Vixen’s go-anywhere scope

Amateur astronomers have numerous telescope options, from simple designs to exotic optical configurations. Refractors, in particular, have gone through many incarnations. Recently, a number of different glass types and coatings have challenged the two-lens combination that makes up the primary objective of a standard achromatic refractor.

Enter the Vixen ED80Sf, a serious contender in the apochromatic refractor (APO) market. Vixen has established itself as one of the major competitors in this area. The ED80Sf is a 3.1-inch (80 millimeters) f/7.5 telescope with a 600mm focal length. At f/7.5, the ED80Sf falls into the medium-focal-length range.

From unpacking to setup
The ED80Sf package includes a 9x50 finder scope, a 2" eyepiece adapter, a Crayford focuser with tension/lock adjustment, a flip mirror assembly with T-threads and dual 1¼" eyepiece adapters, 100mm tube-mounting rings, and the standard Vixen dovetail mounting plate, which pairs with the optional Porta Mount’s dovetail. A lightweight — but sturdy — aluminum tripod is optional.

The telescope, finder scope, flip mirror, and tube rings — along with an eyepiece or two — fit nicely in a custom padded, key-lockable travel case, which is included. This makes an easy-to-carry package. I already see myself taking this case as carry-on luggage for the next total solar eclipse, along with the Porta Mount and tripod — which are not too heavy or bulky and do not require counterweights — packed in checked luggage.

The telescope has high-quality machined components, tight-fitting construction, and an attractive overall finish. I had no trouble setting up the tripod, mount, and telescope, either at home or in the field prior to observing. The tripod adjusts to various heights. Its legs spread to their maximum distance when you deploy the attached leg spreader. A small but useful tray connects to the leg spreader by a small lock knob.

The alt-azimuth Porta Mount attaches to the tripod with Allen-head bolts. Vixen includes the two Allen wrenches you’ll need under a protective rubber cover where the Porta Mount attaches to the tripod. Use one of the two wrenches to attach the Porta Mount to the tripod; the second adjusts the Porta Mount’s motion tension. The location of the wrenches is convenient, and I like the protective rubber cover. With other scopes, it seems I’m always fumbling through a box looking (or feeling in the dark) for the proper size Allen wrench.

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FOR THIS REVIEW, the author used two Vixen LV Series eyepieces: the 5mm (120x) and the 22mm (27x). No eyepiece comes with the telescope.

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### VIXEN ED80SF
- **Type:** Apochromatic refractor
- **Lens diameter:** 3.1 inches (80 millimeters)
- **Focal length:** 600mm (f/7.5)
- **Tube length:** 22.4 inches (570mm)
- **Tube weight:** 7.5 pounds (3.4 kilograms)
- **Included:** 9x50 finder scope, 2" eyepiece adapter, dual T-thread flip-mirror with dual 1¼" eyepiece adapters, Crayford focuser with tension/lock adjustment, rotatable dual-setscrew eyepiece adapter with locking collar, 100mm tube rings, dovetail tube plate, and custom aluminum case
- **Street price:** $625
- **Porta Mount with aluminum tripod:** $450

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The manual altitude and azimuth slow-motion control knobs simply slide onto their respective worm shafts and stay on without tightening a thumb screw (which I have a habit of losing). I like this feature and found no issue in jarring loose the
THE VIXEN ED80Sf apo-chromatic refractor combines high-quality craftsmanship with an easy setup. ALL PHOTOS: ASTRONOMY: WILLIAM ZUBACK
slow-motion control knobs — I tried. The telescope, with the tube rings and standard Vixen dovetail assembly, attaches easily to the Porta Mount. Once you fasten the telescope to the mount and tripod, check the balance along the tube’s long axis. This was easy to do both in daylight and at night when I changed eyepieces.

The telescope is easy to use. This system doesn’t boast go-to or clock-driven capabilities. Instead, the beauty of the Porta Mount lies in its simple alt-azimuth arrangement. Once you adjust the motion tension, the mount moves smoothly with just enough friction. The tripod included as part of the package seemed too light at first. Unexpected bumps at high magnification sent vibrations through the system, but they damped down in a few seconds.

The finder scope boasts 9x magnification and a 50mm diameter, which is quite sufficient for a finder. Its efficient dovetail-mounting system worked smoothly, and finder alignment was a breeze. Vixen employs a three-screw system. One of the three screws is spring-loaded, however, so it keeps continuous pressure on the finder scope. You need to adjust only the other two screws.

I appreciate a Crayford-style focuser because of its smooth motion. Vixen includes a 1¼” flip mirror with T-threads, which allows for straight or 90° viewing. The flip mirror moves smoothly and stops exactly where it should — a nice feature for those wishing to alternate between imaging and viewing. The flip-mirror system accepts only 1¼” eyepieces, so if you require a 2” diagonal, you’ll need to purchase one separately.

**To the sky**

Once I set up the ED80Sf in the field, I was eager to see how it performs. I was not disappointed. For my review, two Vixen LV Series eyepieces accompanied this instrument: the 22mm (27x) and the 5mm (120x). I also used my own 1.7x Tele Vue Barlow lens. Theoretically, the maximum magnification for this telescope — going by the adage of 50x to 60x per inch of aperture — lies between 157x and 189x. In practice, however, I easily surpassed that limit: The 5mm plus 1.7x Barlow lens (204x) delivered high-quality images.

**OPTIONAL ACCESSORIES** include the Porta Mount and a lightweight aluminum tripod. Together, this setup weighs 12.1 pounds (5.5 kg). The dovetail groove in the Porta Mount accepts a matching plate attached to the telescope tube.

**THE PORTA MOUNT** attaches to the aluminum tripod (both optional accessories) with four Allen-head bolts. Both Allen wrenches you’ll need for assembly reside in a magnetized, built-in storage bay under a protective rubber cover.

SWITCHING FROM IMAGING to visual observing is a snap. The Vixen ED80Sf comes with a dual T-thread flip-mirror assembly with 1¼” eyepiece adapters. Vixen also includes a 2” eyepiece adapter.
I made all of my observations with the Vixen ED80Sf under excellent sky conditions. I first tested the telescope on the First Quarter Moon. I checked for any excess color or internal reflections. The system showed none at any magnification or with any eyepiece/Barlow combination. The telescope performed well and produced sharp images with excellent contrast.

After the Moon, I observed Venus, Mars, and Saturn. The Association of Lunar and Planetary Observers recommends a 4-inch-diameter telescope as the minimum aperture observers should use for planet-viewing, but that didn’t stop me from aiming the Vixen ED80Sf at these objects.

Although Venus lay relatively low on the horizon, the telescope delivered an acceptable image. When I turned the ED80Sf toward Mars and Saturn, I used the 5mm and Barlow lens combo. Planetary features were sharp with excellent contrast.

I next turned my attention to the stars, in particular Vega (Alpha [α] Lyrae), Sirius (Alpha Canis Majoris), and a number of double stars. I found the Vixen ED80Sf performed well at all magnifications and produced nice Airy disks with no false color. At high magnifications, the telescope also did a nice job splitting double stars with separations as small as 1.5". The background sky appeared black and even, which indicates minimal scattered light. Stars appeared as pinpoints with no distortion at any magnification.

Deep-sky objects were beautiful through the Vixen ED80Sf. Open clusters were stunning — I spent quite some time viewing the Pleiades (M45). Views of fainter open clusters proved equally rewarding. The high contrast (black background) coupled with tack-sharp images produced wonderful views at both 27x and 120x.

Globular clusters such as M2 and M15 also appeared stunning, as were a variety of nebulae. Because the winter sky loomed overhead, one of my primary targets was the Orion Nebula (M42). I resolved the four Trapezium stars easily once the constellation gained a little altitude.

With almost no effort, I found a street price for the Vixen ED80Sf package of $625. For this price, the ED80Sf is a good choice. And while you can buy more aperture for the same cost, this package — great optics, portability, ease of setup, a nice overall design, and outstanding views — ranks at the top of my list.

Most achromatic refractors built from the 1950s through the 1980s had long focal lengths when compared to their reflector relatives. The primary reason involved excess color around images of bright objects. Many refractors had “issues” with chromatic aberration (where light of different colors arrives at different focal points).

This problem becomes less noticeable with long focal lengths because the lens doesn’t have to bend the light rays as much. In a poor-quality refractor, one can see a blue or green Moon. Although it may seem cute to observe a “green-cheese Moon,” most observers want true colors.

The types of small refractors — and the number sold — has grown significantly in recent years. Manufacturers present buyers with choices among high-quality achromats, refractors with fluorite lenses, semi-apochromats, and apochromats. The apochromat (APO) — a refractor employing three or more lens elements — ranks as the most expensive.

Not only is the correct lens-curvature combination essential, these components also must be made with special types of glass. And don’t forget each optical surface has to be ground and polished to perfection. In a reflector, that means one surface: the mirror’s front. In a three-element apochromat, the number of surfaces rises to six (the front and back of each lens).

In the past, high-quality refractors were not easily portable because of their long tubes, which required hefty mounts. But many new APOs combine shorter focal lengths, great color correction, and superb contrast. This means a portable instrument and high-quality views. — M. R.
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