Coronado CEMAX 12mm, 18mm, and 25mm Eyepieces and 2x Barlow
MSRP: $129 ea. or $389 for the set.

by David Knisely

*Note: these are *not* filtered eyepieces and thus should *never* be used for viewing the sun unless a safe solar filter is in place in front of the telescope*

Coronado Technology Group
1674 S. Research Loop, Ste 436
Tuscon, AZ 85710

The realm of H-alpha solar observing is gaining in popularity, but the requirements for the equipment are often somewhat stringent. Some eyepieces tend to perform somewhat poorly in daytime use, showing mostly manufacturing defects rather than design ones. Dust and dirt or minor flaws often show up at higher powers quite prominently, with the fainter H-alpha details sometimes being made harder to see due to scattered light in the optical system. Daytime eye relief also becomes a more critical factor in the usability of the eyepiece. Thus, Coronado, the maker of some fine H-alpha filtering systems, has introduced its CEMAX series of eyepieces to attempt to address

some of these issues.

Product Description:

The CEMAX series are a relatively simple 1.25 inch barrel eyepiece design similar in performance to a decent Plossl. The series consists of 25mm, 18mm, and 12mm focal length units, along with a 2x Barlow. Each eyepiece shows high quality machining, with the external surfaces being mainly gold and silver in color. There are also knurled rubber grips on the side of the barrels and a short rubber eyecup on the eye end of each eyepiece. Each eyepiece has a maximum diameter of about 1.5 inches, with the 25mm being 73mm in length, the 18mm about 70mm long, and the 12mm being about 57mm long (the 2x Barlow is about 78mm long). All three have weights typical of smaller 1.25" barrel eypieces, so balance should not be a problem when these eyepieces are used in Dobsonians.

All optical surfaces appear to be well coated, with the field and eye lenses showing a dark greenish color in light reflected from them. The interiors of the eyepieces are grooved and blackened nicely to prevent light scatter, and there is a single baffle in the Barlow about halfway down its tube. The eyepieces are threaded for standard 1.25" filters as well. The surfaces of the field and eye lenses appear to be slightly convex, and from the reflections, it appears that they may have at least four elements (other than the Barlow, which appears to be a standard 2-element model with a 22mm diameter negative lens). The eyepieces are stated by the manufacturer to have a 20mm eye relief and a 52 degree apparent field without regard to focal length. However, measurements indicated some differences here. The following data is what I consider to be the measured specifications:

Eyepiece	Apparent Field of View	Field Stop Diam.	Eye Relief (approx.)
25mm	47.2 deg.	19.5mm	13mm
18mm	52.0 deg.	18.0mm	12mm
12mm	52.2 deg.	10.5mm	9mm

Again, these numbers are fairly typical of Kellners and Plossls, but the eye relief numbers were significantly shorter than the claimed 20mm value. I could view over 3/4ths of the field of view in the 25mm using my glasses, but I could not see the entire field with any of them unless I took my glasses off.

Daytime Performance:

The CEMAX eyepieces were tested in my Coronado PST H-alpha scope. In general, the performance for H-alpha use was quite good. These units appear to be *very* clean, with no dust motes or bubbles visible when used in the PST (even with the 2x Barlow in place). Contrast was nice and high, although the 12.5mm Kellner which comes with the PST gave the 12mm CEMAX a real run for its money, providing very comparable performance (very slightly better contrast in the 12mm CEMAX however).

The PST is an f/10 instrument, so the image was sharp pretty much across the entire field of view. However, the small size of the blocking filter on the PST meant that

significant vignetting occurred when I used the 25mm CEMAX, so there is little need for a focal length longer than 18mm with that scope.

However, those who are using longer focal length H-alpha units with larger blocking filters should at least look at the CEMAX 25mm. I particularly liked using the 18mm CEMAX with the CEMAX 2x Barlow in the PST, as it gave me moderate power and larger image scale without sacrificing much image brightness or quality. I even pushed the little PST to 67x using the CEMAX 12mm and Barlow, although that was close to the operational limits of that little scope and I prerfered the view at a somewhat lower power. I had tried my 10mm Celestron Plossl, and although it gave a reasonably good image, there were just a few faint but annoying dust motes visible which were not seen in the CEMAX eyepieces. The included rubber eyecups were quite helpful in blocking out ambient light, but I could not use my glasses with these eyepieces and see more than a portion of the field of view.

Nighttime Performance:

I used my Celestron NexStar 9.25" SCT and my 100mm f/6 refractor to further test the CEMAX eyepieces and Barlow at night. Although optimized for H-alpha daytime use, the night performance of the CEMAX eyepieces was also fairly good. In general, they yielded views comparable to that of most decent Plossls, although the CEMAX units appear to yield a nice high contrast image on or near on-axis, especially for lunar and planetary viewing. They work quite well at longer f/ratios, but at f/6 and below, the outer field performance suffers significantly.

The main aberration seen with the CEMAX eyepieces is astigmatism which again is similar to that found in Plossls or the various simple 1.25" eyepiece designs which also have difficulty with shorter focal length systems (Ultrascopics, "Super-Plossls", ect.). Between 2/3rds and 3/4ths of the field of view was reasonably sharp in the refractor, but beyond that, the stars showed their usual short astigmatic form which got somewhat more noticable next to the field stop. The field stop of the 25mm in particular showed a very small bump on one edge, and the edge of the field showed a faint greenish tinge of lateral color when used on the moon. The 18mm and 12mm showed little or no significant lateral color however.

I had to push my eye a bit into the eyecup of the 12mm to see the entire field, but the other two eyepieces allowed me to have my eye just barely off the edge of each eyecup. Again, the eye relief was more than adequate for use without glasses, but was less than the 20mm figure quoted on Coronado's web site. In the 9.25" f/10 SCT, the astigmatism seen with these eyepieces was noticably less, but it was just detectable for

stars near the field stop. Field curvature was very slight, but some mild pin-cushion distortion was visible, as is the case with many eyepiece designs when used at f/6. However, for the expense, a simpler and less expensive eyepiece might be more cost effective for night use.

The CEMAX 2x Barlow performed quite well, with no signs of the introduction of significant aberrations and little scattered light. Indeed, its performance was at least somewhat comparable to that of my 2.5x Powermate, although the Barlow required some infocusing travel which the Powermate did not.

What I liked about the CEMAX Series:

1. Very clear and clean optics with good coatings.
2. Good performance for H-alpha viewing.
3. Good planetary contrast for night use.
4. Excellent build and quality appearance.

What I didn't like about the CEMAX series.

1. Performed like a less-expensive Plossl in the outer portions of the field.
2. 25mm showed some slight lateral color.
3. Cost (not a lot more performance for the money).
4. Average eye relief (not up to the quoted specification).

Summary

The Coronado CEMAX series of eyepieces and 2x Barlow is a good set of occulars for H-alpha work which also will work fairly well for night use, especially at longer f/ratios.

Click to Discuss this article in the forums