

## High ISO Test Exposures

When photographing in very dark environments, the camera's light meter is usually unable to suggest a starting exposure. It can be a tedious exercise of trial and error to determine the best exposure to use. Waiting 15 or 20 minutes for an exposure to finish, and then an additional 15 or 20 minutes for Long Exposure Noise Reduction can be very frustrating if the end result is an image that is considerably under or over exposed. Waiting that long for an image only to find out that the shot was not properly focused, or that the camera was not level isn't any better. To take some of the guesswork out of calculating long exposures, and to save time in doing so, I've devised a simple system for testing exposures at high ISOs.

The aim of High ISO test exposures is two-fold. The first is to quickly determine the correct exposure in moonlight or other very dark situations. High ISO testing is not very useful in situations where the exposure will be less than about 2 minutes.

The second purpose is to confirm focus, composition, camera alignment, and to make sure there are no unintended distractions in the frame. Using this procedure will save you a lot of time, and eliminate a lot of frustration in the field.

Testing is performed by raising the ISO 6 stops above your camera's native ISO. This is because there are six stops of exposure between one second and one minute, and using this formula allows for a direct translation from testing exposure in seconds to final exposure in minutes. This greatly simplifies exposure calculation, and as a result:

***The number of seconds In a High ISO test exposure equals the number of minutes at the shooting ISO at the same aperture\*.***

\*Some cameras may not have a six stop range in ISOs, and in this case, an aperture adjustment is required to compensate, as is illustrated in the charts below.

To access the highest ISO on some cameras, you may need to activate them in the custom functions menu. Also, the highest ISO may be indicated by something like "H1.0". If this is the case, you may need to refer to your camera's manual to figure out which numerical ISO the "H" settings correspond to.

Use the charts below to determine your High ISO test, and final shooting settings. If it seems confusing, once you determine the correct settings for your camera, they never change. You'll use the same settings for as long as you own the camera.

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### Cameras with native ISO of 100

High ISO Settings at <b>X seconds</b> exposure	Final Settings at <b>X minutes</b> exposure
1600 ISO, SA + open 2 stops	100 ISO, SA
3200 ISO, SA + open 1 stop	100 ISO, SA
6400 ISO, SA	100 ISO, SA
3200 ISO, SA	50 ISO, SA (for extended exposures to create long star trails)

### Cameras with native ISO of 200

High ISO Settings at <b>X seconds</b> exposure	Final Settings at <b>X minutes</b> exposure
1600 ISO, SA + open 3 stops	200 ISO, SA
3200 ISO, SA + open 2 stop	200 ISO, SA
6400 ISO, SA + open 1 stop	200 ISO, SA
12800 ISO, SA	200 ISO, SA

**\*SA = shooting aperture**

Examples:

A Nikon camera with a native ISO of 200 and highest ISO of 12,800. f/8 is the desired shooting aperture. The chart above indicates High ISO test settings of ISO 12,800 @ f/8. Test exposures yield a good histogram at 6 seconds, ISO 12,000, f/8. Final shot 6 Minutes, ISO 200, f/8.

A Canon camera with a native ISO of 100 and highest ISO of 3200. f/8 is the desired shooting aperture. The chart above indicates High ISO test settings of ISO 3200 @ f/5.6 (one stop open from f/8) Test exposures yield a good histogram at 10 seconds, ISO 12,000, f/8. Final shot 10 Minutes, ISO 100, f/8.

In moonlight or similar relatively low contrast situations, using the histogram is the best way to determine exposure. Five seconds, ISO 6400, f/8 or 3 seconds, ISO 12,800, f/8 is a good starting point for full moon conditions. Keep in mind that there is no one correct exposure, but many possibilities that will all yield different results. Use the exposure that best meets your needs based on your intended appearance of the final shot. In a moonlight only image, a full,

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right biased histogram may be best for optimal image quality. If you will be adding light to the shot, a better ambient exposure might be one that is just enough to avoid shadow clipping. In this case, the highlights will be provided by the added light, which will also push the histogram to the right. Simply increase or decrease the exposure until the desired histogram is achieved.

If you will be adding light painting to the shot, do the high ISO testing first, for the ambient light only. Trying to calculate the lighting with a six stop difference between exposures can be challenging with strobe, and is impossible with flashlights- especially if you need to change apertures to compensate for inadequate ISO range in your camera. Once the ambient exposure has been determined, set your camera at the final shooting ISO and aperture, and then begin to experiment with the lighting. Because the ambient exposure has been predetermined, there is no need to wait for the full exposure to evaluate the lighting. Once you have finished lighting, end the exposure and check the lighting, disregarding the areas where no light was added. Modify the light as needed until the desired result has been achieved, making mental or written notes as you go if the lighting is complex.

When you are satisfied with the lighting, then go back and combine the full ambient exposure with the lighting to complete the final image. Keep in mind that once you see the combined results, you may wish to either increase or decrease the ambient exposure to change the ratio of ambient to added light. Of course it's possible to combine separate ambient and lighting exposures in post processing, but I find real satisfaction in being able to complete the shot in camera rather than using Photoshop to finish the job.

One final thought is that you might want to begin by shooting a few frames at maximum ISO and maximum aperture before even putting the camera on your tripod. These hand held shots will be blurry from camera movement, but this still a great way to get a rough idea of how the scene might look, and whether or not it merits investing the time required to complete the shot.

Photographing by the light of the moon and light painting is a lot of fun, and can be a tremendously rewarding endeavor with almost limitless possibilities. Getting the technical aspects of exposure and lighting out of the way quickly and efficiently leaves you with more time and energy to use your creativity to make truly outstanding images. With practice, these techniques will become second nature. If you incorporate them into your working methods, you'll be rewarded with increased productivity, and a higher success rate with your night photography.