

A CANADIAN-DESIGNED APO TESTING THE STARFIELD GÉAR80 REFRACTOR



A new refractor from Canadian company StarField Optics delivers premium optics and first-class fittings

Ontario apo

The GEAR80 is built with features specified by Ontario-based StarField Optics. Coupled with its adjustable reducer, it provides a field 5.3° by 3.5° on a full-frame camera, ideal for big targets like the Andromeda Galaxy, captured here with the GEAR80 in a stack of six 8-minute exposures using a Canon Ra camera. With fittings and reducer, the GEAR80 weighs 4.3 kilograms (9.5 pounds) and is 38 centimetres (15 inches) long.

I LOVE REFRACTORS! When I saw the small Canadian company StarField Optics, owned by Steve Mallia, was introducing a new line of premium models, including an 80mm with attractive specs, I was intrigued.

The GEAR80 is a triplet apochromat (or “apo” for short) with one lens element made of extra-low-dispersion Ohara FPL53 glass, the costly glass used in the best apos on the market. That promised top-class optics.

Visual performance

I tested a unit sent on loan from StarField. The first check was to inspect bright stars at high power. The sensitive star test can reveal flaws in optics that might go unnoticed in photos. The GEAR80 passed with flying colours — or lack

thereof! Chromatic aberration — the bane of refractors — was entirely absent.

Even when racking through focus, bright stars and the limb of the Moon remained neutral in colour. Apo refractors using lower-grade glass can exhibit cyan or magenta tints inside and outside of focus, even if they don't show blue halos in focus. That lesser level of correction, while still very good, can add fleeting false colour to bright objects as the seeing conditions throw images in and out of focus. Not so with the GEAR80.

In addition, star images looked textbook perfect, with a cleanly defined central Airy disk and a dimmer first diffraction ring. There was no sign of astigmatism, which elongates star images, and only the tiniest →

StarField GEAR80 80mm f/6 Triplet Refractor

starfieldoptics.com



▲ Dewcap and focuser

The lockable dewcap extends by 65mm. The focuser racks out over 95mm. All eyepieces reached focus and a DSLR camera focused with the focuser racked out 30mm.

◀ Supplied case

The GEAR80 comes with a foam-lined aluminum case with room for the adjustable reducer or for a star diagonal and one eyepiece.

▲ Apo optics

The triplet lens is superbly multi-coated. To eliminate glare, the tube is well blackened, with two baffles in the main tube plus ribbing on the focuser drawtube.

▼ Focuser fittings

The focuser has a lock plus bolt holes to accept electric focusers. While the 24-centimetre-long rail clears the focuser, it will restrict the rotation if mounted to the back.

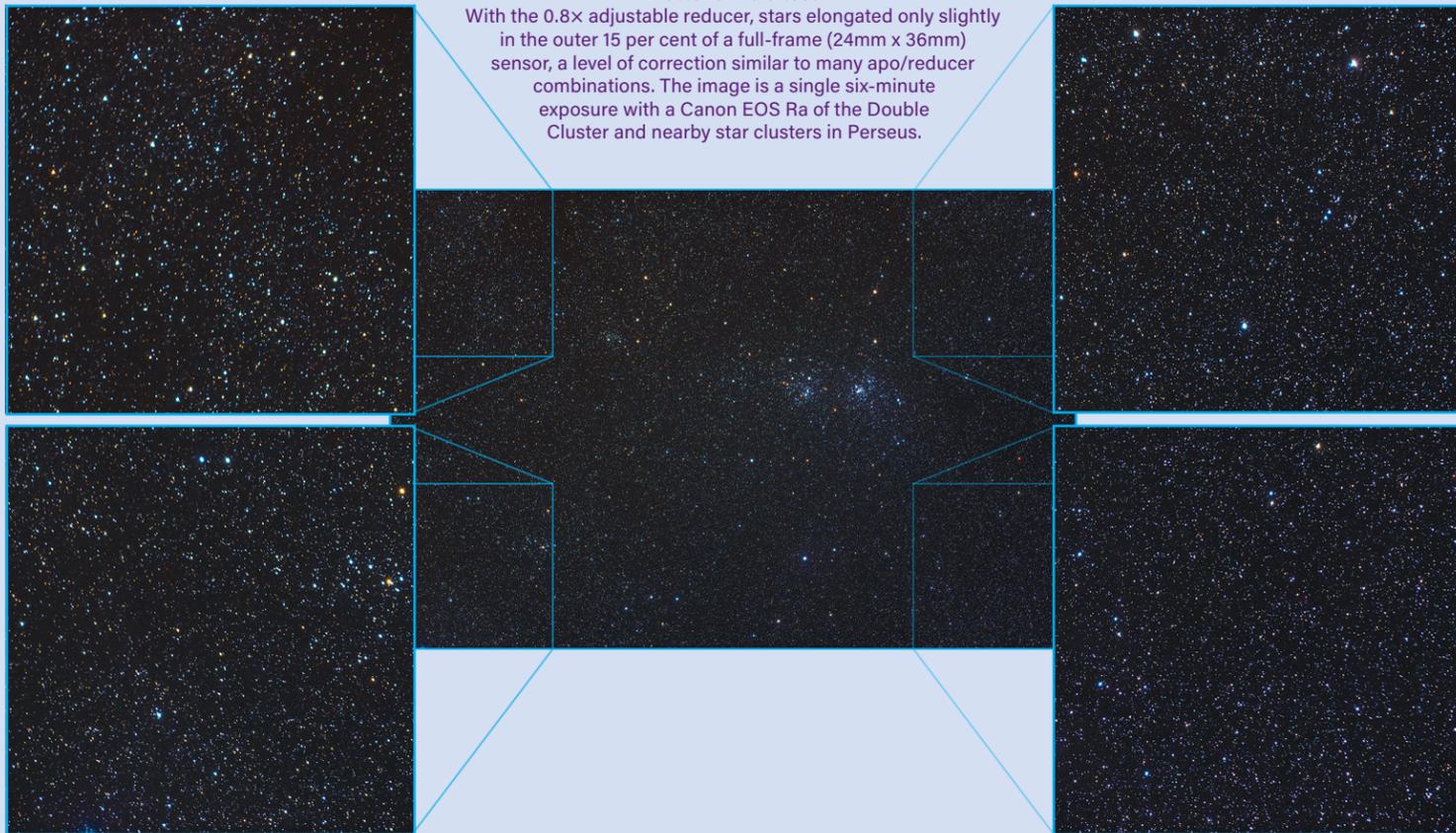


Available from select dealers in Canada
CAN \$1,700 (0.8 x adjustable reducer \$260)

PLUS: First-class optics and fittings

MINUS: Slight off-axis aberrations on full-frame images

Flattener field test
 With the 0.8x adjustable reducer, stars elongated only slightly in the outer 15 per cent of a full-frame (24mm x 36mm) sensor, a level of correction similar to many apo/reducer combinations. The image is a single six-minute exposure with a Canon EOS Ra of the Double Cluster and nearby star clusters in Perseus.



Without Flattener/Reducer at f/6

With Flattener/Reducer at f/4.8

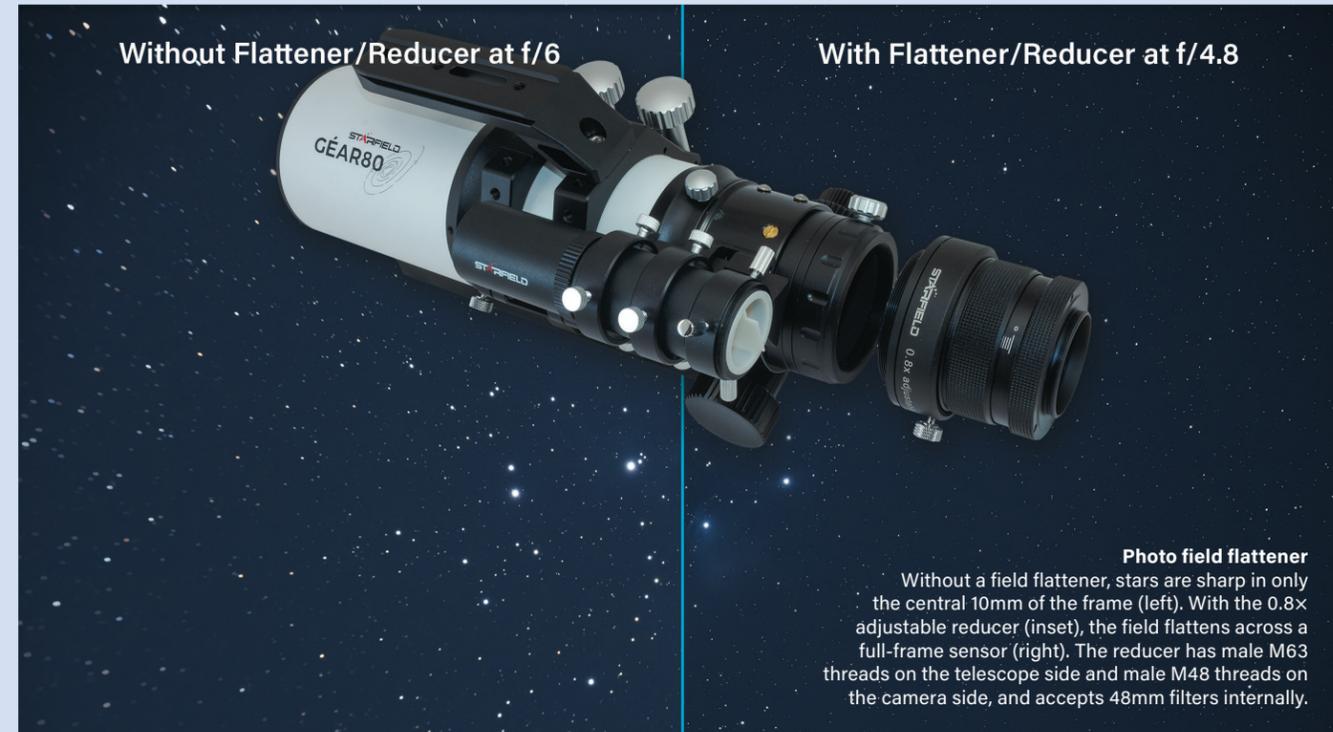


Photo field flattener

Without a field flattener, stars are sharp in only the central 10mm of the frame (left). With the 0.8x adjustable reducer (inset), the field flattens across a full-frame sensor (right). The reducer has male M63 threads on the telescope side and male M48 threads on the camera side, and accepts 48mm filters internally.

trace of spherical aberration, which can soften star images. This was true even on -20 C nights, when contracting lens cells can sometimes pinch optics, adding astigmatism.

reducer handy for fine-tuning the spacing without having to fuss with combinations of adapter rings.

Rare even among high-end brands, an optics report comes with each GEAR80, showing how your lens tested on the bench. My unit was listed as having a Strehl ratio of a superb 0.973, just shy of an impossibly perfect 1.0. In short, the GEAR80's visual performance was comparable to the best apos I have used, including models from prestige brands such as Astro-Physics and Officina Stellare.

Mechanical features

The fittings exude high quality and a well-thought-out design. The sturdy tube rings are CNC machined and have metric-threaded holes for adding other mounting rings or accessory plates. The top handle, machined with an Arca Swiss-standard dovetail, also has slots for bolting on items such as guidescopes. Shown on Page 23 is the supplied aluminum case.

Photographic performance

With few exceptions, most apo refractors require the addition of a field flattener lens when imaging to ensure sharp stars across the entire frame. StarField offers a couple of options. One flattener retains the original f/6 focal ratio and 480mm focal length. My test unit came with the other option, the two-inch 0.8x adjustable reducer. It takes the GEAR80 to a focal length of 380mm at f/4.8, nearly a stop faster, almost halving exposure times.

The bottom rail, a Vixen-standard dovetail, can be positioned as needed for balancing a variety of back-end loads. The rack-and-pinion focuser, with its 10:1 fine-focus knob, proved smooth and precise. The entire focuser can rotate. But a separate adjustment allows a camera (or a star diagonal) to be rotated by a full 360° for framing. I saw no focus or image shift when doing so, though stiffening grease made turning the rotator difficult at -20 C. Both rotation adjustments have large lock knobs that are easy to grip with gloves on — a feature you will appreciate every night. The visual back also has a unique twist-lock mechanism to clamp a star diagonal firmly in place.

The reducer I tested has the unique feature of being able to shift the flattener-to-sensor spacing over a range of 12mm. The setting needed to achieve the industry-standard 55mm spacing was stated as 4.5mm, which I found worked well on my Canon cameras. I tried other settings at 0.5mm increments on either side of the recommended spacing, to see if the off-axis performance improved, but it did not.

The GEAR80 is, of course, made offshore, but to Steve Mallia's specifications. As of this writing, it is unique to StarField Optics and to Canada. While you can buy apos of this aperture for less, in my experience none will have quite the quality of the GEAR80. I can highly recommend it for anyone looking for the best in class. *

Users attaching cooled CMOS cameras, plus a mix of off-axis guiders and filter wheels, will find the adjustable

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