

# Astronomik CLS-CCD Light Pollution Filter

## Got Light Pollution?

By Dave Snay

Got light pollution? You might benefit from a high quality filter. Most of us have some level of light pollution at our most frequently used locations. General light pollution is typically the result of street lights and parking lot lights. These lights are usually quite wasteful, sending much of their output outward and upward rather than directing it down, where it is actually needed.

I probably don't need to tell you this, but light pollution is even more intrusive to imaging than it is to visual work, in my opinion. When observing under light polluted skies, you can use a variety of filters to reduce the impact of extraneous light. More importantly, since our eyes are not very sensitive to color in the low-light conditions of astronomical observing, we don't see the gradients introduced by artificial light. However, plug a camera into the back of your telescope and those gradients become more notice-



able than the object being photographed!

There are a number of ways to deal with unwanted light during astrophotography sessions. Some are more socially acceptable than others. The 22-caliber light filter is generally frowned upon by local constabulary. So most of us have to rely on filtration or travel to a dark sky site.

I'm not patient enough to wait for my yearly excursion to a dark sky site, so I have chosen the filtration option.

Since I'm dedicated to imaging from my home location, I've chosen to use a light pollution filter that is designed for imaging demands. To that end, I have an Astronomik CLS-CCD filter installed in



Image 1 - M13 without CLS-CCD filter



Image 2 - M13 with CLS-CCD filter

the end of my T-adaptor that attaches to my filter wheel. That way I can simply run through my imaging session without any concern for the CLS-CCD filter.

According to the Astronomik web site, the CCD version has a narrower band-pass and has an IR-blocking layer included. This layer enables use with modified DSLRs and webcams that have had their IR blocking filter removed (those are far too restrictive for astrophotography). It can also be used for visual observation, but its narrower band pass will likely reduce some of the details in the image, but it will greatly increase the contrast of the view. The extra layer has no effect on LRGB filters that are typically used with monochrome CCD cameras and is most likely essential when working with one-shot color cameras as well. Okay, enough talk. Let's see some results.

**Image 1** shows the M13 taken with no CLS-CCD filter in line. You can see the usual softness around the brighter

stars that results from the suboptimal optics in my telescope. It's not a bad rendition of a relatively easy subject for image. However, it took all my editing skills (admittedly a limited set) to bring out the detail shown here.

The day after I took that image was also clear and steady, so I installed the CLS-CCD filter and I took a set of images of the same subject using the exact same exposures and settings. Processing was similar, but quite the same. That's because I had much better data to work with.

**Image 2** shows the results. I was surprised at the difference. I expected that the filter would work well on faint objects like galaxies and nebulae, but this image shows a significant improvement in my star quality. Some of this is probably attributable to sky condition changes from one day to the next, but certainly not all the improvement can be from one night to the next. Remember, this is with the same equipment and exposure settings as

the previous session.

Light pollution filters are designed to be most effective with nebulae. So let's take a look at the results when using the filter as intended. The first nebula I had a chance to target was an old favorite, M42. The image shown in **Image 3** was made with an Orion StarShoot Deep Space Imager and Astronomik LRGB filters, again through my refractor. The Astronomik CLS-CCD filter is in line between the filter wheel and the focuser, so all light reaching the camera has passed through the CLS-CCD filter.

As you can see, there is very nice contrast in this image. What you don't see is any noticeable gradient. That's because the CLS-CCD filter has nearly eliminated them, making processing them out much easier!

The last images I have to share with you are a comparison of NGC 2237 (the Rosette). These two images (**Image 4 and 5**) were made on consecutive nights using the same exposure count and durations.



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Image 3 - M42 with CLS-CCD filter

They were pre-processed identically and post-processed using roughly the same adjustments in *Photoshop*. There are a couple of things that should jump out at you when you compare these two versions. First is the contrast difference in the two images. The one made without the CLS-CCD filters is pretty nice, but the one with the filter has significantly more contrast.

The second thing you should notice is that the version made with the CLS-CCD filter seems a little “thinner.” That’s because the filter is blocking some signal. That’s part of the design of all light pollution filters. I used the color sampler tool in *Photoshop* to measure the amount of data in the two images and found approximately 20% difference in signal. I expected it to be more significant than that, so I was pleasantly surprised.

You have to increase your exposure time – through either longer exposures or more of them – to compensate for the difference and you’ll have all the data you want with significantly less of the data you don’t want.

Image 5 was made with the same amount of data as Image 4. Notice the difference in contrast and detail visible in the image made with the CSL-CCD filter in place. I didn’t take the time to ensure that image was oriented the same way in both pictures. That would have made the comparison easier, but if you spend a few minutes with the online version of this document, the difference will be readily apparent.

I haven’t had a chance to use it on galaxies yet, so I don’t know what to expect. I wouldn’t be surprised if it had an impact on the details shown in larger and brighter galaxies. However, smaller ones might not benefit as much.

For me, the biggest surprise and per-

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haps most useful benefit is the way this filter reduces the time required to deal with light gradients in my images. Until now, I have had to spend a great deal of effort reducing gradients produced by light pollution. This filter has significantly reduced the amount of unwanted light in the background of my data, freeing me up to work on the more enjoyable task of bringing out the details of the current target. If it did nothing more than that, I'd be happy with the results.

I've had this filter for several months and have been trying it on many objects to learn where it works best. What I've learned is that its impact on star clusters is variable. Sometimes I was able to see the startling difference shown in the images of M13 shown earlier. Other times I saw almost no difference in star quality. I have only had a few chances with nebulae because of the time of year, but my results show that this filter excels at bringing out detail and increased contrast in those faint fuzzies we've all come to love.

The Astronomik CLS-CCD light pollution filter is available online at a variety of sources and directly from Astronomik. It currently lists for \$199 for the two-inch version. If you've got light pollution (most of us do) and can support extended exposure times, this would be a good low cost purchase for your imaging tool box.

So there you have it. A method for dealing with light pollution that is more socially acceptable than using the neighborhood street lights for target practice – never mind the neighbor's light bombs – at a reasonable price. 📷



**Image 4 – NGC 2237 without CLS-CCD filter**



**Image 5 – NGC 2237 with CLS-CCD filter**