

Selenium Toning for Maximum Black

By Fred Newman

Most photographers don't consider a print finished until it's been toned, and selenium is the toner of popular choice. There are three reasons to selenium tone prints: it contributes to print permanence; it increases maximum black; and it shifts the image color toward a blue-black or purplish tone when desirable.

A comparison of a toned to an untoned print reveals an increase in depth and shadow richness, which becomes apparent as soon as you start to tone the paper. Some papers will show a slight color shift toward blue-black or purple as toning time increases. Extending the time (overtone) reduces the maximum black, strengthens the image color and, with some papers, produces a split-tone effect with neutral light tones and brownish shadows.

I tested 13 variable-contrast fiber-base glossy papers. Some papers, like Oriental VC Plus, showed a distinct color change. Other papers, including Ilford MG fiber base and Kodak Polymax Fine Art, showed very subtle color shifts.

I used a 21-step step tablet in the enlarger as a test negative for these tests. The step tablet has steps ranging from 0.05 to 3.05 density; the entire step tablet covers a 10-stop range. Each step is about 0.15 density units, which equals one-half stop. Step tablets are available in 35mm, 120 and 4 x 5 sizes. I used a 4 x 5 step tablet enlarged for this test, but size is not critical as long as the test image is projected through the enlarger's optical system. My enlarger's color head was set at 0 magenta and 0 yellow for the test. If you use a variable-contrast head, use the grade 2 setting.

Determining exposure is simple: try about 2 or 3 stops more exposure than you'd give your typical negative. I try to get

tones out to about step 15 on the test print, leaving steps 16 through 21 pure white. If the first test exposure isn't right, it's easy to correct since each step is 1/2-stop. For example, if the test print has tone only out to step 11, but you want it to extend to step 15, subtract 11 from 15 to get 4 steps. Four steps (four half-stops) equals 2 stops, so increase exposure by 2 stops. Similarly, if there is tone out to step 20, you subtract 15 from 20 to get 5 steps, or 2 1/2 stops, and decrease exposure by 2 1/2 stops for the test. Warm-tone papers seem to be about one stop slower than cold-tone ones.

I used the same printing procedure for all papers, processing at 75° F, typical for those living in the Southwest. Each print was developed for two minutes in Ilford Universal paper developer, stopped in Clayton

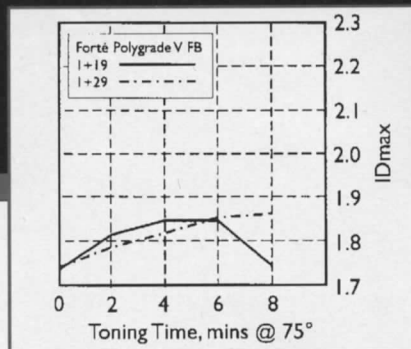
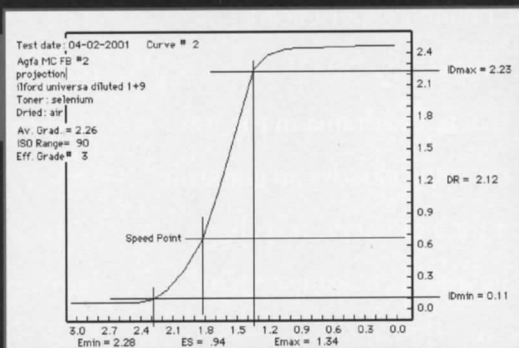
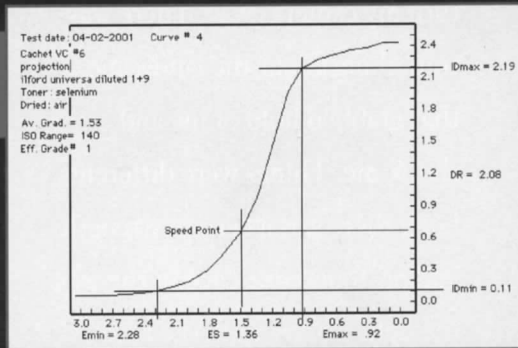


Figure 1. *Forte Polygrade V FB*
Toning time vs. IDMAX

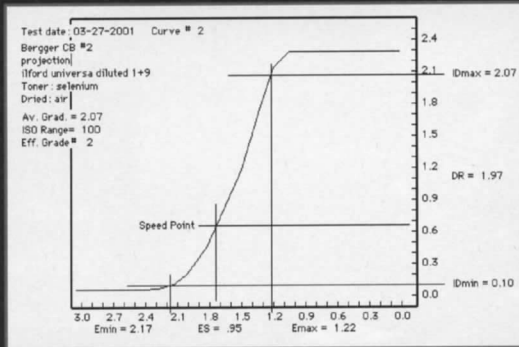
odorless stop bath for 20 seconds, fixed in Ilford Universal fixer for one minute, then washed for 10 minutes. Five prints were made for each paper. One print, not toned, was used for a baseline; the other prints



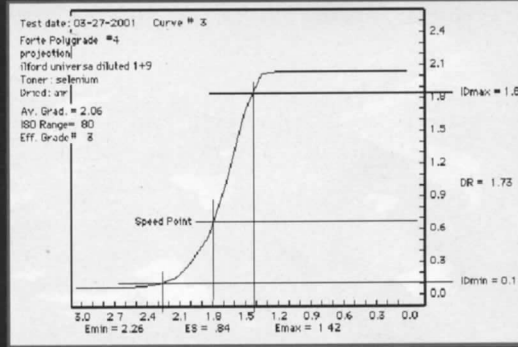
Agfa MC FB



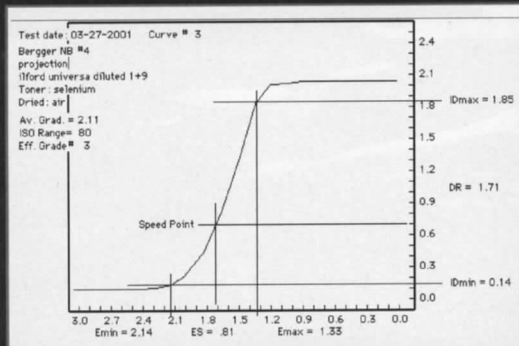
Cachet



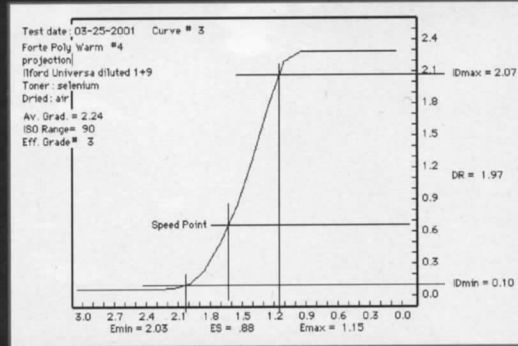
Bergger CB



Forte Polygrade



Bergger NB



Forte Polywarmtone

were toned for 2, 4, 6, and 8 minutes in Kodak Rapid Selenium Toner. The prints were placed in Clayton hypo-clearing agent for two minutes, then washed for 10 minutes. I chose 8 minutes as the longest toning time because I don't like to wait longer than that for the toner to work.

The papers were tested at the following selenium toner dilutions:

- Agfa Multicontrast Classic, 1+19, 1+9
- Bergger Prestige Variable CB, 1+19
- Bergger Prestige Variable NB, 1+19
- Cachet Multibrom VC-FB Plus, 1+19
- Forte Polygrade V FB, 1+19, 1+29
- Forte Polywarmtone FB Plus, 1+19, 1+29, 1+39
- Ilford Multigrade IV FB, 1+19, 1+9, 1+5
- Ilford Multigrade FB Warmtone, 1+19, 1+9
- Kodak Polymax Fine-Art, 1+19, 1+9, 1+5
- Luminos Flexicon VC Premere FB, 1+19
- Oriental Seagull VC, 1+19
- Sterling Premium F VC, 1+19
- Zone VI Brilliant VC III, 1+19, 1+9, 1+5

I would suggest that you record the settings for the enlarger head, enlarger height, enlarging lens used, *f*-stop used, and exposure time. Recording these test conditions gives you a starting point for future tests, and allows comparisons to be made. A complete paper test should take less than an hour from set-up to cleanup.

After the test papers dried, I read the densities of all the steps with an X-Rite 810TR densitometer. These values were entered into the Plotter program that was written by Phil Davis for plotting film and paper curves.

For the graphs, I plotted toning time vs. IDmax, which is 90% of Dmax (maximum obtainable density). I planned the initial dilution of 1+19 to cause IDmax to increase and max out somewhere between 2 and 6 minutes, then fall off at 6 or 8 minutes. If IDmax was still high at 8 minutes I increased the concentration to 1+9, up to 1+5 for a few papers. For both Forte papers, the dilution was decreased to 1+29; I also used 1+39 for the warmtone paper. I was looking for an ideal toning time, which for me, means reaching maximum black in about four minutes, with dilution adjusted as needed.

Each paper in the test series showed increased IDmax when toned for only two minutes. This shows that even a small amount of toning will improve the print. The four warm-toned papers, Agfa Multicontrast (1+9), Bergger Prestige CB (1+19), Forte Polywarmtone Plus (1+19), and Ilford Multigrade FB Warmtone (1+9), were most sensitive to toning, showing split tones at 6 minutes.

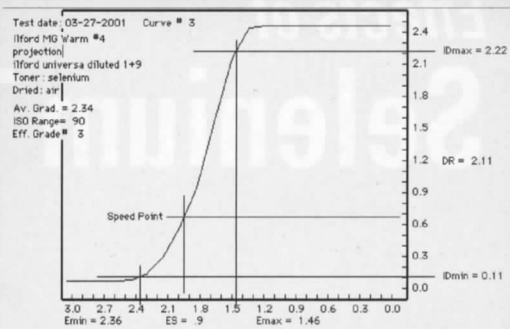
It was interesting to see that increasing the selenium toner concentration from 1+19 to 1+9 caused a slight additional increase in IDmax for Ilford Multigrade Warmtone. This also was seen for Ilford Multigrade IV FB and Zone VI Brilliant VC III when the concentration changed from 1+19 to 1+9 and from 1+9 to 1+5. If you find a paper you really like, it might be worthwhile to try a few different dilutions to see which gives the greatest increase in IDmax.

Several papers gained as much as 0.2 density when toned, which dramatically improved the richness of the image. Some cold-tone papers showed more color shift than others. For example, Forte Polygrade V, Bergger Prestige NB, and Oriental Seagull VC showed more color change than Ilford Multigrade IV FB, Kodak Polymax Fine-Art and Zone VI Brilliant VC III. I'd suggest testing the papers that interest you, toning them for maximum black, then comparing them to see which paper you prefer. You can fine-tune the test by adjusting toning times in the stronger dilutions (1+9 or 1+5) in one-minute increments.

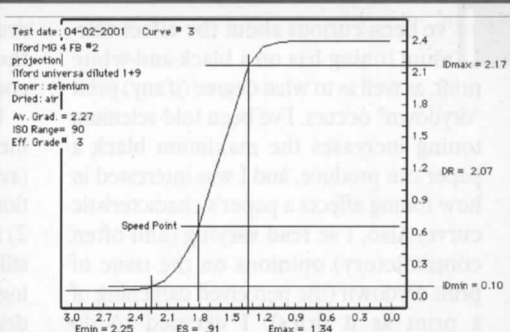
If you have any questions or need help in getting started, please feel free to contact me. The basic references for testing are *Beyond the Zone System*, 4th edition by Phil Davis, along with his "BTZS Video Workshop." We teach these procedures in our "Beyond the Zone System Workshops" and also offer a film and paper testing service for the convenience of photographers who don't own densitometers.

Due to space limitations, all the graphs and charts could not be printed. For copies of the complete test, or if you have any questions, contact the author at 480/767-7105.

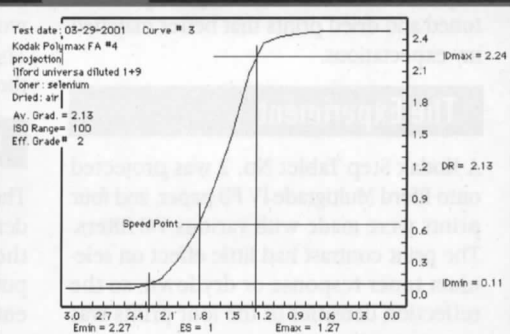
Fred Newman is the owner of The View Camera Store (www.viewcamerastore.com), 480/767-7105, which specializes in large-format photography equipment, supplies, and black-and-white film testing. He lives in Scottsdale, AZ.



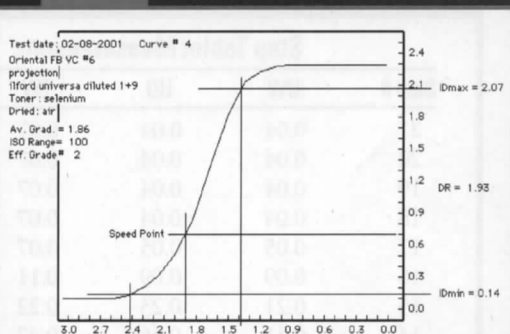
Ilford Multigrade Warm



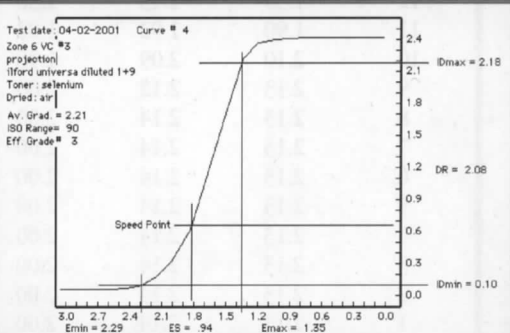
Ilford Multigrade IV FB



Kodak Polymax



Oriental FB



Zone VI