs another and say oh my, I made a mistake! Mistake about what? Because you saw a bit of false color? What kind of evaluation is that? The real meat & potatoes of any optical system is the spherical correction, which is the "optical figure". This is what really gives you great contrast. People are so overwhelmed because there are so many ED refractors to choose from. When I read some of the comments beginners make in the forums, it's really easy to spot who's drinking the Kool-aid and who is not. Since the Evostar has more spherochromatism than highly corrected triplets like the Esprit for example, that out-of-focus color can be used to determine focus. What occurs sometimes is that the seeing conditions can play games with your eyes and mind and here's where it can trick you sometimes. If the seeing is good, it's easier to find focus because when you do, the slight bit of false color you see out of focus disappears. But, if the seeing is bad, it's

sometimes harder to find focus and as a result, while moving slightly in and out of focus, you'll see that bit of color, so don't freak out. Once you're in focus, it's really nice.

### **PERSONAL INDUSTRY EXPERIENCES**

I'd like to share some personal experiences about the telescope industry many people don't acknowledge or understand. In order to bring telescopes like this into production at a very reasonable cost, a good number of them have to be made. Finding acceptable glass in certain apertures that meet the proper quality criteria have to be acquired as well as several other technical challenges like research, product development, marketing, etc. People often get ideas in their head that these companies can just do what they want and it's not that simple. You wouldn't believe the frustrations companies and vendors go through with people regarding their gripes. People these days with internet sales are extremely demanding and vocal about issues they encounter as if they're quick and easy to fix. It's a very complicated situation.

I've been selling telescopes for many years and I've watched this industry change over night because of an overwhelming number of mass produced products being imported from overseas. The more there is to select from, the more dubious and overwhelmed people become, and the more people feel compelled to research the heck out of things and in many cases way too deeply. The beginner starts to think more and more and research these differences to a point where they often can't make a decision at all or are looking too deeply into something that's being blown completely out of proportion by others. I've seen this happen countless times because there's so much available information. On that same note, there's also a great deal of misinformation. A lot of people want to be their own opticians now and it's a huge trend that's going on. I miss the reviews of Ed Ting and Todd Gross who conducted fun comparisons and expressed their visual impressions of telescopes back in the day. They didn't go into these huge fiascos about false color and glass types we now see today.

### **SUMMARY**

In my opinion, the Evostar is an exceptional value. You also have technical service and support from Sky-Watcher USA should it ever be needed, and I think there's value in that. This refractor also proved that it was capable of standing up to some of the finest telescopes on the market at a fraction of the cost. Also, I try to help as many people as I can. If you have any thoughts or questions, I'm happy to talk with you if I have time available.

Steady skies,

Daniel Mounsey aka drD  
Woodland Hills Camera & Telescope

2018

