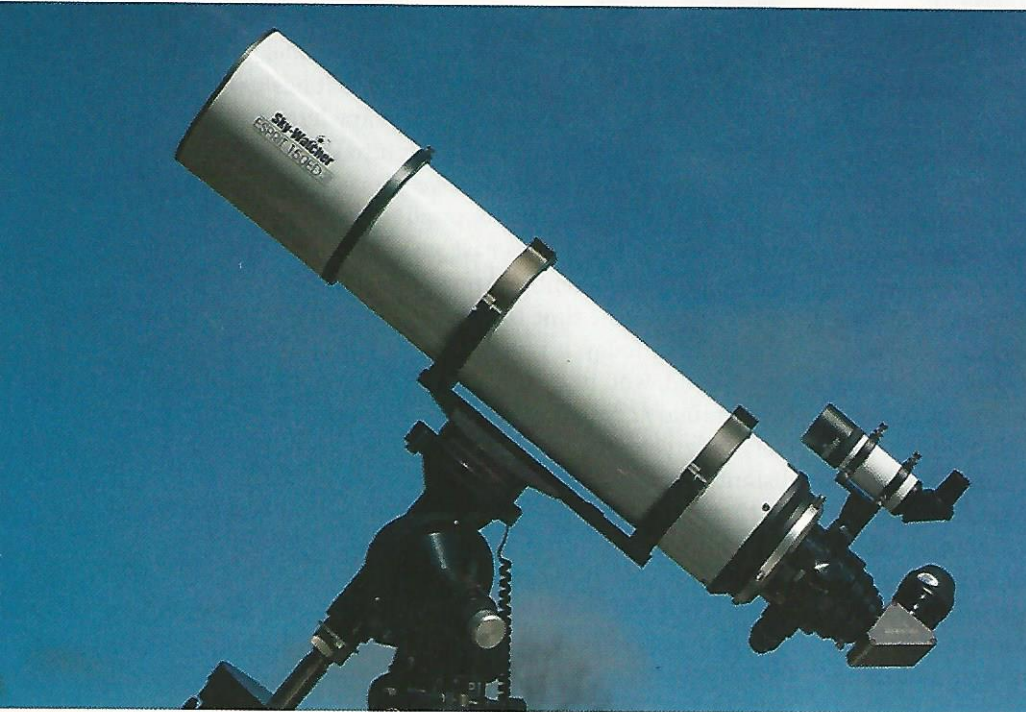


Sky-Watcher's Esprit 150mm APO Refractor

Here's a large apochromat that produces a big bang for your buck.



Sky-Watcher Esprit 150mm ED Triplet Refractor

U.S. Price: \$6,399 (includes case, rings, dovetail bars, 2-inch dielectric star diagonal, finderscope, and 2-inch field flattener)
skywatcherusa.com

What We Like

Imaging performance with included field flattener
Excellent optics

What We Don't Like

Mounting plate (dovetail bar)
Finder mount

WHEN I WAS MUCH YOUNGER than I'd care to relate, I spent lots of time eyeing those S&T back cover ads for 6-inch Unitron refractors. Surely, I thought, that large (and long) refractor would be the perfect telescope. On a cloudy night I could kick back and just gaze at the scope itself. While I've had glimpses through large APO refractors at star parties, the lure of these classical instruments always was just beyond my grasp. When I was presented the opportunity to review the Sky-Watcher Esprit 150mm ED triplet refractor, I finally had the chance to realize my expectations.

▲ The Sky-Watcher Esprit 150mm ED Triplet Refractor is the largest aperture offered in the company's Esprit line of premium apochromatic telescopes. This hefty piece of glass will require a solid, medium-to-heavy-duty mount to fully realize its imaging potential.

The Esprit 150ED on loan from Sky-Watcher USA arrived this past summer. It was shipped in a single, large box, and when removed from its rugged, fitted carrying case the scope is compelling just to look at. Though 2 mm shy of a 6-inch aperture, its smooth, glossy white finish and massive 3.4-inch focuser immediately convey that this is a quality instrument.

Fit and Finish

The Esprit 150ED comes with a top-notch carrying case, although "foot-locker" might be a better description. The hinged 41 × 16½ × 13-inch case is covered in plastic laminate with metal-reinforced edges and corners. One end has two permanently mounted 3-inch-diameter hard rubber wheels, while the opposite end includes sturdy handles allowing a single person to roll the case across smooth surfaces. Inside is custom-fitted, high-density foam to accommodate the Esprit 150ED tube with its mounting rings and dovetail bar attached. A row of seven additional cut-outs provide storage for the finderscope, field flattener, and other accessories. The case alone weighs 37 pounds. With the scope and accessories within, it tips the scales at more than 70 pounds, so those wheels are certainly useful.

Since the Esprit 150ED with its supplied 2-inch diagonal, finderscope, and a 2-inch 28-mm eyepiece weighs 32 pounds, it is a hefty load that may tax some medium-duty mounts. The tube assembly is rather front-heavy even with its massive 3.4-inch focuser. The three-element objective has two lenses made of BK7 glass and one of extra-low dispersion (ED) glass to eliminate color fringing. A metal lens cap slips onto the objective cell to protect the lens when not in use.

The scope includes a pair of heavy, cast-aluminum mounting rings, each with four ¼×20 threaded holes on their top side. The rings are spaced 12 inches apart when attached to the supplied dovetail bar. These threaded holes allow mounting additional accessories such as a guidescope or even a small computer (S&T: Sept. 2019, p. 66).

I was looking forward to using the scope with my 25-year-old Losmandy G-11 German equatorial mount but encountered a problem. The Esprit 150ED's Losmandy-style D-rail dovetail bar was too narrow for my G11's saddle. Tightening the clamps all the way down still allowed the dovetail bar to slide freely in the saddle. The D-rail was almost a millimeter narrower than the Losmandy mounting bars I had on hand. I switched the Esprit 150ED's tube rings to one of my Losmandy plates and was back in business. Note that users with Sky-Watcher and other mounts with the Losmandy D-system may not experience this issue.

The large 3.4-inch focuser of the Esprit 150ED is rotatable by loosening a large metallic "captain's wheel" collar with four $\frac{3}{4}$ -inch machined pegs spaced 90° apart to help your grip. A mounting shoe for the supplied 8×50 right-angle finder attaches to the left side of the focuser.

The Esprit's dual-speed, rack-and-pinion focuser has very smooth motion with almost no backlash. A 2-inch compression-ring accessory adapter threads onto the end of the drawtube. Locking the focus position is done by pulling out a small lever located on the front of the focuser's gearbox, which

was a little awkward in practice.

The supplied 2-inch dielectric mirror star-diagonal, as well as the 2-to-1 $\frac{1}{4}$ -inch adapter, also incorporate non-marring compression rings secured with a thumbscrew.

One nice feature of the Esprit 150ED package is that the purchase price includes a zero-power, two-element field flattener to correct for field curvature when imaging with large-sensor cameras. It attaches to the scope in place of the 3.4-to-2-inch adapter on the focuser drawtube. A camera connects to the flattener using M48 threads.

This rigid, threaded connection between the focuser, flattener, and camera virtually eliminates potential weak points that can tip the camera and distort stars across the imaging plane. However, orienting the camera around the optical axis isn't as convenient as it would be with thumbscrews and a compression-ring-secured coupling. The desired camera orientation can be achieved by rotating the focuser or the telescope within its mounting rings, but doing either rotates the finder position. In some positions the finderscope's view was blocked by the guidescope I had mounted on the tube rings. Several times when imaging with the Esprit 150ED I wished that the finder wasn't



▲ The telescope's 150-mm f/7 (1,050-mm focal length) air-spaced, three-element objective incorporates one element made with FPL-53 extra-low-dispersion glass and two BK7 elements. Its retractable dewshield is secured with two thumbscrews.

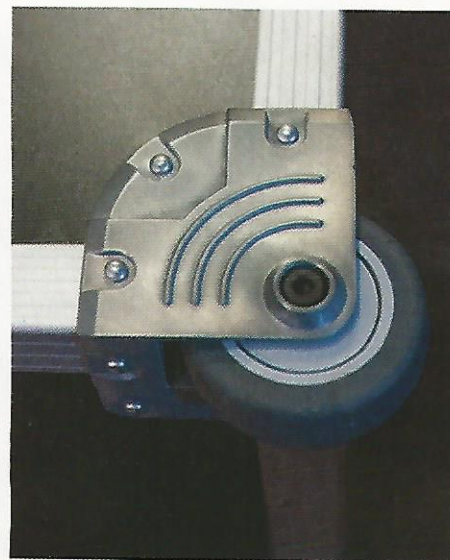
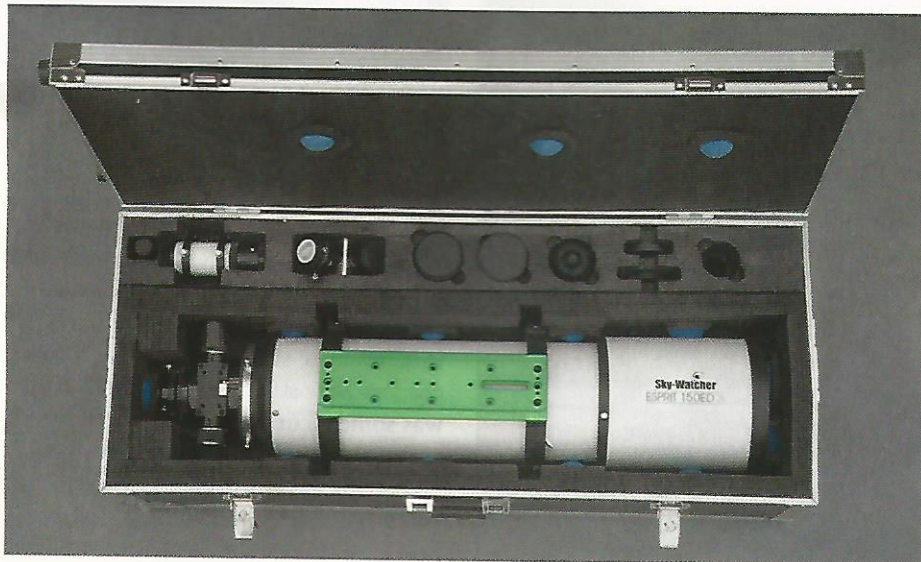
mounted directly to the focuser, or the bracket could at least be moved to the other side of the focuser.

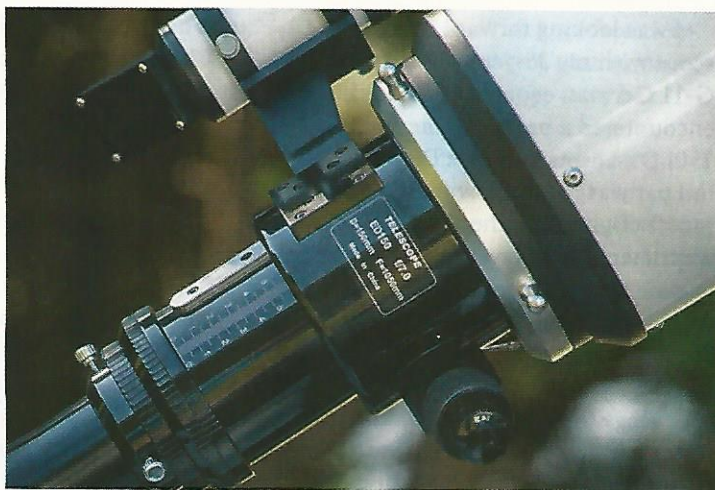
While the scope's \$6,399 price tag is very attractive for such a large triplet apochromatic refractor, the finderscope fell a little short of my expectations. It's an inexpensive 8×50 right-angle finder with a solid mounting bracket, but it has a narrow field of view and lacks any provision for illuminating its crosshairs.

Visual Impressions

The Esprit 150ED is an outstanding

▼ Left: A heavy-duty case included with the scope uses high-density foam with several recessed holes containing blue rubber balls. These nestle the telescope tube on all sides and allow room to reach around the scope to lift it from the case. Right: Weighing in at about 70 pounds with scope and accessories in tow, the case's hard rubber wheels allow one person to transport the scope over most surfaces.





▲ **Left:** The telescope's solid 3.4-inch rack-and-pinion focuser and mounted 8x50 right-angle finderscope are rotatable by loosening the large metallic "captain's wheel" ring with machined spokes. **Right:** A millimeter scale to aid in repeating focus positions is printed on the focuser drawtube. Also visible is the 10:1 fine-focus knob.

visual performer on a variety of objects. Star images were tiny and sharp to the edges of the field using a variety of eyepieces. There were no bluish or violet halos around bright stars, and the sky background was very dark, producing high-contrast views on deep-sky objects and double stars. Stellar Airy disks were clearly surrounded by an unbroken first diffraction ring and stood out vividly during periods of good seeing. With a Barlow to increase the scope's effective focal length, both Jupiter and Saturn revealed lots of fine detail and no distracting false color. Even pushing

the magnification above 50× per inch of aperture with short-focal-length Tele Vue Nagler and Delos eyepieces, planetary views were still sharp and contrasty. Views of both planets riding low in my southern sky were consistently better than those I saw in my 11- and 14-inch Schmidt-Cassegrain telescopes.

Lunar views were equally impressive. The scope was free of any troublesome off-axis scattering or reflections no matter if the Moon was placed in the center of the field or near the edge. The Esprit 150ED's tube uses six internal baffles, which no doubt contributed to the lack

of contrast-robbing scattered light.

White-light views of the Sun with a Baader Astro-Solar Safety Film filter gave great views of the photosphere's surface granulation that easily snapped into sharp focus, though no sunspots were visible during my testing period.

With all my visual tests, the focuser's movement was smooth and positive. All eyepieces I used during my tests reached focus with the included dielectric mirror star diagonal without the need for any extension tubes.

Imaging Performance

Many purchasers will see the Esprit 150ED as an imaging scope with included field flattener and relatively fast f/7 focal ratio.

Sky-Watcher included a T-ring adapter with M48mm threads for me to use with my Nikon D750 camera, and I was really looking forward to how the combination performed. The scope is advertised as having a corrected image circle 43-mm across, and my Nikon D750 full frame DSLR camera body with its 24 × 36-mm sensor has a diagonal measurement slightly greater than 43 mm. Even so, star images in the extreme corners were still tiny and round. There was some vignetting in the very corners and also a narrow strip of mirror-box vignetting along the bottom edge of the D750 frame, though flat-field calibration easily corrected these minor issues.

▼ A 2-inch dielectric mirror star-diagonal with non-marring compression rings is included with the scope, as is a 1¼-inch adapter (not shown).





▲ With the included field flattener, stars appeared about as round and sharp in the corners of the author's Nikon D750 DSLR frame as they were in the center of the field, as revealed by this image of the Lagoon Nebula with blowups of the extreme corners.

► The Esprit 150ED includes a dedicated field flattener to improve star images near the edges of the field of view on full-frame cameras. The flattener replaces the focuser's 2-inch accessory adapter, screwing onto the exposed threads.



Users with smaller detectors shouldn't experience vignetting at all.

To see how flat the field is, I focused a star near the center of my camera's field by evaluating the star's full width at half maximum (FWHM) diameter using *Backyard Nikon* software. Moving the star from the center of the frame to near the edge produced very little difference in the FWHM value, attesting to the Esprit 150ED's well-corrected field.

No focus change due to temperature variations was evident during my imaging tests. The 3.4-inch focuser had no problem keeping my camera aligned to the imaging plane no matter where in the sky the scope was pointed, and the focuser's locking mechanism, though a little awkward to access, held focus throughout every exposure.

In Conclusion

It's hard to imagine a purchaser being disappointed with any performance aspect of the Sky-Watcher Esprit 150ED. Visual observers will enjoy textbook star images across a wide field, and imagers will delight in its tight corner-to-corner star images across large imaging chips.

The weight and length of the scope will be an important consideration for mounting the scope. The scope worked well with my Losmandy G11, but one should probably consider this the minimum in mounting options for the heavy Esprit 150ED, especially if one adds on a large camera, filter wheel, and guidescope.

The scope gave me many memorable views of deep-sky objects, the Moon, and planets. Hooking a camera to the scope with the included field flattener resulted in exciting images of deep-sky objects with textbook star images across the entire field.

■ Contributing Editor **JOHNNY HORNE** still fantasizes about owning a large apochromatic refractor.

► The Esprit 150ED excels at imaging nebulous deep-sky objects and handles bright stars well. This shot of the Pleiades (M45) is a stack of thirty 5-minute exposures with a Nikon D750 DSLR camera showing bright stars free of reflections or large, distracting halos.



◀ Views of the Moon in the Esprit 150ED are sharp, with neither a hint of color fringing visible on the lunar limb, nor any scattered reflections even when placing the Moon outside of the field of view. This image centered on Sinus Iridium was recorded with a ZWO ASI290 high-speed video camera at the telescope's native f/7 focal ratio.

▼ This uncalibrated image of M31 — taken with a full-frame Nikon D750 and a 48-mm T-adaptor — displays minor vignetting in the extreme corners of the field. Flat-field calibration reduces this to imperceptible levels.

