

100% Carbon Variable Tone (beta)

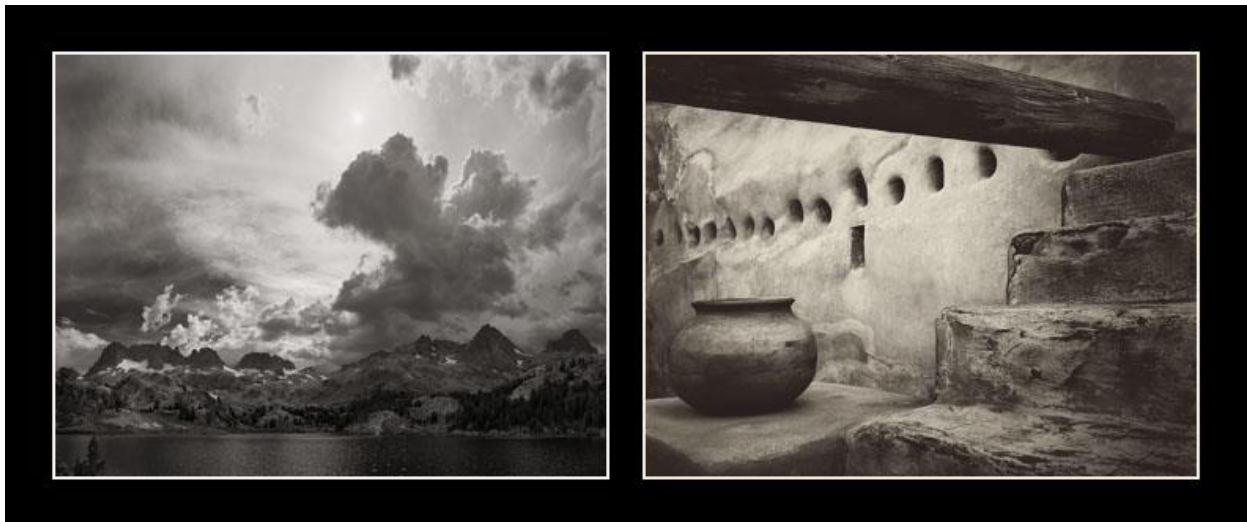
Black and White Inkset

www.PaulRoark.com

Nov. 9, 2014 Early Draft

This PDF discusses an experimental ink arrangement for a 100% carbon pigment “Ebony-6”¹ type inkset that allows a useful variability of print tone with a single paper as well as a broad range when different papers are used. This inkset achieves variability via use of a second MK (100% Ebony) in the Y position. Alternatively I have also looked at using a very light, blue toner in the Y position to neutralize the carbon pigments.²

The fundamental difference with this ink arrangement is that there are two positions of MK. Thus the neutral print tone and characteristics of the “3-MK” inkset,³ and the smoothness and medium warmth of Ebony-6 can be blended as needed – with both the Epson driver, via ICCs, and QuadToneRip.⁴ Note that the Epson 1400/1430 cartridge chips from MIS that I have (v. 6.3) allow one to put any cart in any position without changing the chips, which are not position specific. Thus anyone with a 1400 family printer and Ebony-6 carts can try this setup with only an extra Eb6-K cart needed.⁵



The above images are from soft-proofed files that show the actual print tones as well as I know how. They show the range of the inkset on different OBA-free papers. The image on the left was printed on

¹ See <http://www.paulroark.com/BW-Info/Ebony-6.pdf>. The beta inkset tested used generic dilution base c6c. See <http://www.inksupply.com/roarkslab.cfm> for clear base pre-mixed or DIY formula.

² See <https://groups.yahoo.com/neo/groups/DigitalBlackandWhiteThePrint/conversations/messages/108192> for my initial notes on this “Ebony Variable Tone” inkset.

³ See <http://www.paulroark.com/BW-Info/R1800.htm> and its links

⁴ See <http://www.quadtonerip.com/html/QTRoverview.html>

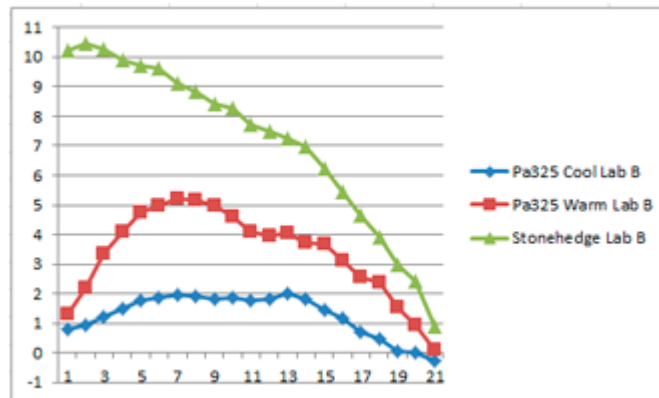
⁵ The MIS carts will have the “classic” Ebony in them, and not the latest iteration from the new supplier. I have not tested this approach with the older Ebony. There are slight differences even though the carbon is the same.

Premier Art's Smooth Hot Press Fine Art 325 paper⁶ with the Epson driver and a curve/ICC I call "cool-smoother." The image on the right was printed on Stonehedge un-coated watercolor paper⁷ with QTR.

The Premier Art 325 paper is a non-OBA paper that has been a standard of mine for some time. It is the thicker version of a paper also known as Epson Premier Art Scrapbook paper, which has been identified by Epson as its most archival paper. The Eboni carbon image on this paper has turned in what I believe is the most lightfast image fade test results among the many reports published by <http://www.Aardenburg-Imaging.com/>.

Stonehedge watercolor paper is an uncoated paper that is widely available at art stores. While images on such watercolor papers may experience slightly more changes in fade tests than the best inkjet papers, I believe the coatings on inkjet papers makes them inherently less archival than an un-coated watercolor paper. I use Arches uncoated watercolor paper for what I consider my top prints. Stonehedge watercolor paper provides a very interesting alternative for images that look best with a very warm tone.

The relative warmth in a more objective manner is best shown by the Lab B measures of the papers and images. The graph below shows these for PremierArt 325 (Pa325) for "cool" and "warm" profiles, as well as for Stonehedge.



Many papers that are brightened with OBA's (Optical Brightening Agents/dyes) may have lower Lab B measures and be preferred by some. Because the use of a 100% carbon pigment suggests to me that the user is concerned with image stability, I have avoided such papers here. On the other hand, one of my favorite images on my walls is printed on an old favorite of mine – Premier Art Smooth Bright White.⁸ Another, non-OBA paper that has turned in an impressive looking image is the Premier Art Generations Alise paper.⁹ I have not tested the brightened version.

Inks

⁶ See http://www.premierimagingproducts.com/pm_smoothhp.php

⁷ See <http://www.DavidKachel.com/> for the website and style of the photographer/artist who introduced me to Stonehedge paper.

⁸ See http://www.premierimagingproducts.com/pm_smoothbwfineart.php

⁹ See http://www.premierimagingproducts.com/pg_alisefineart.php

The matte black ink used at least initially in this beta inkset is from STS Inks, which is the company that purchased Image Specialists. Image Specialists was the source of MIS Associates' Eboni MK, which was the carbon used in the MIS Eboni inkset such as the 1800 "3-MK" inkset and Eboni-6.¹⁰ The STS carbon used here is said to be the same carbon as Eboni. However, I have noticed some printing differences, perhaps due to an upgraded dispersion chemistry. In some cases the dmax is significantly greater, and on some papers the print tone is slightly warmer than the Eboni of 2 years ago.¹¹ Whether this carbon will become the new MIS "Eboni" has not been determined by MIS.

Ink Arrangement

Y = 100% MK (Eb6-K)

LM = 2% MK (Eb6-Y)

M = 9% MK (Eb6-LC)

LC = 6% MK (Eb6-LM)

C = 30% MK (Eb6-C)

K = 100% MK (Eb6-K)

Printing Options and Characteristics

This inkset is Epson driver compatible and, as such, can be printed with either ICCs or PS curves (which allow variable tone within a single image). On the other hand, the best images are usually obtained using QTR. My profiles and curves are and will be posted here:

<http://www.paulroark.com/BW-Info/1400-CarbonVT-Profiles.zip>

Dmax and the "2-MK" Arrangement

The STS carbon has a higher dmax than the old Eboni. Even in a single-MK setup this will be noticeable on some papers. A dmax of 1.8 is not unusual. On many inkjet papers, the addition of a second MK position does not increase the dmax. On some papers it does. The most dramatic example of what can be achieved with two MK inks firing relates to the watercolor papers. Whereas most watercolor papers used to peak out at close to 1.4 in the older systems, Stonehedge achieves 1.55 with the CVT inkset and QTR. That makes a very nice looking print that appears, in typical indoor lighting, to have a good black, not a smoky gray. Arches watercolor paper has had the best dmax of any such paper I've tested. It typically can achieve the mid-1.50's on the 1400 with the old Eboni-6 inkset. With the CVT inkset and QTR, I've seen 1.75.

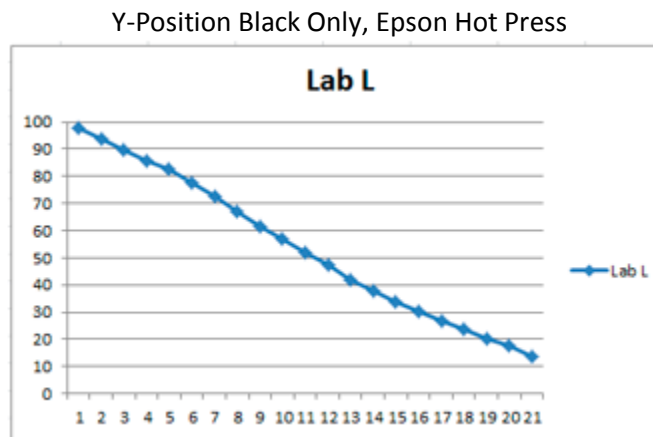
¹⁰ I designed these inksets as an independent photographer/printer and MIS sold them, all on an open and royalty-free basis.

¹¹ I do not have enough samples to know whether whatever changes may have occurred happened when Image Specialists was still independent.

The “2-MK” arrangement is not just about dmax. “Black Only” (aka “BO”) printing (just the 100% MK) has typically produced by far the most neutral/cool carbon pigment prints.¹² Dilute carbon is warmer. BO printing, however, is not possible with a modern Epson driver when inks are in their traditional locations. Additionally, BO printing often if not usually produces some microbanding when it is able to be done, which may be why Epson eliminated the option with its modern printer drivers.

The primary purpose of the old 1800 3-MK setup (three positions of Eboni MK) was to overcome the microbanding of single-position BO printing. The 1400 is a better printer than was the 1800 (or 1900), but at least mine still has some detectable microbanding with just a single black ink firing. While my old 1400, which has been hauled on mules into the wilderness for several workshops, is probably more beat up than the vast majority of 1400 (or later) printers, with 2 MKs installed, the microbanding is completely gone. The Y-position MK appears to effectively fill the light gaps between the nozzles of the K-position MK.

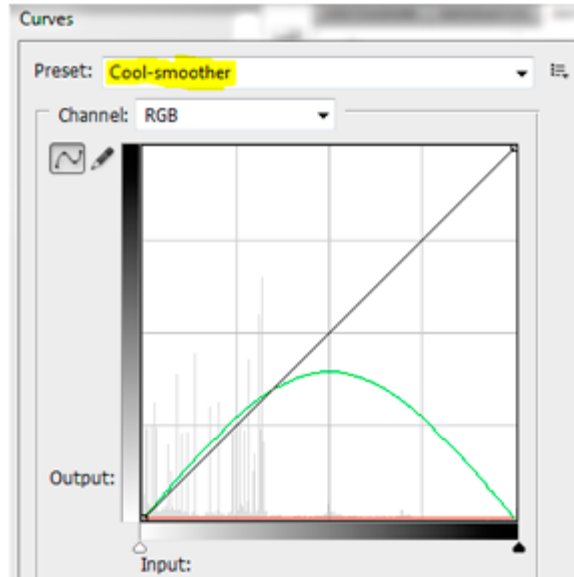
With an MK in the yellow position, Black Only printing is possible with the Epson driver. With just the yellow channel of an RGB image printing, the Epson driver prints a nearly straight-line BO output.



With my printer, there is some microbanding. To hide this defect, the lighter inks can be pulled in to differing degrees, as needed. Some papers, even with my old system, will show no microbanding at all when this is done. While these images will be warmer than a straight BO print, they are more neutral than a typical Eboni-6 type of arrangement. With some papers the 2% K ink is very neutral and has minimal warming effects. Implementing this type of “fill” is easy with both PS curves and QTR.

Black Only printing is also grainier than a smooth, modern dilute B&W inkset can achieve. Here, again, pulling in dilute inks will smooth out the graininess to different degrees. One of the best methods I’ve found is to add a 2% K “toner” to the profile. This, as well as the black inks, spans the entire range, aside from the end points. Note that with a 1.5 pl printer like the 1400, I’m talking about profiles that make very good looking prints with *no* crossovers. These are simple, effective, and will be very tolerant of paper and ink variations. No more flat spots or “solarization.”

¹² See <http://www.paulroark.com/BW-Info/R1800-No-OBA-Paper.pdf> for a number of Eboni black only tests with the 3-MK system.

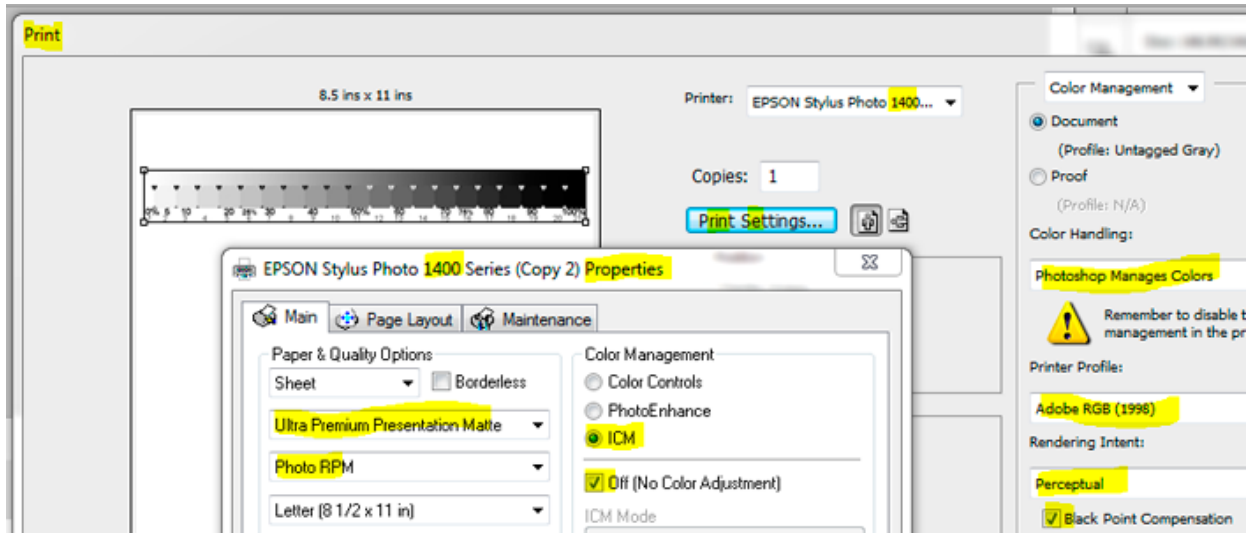


Photoshop curve for smoother BO printing

With Photoshop curves, the Blue curve controls the Y-position MK. Above, the Blue curve has been left as a straight line. The Red curve controls the Cyan channel (C and LC). Above it has been pulled flat to turn it off entirely. The Green curve controls the Magenta channel (M and LM). Here a single point pulled the center up enough to largely smooth the BO roughness, while using only the LM (2% “Eb6-Y) ink that prints relatively neutrally on many papers. This curve is in the CarbonVT-Profiles Zip file. The curve can be embedded in an ICC and linearized using QTR’s Create ICC-RGB. It is also easy to do an approximate job just with a few points on the Blue (here K) curve. With PS curves and an RGB version of the B&W file, variable tone can be accomplished within a single file. An old example of this is shown at <http://www.paulroark.com/Whalers.html> .

The optimum blend of smoothness and print tone are variables that the individual photographer/artist/printer can balance depending on the character of the image and artistic judgment of the individual. As any experienced B&W film shooter knows, some grain can impart a sense of sharpness that is beyond what the image actually has. It can also add “atmosphere” to some types of images. “Grain” is not necessarily a bad thing, particularly if it is an aspect of the image that one controls. QTR sliders and Photoshop curves can give significant control of these variables.

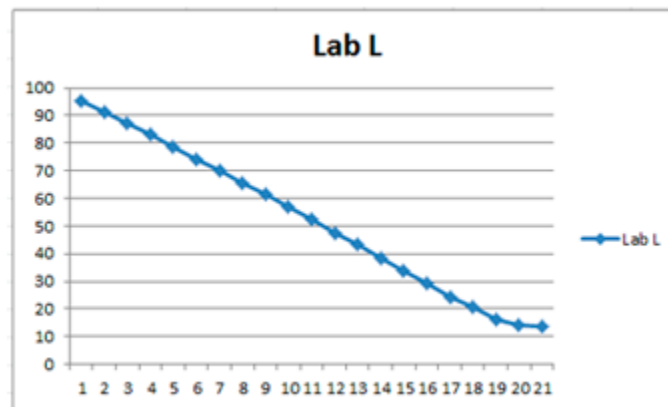
Epson Driver and PS “Print” Screen Settings¹³



It's convenient to save the Properties settings with a name that ties them to the approach being used.

I just leave my system set up this way for both making ICCs and printing from curves. ICCs made with the system are pulled up where "Adobe RGB (1998)" shows in this screen grab.

Those who want to make and print with their own curves without an ICC can probably just use the default Epson printer profile that appears. The Blue curve (K) can be tweaked to be linear or replicate the Gray Gamma 2.2/Adobe RGB characteristic curve, which is close to a straight line with compressed deep shadows. It's the most standard curve shape.

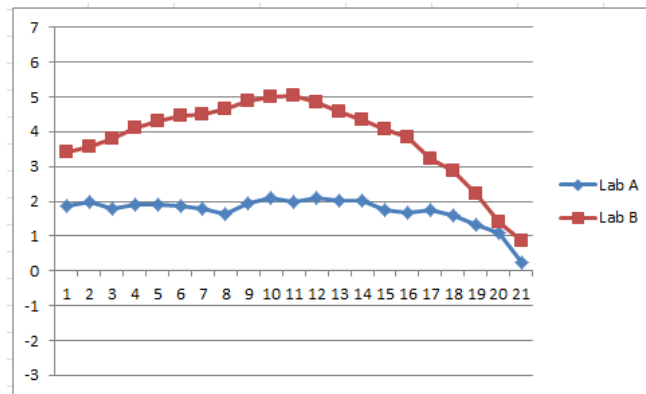
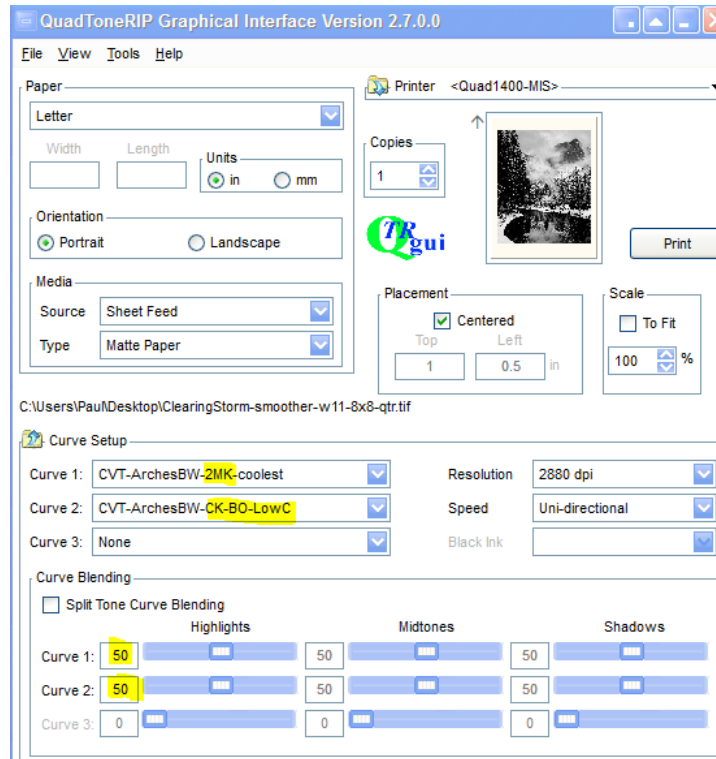


Gray Gamma and Adobe RGB printing characteristic curve shape;
This one is a from an ICC when the 21-step file was printed in Gray Gamma 2.2 workspace.

¹³ I use mostly Photoshop CS 5 for setting up this inkset because ICC's are easier to make by using Adobe RGB (1998) as both a workspace and printing profile. PS Cloud and probably CS6 do not allow this (or the old "No Color Management" option).

(End of draft as of 11/9 – I have shifted to pursuing the color toner route due to its greater range and smoother highlights.)

Arches profile suggestion:



With a high dmax profile on Arches, the blacks may be best when well separated so that the deepest blacks are just in small areas. This approaches a glossy printing style. Large plain very deep blacks are somewhat shiny and blotchy, but they look very good in small areas. Under glass, larger areas of 100% or close to it may look very good indeed if there is enough detail, including, for example, stars.