

A Simple Way To Test For Film Speed and Developing Time

by Steve Simmons

If you are going to be a black and white photographer, whether your final output is a traditional black and white print or a digital print, you need to test for your personal Exposure Index and your personal developing time. You cannot simply follow the manufacturer's instructions. Nor can you ask someone else or go online and ask in a discussion forum. There are simply too many variables that are unique to each of us. You need to do your own testing.

When I began my photo career — actually, it was a hobby back then — the zone system was explained primarily in Ansel Adams' thin books of his first series, *The Negative*. It was the type of book that made sense when I read it.

It made sense, that is, until I tried to put what I thought I understood into practice. Then I was lost. Then, in about 1975, Fred Picker came out with his book, *The Zone VI Workshop*. In this book, he explained how to test, in a practical manner that I and many others could actually understand and put into practice. The name of the testing procedure was "minimum time for maximum black."

Here is how the procedure works.

Finding the Proper Proof Time

1. Take an unexposed negative and process as you normally do. Use the same developer and fixing procedure. When this is processed, it will give you an almost clear piece of film. I say "almost clear," because what you now have is film base plus fog. If you are using a staining developer, then you may have a little stain as well.

2. Now, set up your enlarger

to make an 8x10 print, and place your negative in the negative carrier and up into the slot. If you are using a large piece of film and making contact prints, then place your film onto the paper, and set your light source so the film is given good, even coverage.

3. Set your timer for a short amount of time, let's say 5 seconds. Find a piece of cardboard or some other opaque object. Another piece of enlarging paper may not work, because there may be a small amount of light that gets through down to the easel.

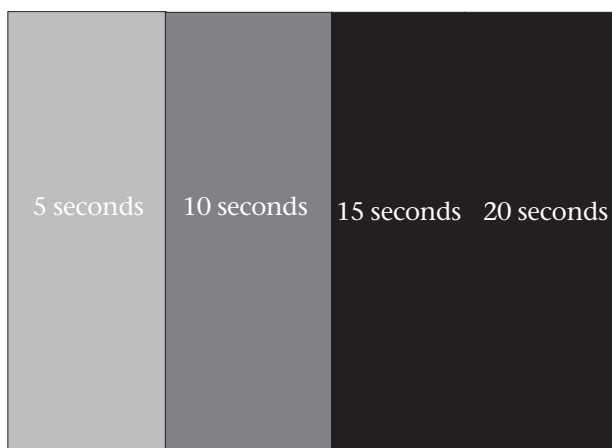
4. Set the f-stop on your enlarging lens down 2-3 stops from wide open.

5. Using the piece of opaque material, expose the paper in the easel for several bursts of light. Move the opaque object across the paper in increments, so that the paper receives several five-second exposures. As you move across, the exposures on the paper will build up so that one section will have five seconds, the next one will have ten, then fifteen, etc., etc.

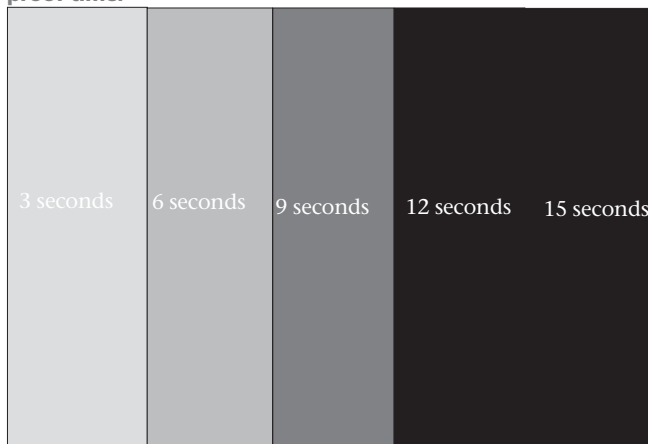
6. Then move the paper to your tray of developer and process normally. It is important that you use your standard paper developer at its normal dilution for the normal amount of time. This has to be standardized and done the same way every time.

7. After the paper is developed and fixed, turn on the lights and look over the successive strips of darkening tones. At some point, you will not be able to see the difference between two adjacent strips. Write down the times for the two strips. For the sake of discussion, let's say you cannot see any difference between 15 and 20 seconds.

8. This is too much time between the strips, but you are making progress. Set the timer for 3 seconds. Now repeat the process. Your strips now will be 3 seconds, 6 seconds, 9 seconds,



Your first test for Minimum Time for Maximum Black may look like this. This is a great place to start. For the second effort I would try increments of 3 seconds so that you may get results like below. Below tells you your Minimum Time for Maximum Black is 12 seconds. This now is your proper proof time.



12 seconds, and 15 seconds and if possible, 18 seconds.

9. Process this paper again as usual.

10. Now look at the paper and review the ever darkening strips as you go across the paper. The 3 second strip should be very light, 6 seconds a little darker, etc. Look carefully to see where the distinctions become invisible. For the sake of discussion, let's say the 12 and 15 second strips look the same. If so, then 12 seconds becomes your proper proof time with this film, this paper, this f-stop and this enlarger height. Record all of this information.

Finding Your Personal Exposure Index

1. Load six holders with your film. Find an evenly lit surface, such as a wall in the shade. Set your meter for the manufacturer's recommended film speed. Take a meter reading of the light being reflected from the wall. Now remember, your meter wants to make this, and everything else, a medium gray, which is zone 5. You are looking for a zone 1 density, which is the amount of density that will make zone 1 just perceptibly lighter than your paper's maximum black. So, after taking this reading and getting the possible f-stop and shutter speed combinations, close down 4 stops. Yes, closedown, as you want this tone to be darker than medium gray. So, if you are given a combination of 1/8 of a second at f11, for example, use 1/8 at f45. Now, pull the darkslide out only half way. You want to expose only half of the film and leave the other half unexposed. After partially exposing this sheet, do the same with another sheet, but at a film speed of 75% of the recommended exposure index. Now, do a third sheet at a film speed of 50% of the manufacturer's recommendation. Now, do a fourth sheet with a speed of 125% of the manufacturer's recommendation, and then a fifth sheet with a speed of 150% of the manufacturer's recommendation. The sixth sheet can remain unexposed.

2. Process these sheets as recommended by the manufacturer or any guide book you may have. Use the developer you want to use and the developing method you will be using in the future. After the film is processed, look it over. You will see the five sheets with clear unexposed areas, and slight density on the other half of the film. You should be able to tell which sheets received which exposures. You may have one or two sheets with little, if any, discernible exposure, and 3-4 sheets with easily discernible and increasing densities.

3. Now, set up your enlarger as you did before. Use the same enlarger height and f-stop. Use the same paper, contrast filter (if you used one before), and paper developer. Place one of the negatives in the enlarger and expose the paper for your proper proof time.

4. Process this test print as you normally do. You are looking for the piece of film that creates a tone on the paper just perceptibly lighter than that paper's maximum black. When you find it, you have discovered your personal film speed for that film, that film developer, that paper, and that paper developer. What you are doing is building the necessary density on the negative and the shape of its curve to adjust it to the shape of the curve for the paper. You are now making the two fit together. You can check this necessary zone 1 density, but assuming you are using a grade 2 paper or contrast filter, this densi-

ty is almost always between .09 and .14 above film base plus fog. This is considered to be the target density for this area of the negative.

It is important during these tests that you have a standard print developer dilution and developing time. Do not vary either of these when doing this testing procedure.

Finding Your Normal Developing Time

The next, and final step, is to find your "normal" de-

Here, within the limits of the printed page, is an example of a piece of printing paper with a zone 0 (clear film) and a zone 1. The zone 1 tone should just be barely perceptibly lighter than the zone 0 tone which was done by the clear area of the film



veloping time. In my case, I use zone 8 as the top of my normal range. Many people use either zone 7 or 9. It does not matter, as long as you are consistent.

1. Find an evenly lit wall or flat surface. Here you want a tone that is just barely perceptibly darker than the pure white of your printing paper. Take a meter reading of this surface. Again, remember, the meter wants to make everything a medium gray, which is zone 5. You want this tone to be brighter than medium gray. If you are going to use zone 7 as the upper end of your normal scale, then open up two stops. That's right, the exposure needs to be increased. If you are going to use zone 8, then open up three stops. Go ahead and expose the entire sheet. In fact, expose six sheets.

2. Process these six sheets for different times. Do one for the time suggested by the film and/or film developer manufacturer. Then do one for 60% of the recommended time, one for 80%, one for 110%, one for 120%, and one for 130% of the recommended time.

3. When these sheets are processed you will see that each one has a different density. Take one, perhaps the one developed for the recommended time, and place it in your enlarger. The enlarger should be set up exactly as it was for the earlier steps. Now cover up one half of the printing paper with an opaque piece of cardboard.

Expose the other half of the paper through the test negative for your proper proof time.

4. After processing this print, turn on your viewing light and look at the two sides of the paper. If there is no discernible difference, then this sheet of film was processed too long. If the side exposed through the negative is much more than barely perceptibly darker than the unexposed side, then it was not processed long enough.

You are looking for a tone that is just barely perceptibly darker than pure paper white. If this test sheet does not show any difference, then go to the sheet of film devel-

oped for 80% of the recommended time. Perform the same proofing procedure. Look at the results. You are looking for a tone just darker than the white of the unexposed paper.

What you are doing at this step is building the top area of the film curve to fit onto your printing paper.

Once you find this sheet of film, you have determine your developing time for putting the top of your "normal" scale onto your printing paper. You will usually find that your developing time is different than what is recommended by the manufacturer. That is fine. This is your personal normal developing time. From this point on, use your personal exposure index and developing time with this film, film developer, and printing paper combination for your "normal" scenes. If you run across a scene with more or less contrast, then you will have to make adjustments to your exposure and developing times.

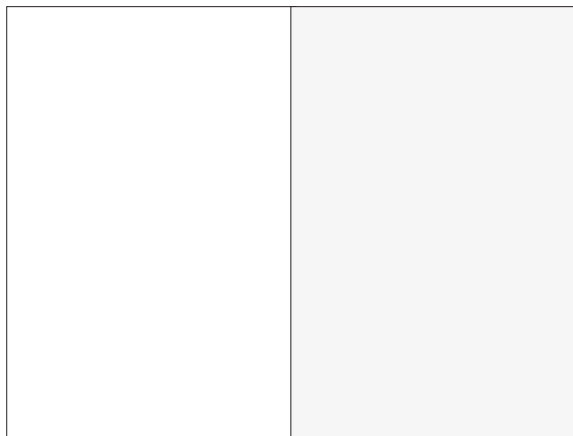
You can also use this proper proof time to check all of your negatives in the future, as a test of how you are exposing and processing your film.

You now know how to create a full scale negative with good detail and separation all up and down the scale.

At this point, you have the basic knowledge and results to go and make very good black and white negatives. At some future point, you may want to do some more sophisticated testing with a densitometer. But for now, you are in great shape.

Scanning Your Negatives

I use the same exposure index and developing times for all of my film. It does not matter if I am going to make a traditional print or scan my film for



Here, within the limits of the printed page, is an example of a piece of printing paper with a pure paper white and a tone that is barely darker than pure paper white. For me, this would be zone 8. It can be zone 7 or 9 if you prefer. I use zone 8 as the brightest tone in my prints where I want the hint of detail and texture. For me zone 9 is pure paper white.



Chaco Canyon. 5x7 camera, 240mm lens, Tri-X developed in PMK. Here is an image that prints well on a #2 paper, with a #2 filter, and that scans as a full scale image into my computer for some type of digital output. I have built a scanning input curve for this film size, film type, and developer that I can load anytime I am working with this combination. This reproduction was done from a straight scan of this negative.

some type of digital output.

My goal in making a negative is to make a good one that will serve me for either type of printing process. It is always important to get the right densities on the negative that will allow for multiple interpretations. Good detail all the way up and down the scale of the film is important for any type or style of output.

If you are going to be scanning your film, I would still go through the exercise described in this article. Now, there will be one more step.

Place the film in your scanner and begin building a scanning curve that will bring the image into your computer as a full scale photograph. Adjust the curve or

levels to bring in the image as it proofed for you. You may want to make adjustments in the toe, mid tones, or high values but your scanning software should allow you to do this.

You do not want to be in the position of having to spend time correcting a bad scan in your photo program. Too much manipulation of the curves, levels, contrast, brightness, etc., will expose you to the risk of breaking up the smooth curve of the histogram and posterizing the image. It is much better to create the scanning curve that will give you an accurate and full scale rendering of the negative.

Once you build the curve for the film and film developer combination, save it and label it. Next time you work with this film and film developer call up the scanning curve and use it.

Now you should be set.

Enjoy.

If you want to go on from here and take a more scientific approach you can proceed if you so desire. It can become an interesting study of sensitometry. It may or may not help you be a better photographer.