A new, large aperture doublet

Neil English puts a groundbreaking six-inch refractor through its paces.

▲ APM's LZOS Model 152/1200D refractor on the author's alt-az mount. All images: Neil English.

▼ A closer look at the telescope tube baffling.

As amateur astronomers, we live in rather strange times. Over the last few years, top-ranking optics houses have either greatly reduced, or entirely ceased, production of quality ED doublet refractors. I look back fondly at the FS series of telescopes offered by Takahashi and the more economical Meade ED doublets, which were lauded as choice refractors for the fastidious visual observer. Recently, the top-drawer manufacturers have focused their attention on producing triplet apochromats but, whatever the precise reasons for this, there has never been any acute need for visual observers to move to a triplet objective. Fine achromatic refractors already exist and ED doublet refractors have excellent colour correction, in tube sizes that are considerably easier to manage. Moreover, doublet objectives have better thermal properties than their triplet counterparts, allowing astronomers to engage with the sky more quickly.

So when APM, Germany, announced that they were designing a new, large aperture doublet apochromat, you can imagine the hoopla it garnered on the Internet. I finally got the opportunity to review their LZOS (Lytkarina Optical Glass Company, from Russia) Model 152/1200D refractor in October 2012.

First impressions

The telescope arrived inside a large, single box. It was exceptionally well packaged. I received only the optical assembly, tube rings, a standard dovetail plate and a copy of the LZOS optical test report. Just a few minutes inspecting the telescope reveals that a considerable amount of engineering went into the design of this new telescope. For one thing, it's reassuringly lightweight (just over eight kilograms), with tubing made from Kruppax 50 and CNC aluminium. That's a big plus for such a large aperture refractor as it will allow stable mounting on more lightweight (read inexpensive) mounts.

The telescope is better corrected at the shorter visible wavelengths than at the red end; an acceptable compromise, as the dark adapted human eye is not especially sensitive to deep red wavelengths. Extending the retractable dew shield, the instrument measures about 1.2 metres (reducing to 1.07 metres when fully retracted). The internal baffling is exceptionally well executed, although I would have liked to have seen better flocking of the inner tube walls to bring internal glare to an absolute minimum.

The focuser is a sturdy, fully rotatable, three-inch APM designed rack and pinion, with a 1:10 microfocuser. Operationally, it's a joy to use and is more than adequate to accommodate the heaviest eyepieces and most CCD cameras.

Optical testing

Night time testing was conducted under a mixture of mild and cold nights (sometimes below zero). After leaving the instrument to acclimate for about 90 minutes in the open air, my star testing revealed that the telescope was squarely collimated and displayed excellent optics. In focus at high power (200× and over), bright white stars like Vega focused to nice, round seeing discs. Remarkably for a doublet, I detected no unfocused blue halo, confirming its excellent correction at blue wavelengths. Critically examining a slightly defocused third magnitude star at 250×, I could detect no astigmatism. The intra and extra-focal diffraction patterns revealed smooth, concentric diffraction rings and very good spherical correction. All in all, there was nothing revealed in the star tests that was incompatible with the accompanying LZOS test report for this optic (minimum Strehl 0.95 and ~1/5 wave P-V).

Following the phases of the Moon, the telescope never failed to throw up razor sharp and colour free images of the lunar regolith at all magnifications from 30× to 300×. The views of Hadley Rille, the great Apennine mountain

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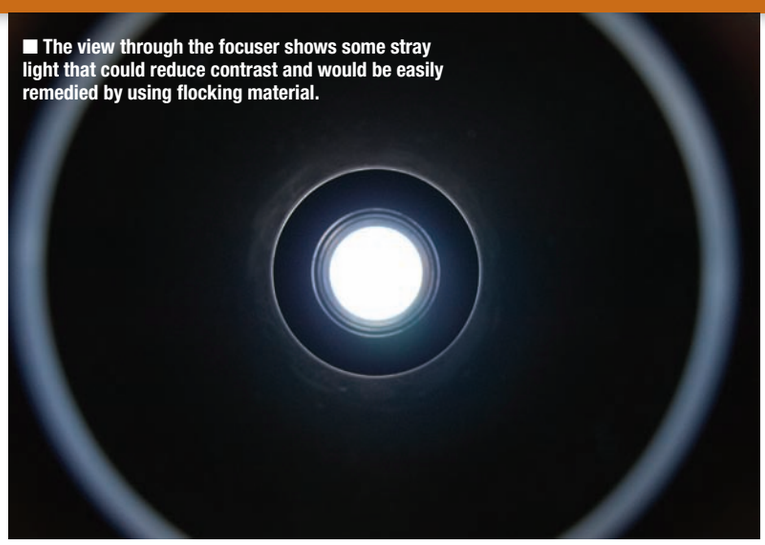
from APM



■ The view through the focuser shows some stray light that could reduce contrast and would be easily remedied by using flocking material.

range and several craterlets on the floor of the great crater Plato were first rate. The most stringent test for any telescope is to examine the high magnification images of bright, extended objects like Jupiter. To assess its prowess in this regard, you really have to ensure that the optic is adequately cooled before drawing conclusions. In this capacity, I let the telescope acclimate for a good hour before commencing my tests, with Jupiter placed very high in the sky around midnight. Delivering a power of 180× to the telescope, I enjoyed very crisp and detailed images of the giant planet. A wealth of atmospheric details, belts – both continuous and disjointed – the Great Red Spot, ovals and barges were easy pickings with this large refractor under good seeing conditions. During the best seeing conditions, when the planet was near the meridian, I used a 3.2mm eyepiece (delivering 375×) to resolve the tiny discs of the Galilean satellites and could easily note tonal differences between ochre Io and grey-white Europa.

One of the most demanding resolution tests one can subject an optic to is to assess how efficacious it is at ferreting out tricky double stars near the resolving limit of the telescope. During my nights out with the telescope, colourful double stars like Almach, gamma Delphini and alpha Herculis were beautiful and, dare I say, easy fodder for this telescope. More taxing was the devilish component to delta Cygni, the faint secondary that tends to get lost in the glare of the brighter primary. On a night of good seeing, the instrument made light work of it. Finally, the telescope was easily able to resolve 36 Andromedae, a pair of yellow sixth magnitude stars, separated by one arcsecond of dark sky.

The joys of a six-inch refractor

During dark, transparent nights with the Moon out of the sky, I enjoyed some truly spellbinding adventures with this powerful telescope. Because of its relatively slow focal ratio (f/8), even modestly inexpensive wide field oculars deliver well corrected vistas over much of the field-of-view. The telescope is light enough to be nudged effortlessly across the sky for intrepid Milky Way sweeps. Sticking to low power vistas, I paid Kemble's Cascade in Camelopardalis a visit, eagerly following the waterfall of stars in their variegated hues.

When I coupled the telescope to a 9mm, 100 degree eyepiece yielding a magnification of 133× (but with a relatively enormous true field of 0.75 degrees), it proved to be a match made in heaven. The Ring Nebula (M57) was beautifully presented against a jet black sky.

Touring the glories of Orion, I enjoyed one of the most memorable views of the Orion Nebula I've had in any telescope. It's that killer combination of decent light gathering power, high magnification and wide field-of-view that takes your breath away. The Sun-ripened corn yellow Trapezium stars at its heart were wonderfully presented at low and high magnifications and, under better conditions, the more elusive E and F components proved simple targets for this instrument.

APM believe this telescope will break new ground with the amateur community. Having had the opportunity to put the instrument through its paces over several weeks, I'm inclined to agree. It is powerful without being cumbersome. It is reassuringly light and acclimates fairly rapidly, allowing you to divine crisp, high resolution images without having to wait half the night. It works just fine under mild (for Scotland) as well as harsh (read sub-zero) conditions. Visually, I don't think it gives up too much even to the finest triplet apochromats available today. And while it is on the pricey side, you certainly get what you pay for.

Neil English's new book, Classic Telescopes, is now available from Springer.

At a glance

APM 152/1200D doublet apochromatic refractor

Aperture:	152mm (six inches)
Focal ratio:	f/7.9
Focal length:	1,200mm
Tube weight:	9kg
Tube length:	1,070mm (1,210mm when observing)
Resolution:	0.76 arcseconds
Price:	£6,099
Details:	www.apm-telescopes.co.uk

▲ The three-inch APM rack and pinion focuser.

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