

## PRODUCT REVIEW

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### Expanded views



let's review some fundamentals. Today's eyepieces come in two sizes: 1.25- and 2-inch barrels. All modern telescope focusers accept the 1.25-inch size, but only scopes with 2-inch focusers accept the larger size. Because a larger cone of light can fit through a 2-inch focuser—and a 2-inch eyepiece—a wider field of view is accessible than with the 1.25-inch.

Eyepieces can be designed to provide the maximum possible field of view visible in a 1.25- or 2-inch format. The eyepieces that come as standard equipment with new telescopes are rarely of this design, so to take advantage of the widest gulp of sky your scope can offer in either 1.25-inch or 2-inch format, you should upgrade to an eyepiece of this design as soon as possible. Of the eyepieces tested here, the 26mm Plössl, the 14mm Ultra Wide and the 20mm QX all offer very close to the maximum possible field of view in the 1.25-inch barrel size. In the 2-inch barrel, the 40mm Plössl and 30mm Ultra Wide are also very close to the maximum field of view.

Eyepiece magnification depends on the telescope focal length. A 20mm eyepiece on a 500mm-focal-length telescope provides a magnification, or power, of 25x ( $500 \div 20 = 25$ ). The magnification would be 50x on a 1,000mm-focal-length telescope ( $1,000 \div 20$ ), and so on.

Stargazing guidebooks often mention telescope eyepiece types, such as Kellner, Orthoscopic, Plössl, Erfle, RKE and many others—names that refer to eyepiece-lens designs, some of which are more than a century old. These names mean less today than they once did, because most modern eyepieces are either modifications of older designs or something new. In general, the eyepieces currently available to backyard astronomers are superior to what came before, with better antireflection coatings, wider fields of view and more comfortable eye relief.

With its adjustable, twist-up eyeguards, the Meade 5000 Series takes eye-relief comfort to a higher level. Whether or not you wear eyeglasses, chances are you will find a twist-up position with each eyepiece that perfectly guides your eye to your personal sweet spot for viewing. This agreeable “personal tuning” feature stays where you put it until you decide to readjust. We did note that when the guard is near the top of its extension, the exposed area beneath may contain a small amount of lubricant, although it wipes off without much fuss.

# Meade's new eyepieces

*The introduction of two dozen new eyepieces by a major astronomy-equipment manufacturer is more than enough to make any telescope user sit up and take notice*

FOR THE BACKYARD ASTRONOMER, a good set of eyepieces is essential to get the maximum performance from a telescope. Two generations ago, eyepieces were the bottleneck in telescope performance. High-power eyepieces with their tiny lenses and narrow fields of view were difficult to look through, because the observer's eye needed to be within a few millimetres of the surface of the outer lens. Low-power eyepieces frequently offered blatant demonstrations of optical aberrations that turned stars into multihued comets.

The modern revolution in eyepiece design began in the 1980s with the use of new types of optical glass and computer-generated optical designs. Today, eyepiece design has matured so that high-power models can have ideal eye relief of 12mm to 20mm. (Eye relief is the distance the

eye should be from the surface of the top eyepiece lens for optimum viewing.) At the other end of the design spectrum, modern low-power eyepieces offer much wider, sharper views than the oculars of yesteryear.

The new Meade eyepieces are the Series 5000 Plössl, with 60-degree fields of view in seven focal lengths; the Series 5000 Super Wide Angle, with 68-degree fields of view in six focal lengths; the Series 5000 Ultra Wide Angle, with 82-degree fields of view in seven focal lengths; and the Series 4000 QX Wide Angle, with 70-degree fields of view in four focal lengths. That's 24 eyepieces in all. Meade supplied a selection of 16 eyepieces for our review (the Series 5000 Super Wide Angle and the 24mm and 18mm Ultra Wide Angle eyepieces were unavailable).

Before we get to the specific evaluations,

## The eyes have it

All the Series 5000 eyepieces have the twist-up eyeguard, demonstrated here on the 40mm Plössl. The eyeguard is fully extended at left, fully retracted at right. This permits fine-tuning for personal preference or for observing with eyeglasses on or off. Previous Meade eyepieces did not include this neat feature.



Our overriding goal in testing the Meade 5000 Series was to identify value. That is, keeping in mind the price compared with corresponding eyepieces on the market, how do these new oculars rate on a dollar-value basis? Here is a synopsis of our test results.

### SERIES 5000

**Plössl 40mm:** Beautiful wide field and excellent sharpness across the field in f/10 Schmidt-Cassegrain scope and f/8 refractor; good edge of field in f/6 refractor; overall, a joy to use. *Value rating: 5 out of 5 stars*



The Meade 30mm Series 5000 Ultra Wide Angle may be the largest production eyepiece ever. At 2.8 pounds, balance will be an issue on some telescopes.

**Plössl 32mm:** Similar to 40mm, with edge-of-field sharpness slightly softer than its bigger brother. *Value rating: 4 1/2 out of 5 stars*

**Plössl 26mm and 20mm:** Outstanding eyepieces at this price; excellent eye relief, sharpness and contrast, with distinctly wider field of view than the competition and previous Meade Plössls; work very well with Barlows; exceptionally comfortable to use. *Value rating: 5 out of 5 stars*

**Plössl 14mm:** Very close to performance of 20mm; a nice eyepiece. *Value rating: 4 1/2 out of 5 stars*

**Plössl 9mm and 5.5mm:** Excellent sharpness for planetary and lunar detail, but the Plössl design is less than ideal in 10mm and under sizes because of intrinsically tight eye relief. *Value rating: 4 out of 5 stars*

**General comment on Plössls:** This design has always been noted for sharp, ghost-free, high-contrast images, and we observed this on the Series 5000 Plössls. On-axis (i.e., the central region of the field), they are as crisp as the most expensive eyepieces available. Conversely, the Plössl design has never been noted for sharp edge-of-field performance on telescopes with f/5 or faster (shorter) focal ratios, and that still applies here.

**Ultra Wide 30mm:** This colossal eyepiece is almost cartoonishly huge, yet it offers

serious performance, with a spectacularly wide, sharp field. It has higher magnification and is notably sharper to the edge than the 40mm Plössl, which has the same actual field of view on a given telescope. However, some observers find that the 30mm Ultra Wide's substantial bulk makes it somewhat awkward to place the eye at the sweet spot. Although certainly expensive, it is only relatively so, as the closest competition is 50 percent costlier. *Value rating: 4 out of 5 stars*

**Ultra Wide 14mm:** Meade's previous version, the Series 4000 14mm Ultra Wide Angle (UWA), is heavier than the Series 5000 version, but the old unit is optically superior in all respects. We rate this as the weakest of the new UWA eyepieces tested. *Value rating: 2 1/2 out of 5 stars*

**Ultra Wide 8.8mm:** Optically just a shade under the performance of the top-rated 6.7mm and 4.7mm (below). *Value rating: 4 1/2 out of 5 stars*

**Ultra Wide 6.7mm and 4.7mm:** These are our favourites in the UWA line, their chief attributes being huge "spacewalk" fields of view accompanied by high power. They are ideally suited for telescopes of 500mm-to-900mm focal length. Excellent eye relief for such short focal lengths. *Value rating: 5 out of 5 stars*

### SERIES 4000

**QX 36mm, 26mm, 20mm and 15mm:** This line of eyepieces is a viable option for observers seeking wide-field viewing on a budget. Predictably, edge-of-field sharpness does not match the higher-priced Series 5000 Plössl and Ultra Wide Angle, but the QX eyepieces offer good contrast, are free of ghost images and have comfortable eye relief. *Value rating: 4 out of 5 stars for the 36mm and 26mm; 4 1/2 for the 20mm and 15mm.* ■