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Celestron F/6.3 Reducer/Corrector

(Model # 94175)

Suggested retail price: \$130

by David Knisely [click to email author](#)

With many of the modern Schmidt-Cassegrain telescopes (SCTs), the longer effective focal length can be a bit of a hassle, limiting the field of view and increasing the length of exposure time needed for some kinds of astrophotography. To compensate for this, many amateurs employ an optical device known as a telecompressor, or, more commonly, a "focal reducer" to bring the image scale back down. Celestron has produced its own "reducer/corrector" for its f/10 SCTs, allowing a somewhat shorter focal length and a flatter image field.

Product Description

The focal reducer (sometimes known as a "Shapley Lens") is an optical device placed ahead of the focal point to allow a more convergent light cone with a shorter effective focal length to be created. In the case of the Celestron Reducer, it consists of two multicoated glass lenses fairly closely spaced in their housing. The compression of the focal length is stated by Celestron as going to f/6.3 (from an initial f/10), a compression factor of about 0.63. This can result in a mild improvement in the usable field of view in 1.25 inch barrel eyepieces, but the physical size of the reducer can put substantial limits on how

much improvement in field actually will be possible. The photographic image field of an SCT is often strongly curved, so for imaging, this can mean less than pin-point star images at the edges of the field. The Celestron focal reducer is designed to also flatten this field to help improve the overall image quality.



The Celestron Reducer is a small unit about 2.25" in diameter and 1.3 inches long which will screw onto the back of most Celestron SCT's in place of the visual back. A visual back or camera adapter is then screwed onto the reducer's back end. The reducer itself has a nice black finish with a rubber knurled outer section for easy gripping in cold or gloved hands. The optical diameter of the rear lens is only about 41mm, which will impact the maximum fully-illuminated field of view which the reducer may provide in the telescope.



Performance

I tested the Focal Reducer/Corrector in my Celestron NexStar 9.25GPS Schmidt-Cassegrain. The focal reducer went on easily, although I had to fumble a little in getting the 1.25" visual back screwed on. I tried my longest focal length 1.25" eyepiece, a 30mm Orion Ultrascopic which yields about a 0.679 degree field of view in the scope (the scope's effective focal ratio was $f/9.37$ using that eyepiece). With the focal reducer in, that field jumped to 1.1 degrees (an effective focal ratio now at $f/5.77$), so the compression factor was more like 0.62 instead of the 0.63 figure. The image quality at the center was quite close to what it had been before and was also good out to fairly close to the field edges.

With the NexStar's Starbright XLT coatings, any increase in scattered light is noticable. The Celestron Reducer/Corrector showed a very slight increase in the very faint glow of scattered light around bright stars compared to without the focal reducer in place. This increase was just barely noticable, so it should not be a significant factor during routine use. Higher power performance with the reducer was also reasonably good. However, at powers greater than about 170x, I could see very slight hints of mild secondary color, along with the less than jet-blackness near bright objects, so those wanting the very best planetary contrast might wish to take out the reducer when the wider field is not needed.

The star image quality in my 30mm Ultrascopic did decline a bit towards the edge of the field, showing

some astigmatism. This was probably mostly due to the eyepiece not performing as well due to the shorter effective f/ratio, so this is something to watch out for when using less-expensive eyepiece designs (ie: its not the fault of the focal reducer). One thing I also noticed was a slight falloff of illumination in the outermost ten percent of the field, probably due again to the reducer's limited diameter and placement about 1.5 inches ahead of the field stop of the eyepiece. It is very probable that for visual use, eyepieces longer than 30mm would experience more severe vignetting, as would many 2 inch barrel diameter eyepieces.

In any case, as a purely-visual accessory, the focal reducer did boost the field of view without seriously compromising the NexStar's fine performance. I compared the performance of my 30mm Ultrascopic with the focal reducer to that of my 2-inch 30mm WideScan III in a 2 inch visual back, and the larger barrel eyepiece provided a more uniform illumination as well as a large apparent field, although the images near the edges of the field were fairly good in both cases. I was unable to assess the focal reducer's photographic performance, but if larger fields of view are required for the small CCD chips now on the market, the focal reducer/corrector should prove useful there as well.

Summary

The Celestron Focal Reducer/Corrector can provide somewhat larger true fields of view for may 1.25 inch barrel eyepieces of 30mm focal length or less. However, a standard 2 inch visual back and a longer focal length 2 inch wide-field eyepiece might serve as well or possibly slightly better than the focal reducer, as there would be less vignetting and the potential for the use of wider apparent field eyepieces.

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