Making Large Display Size, 100% Carbon-Pigment Prints in Epson K2 (2200, 9600, etc.) Printers with LK + Eboni & QTR Profiles

Paul Roark
www.PaulRoark.com

10-26-07

The Problem

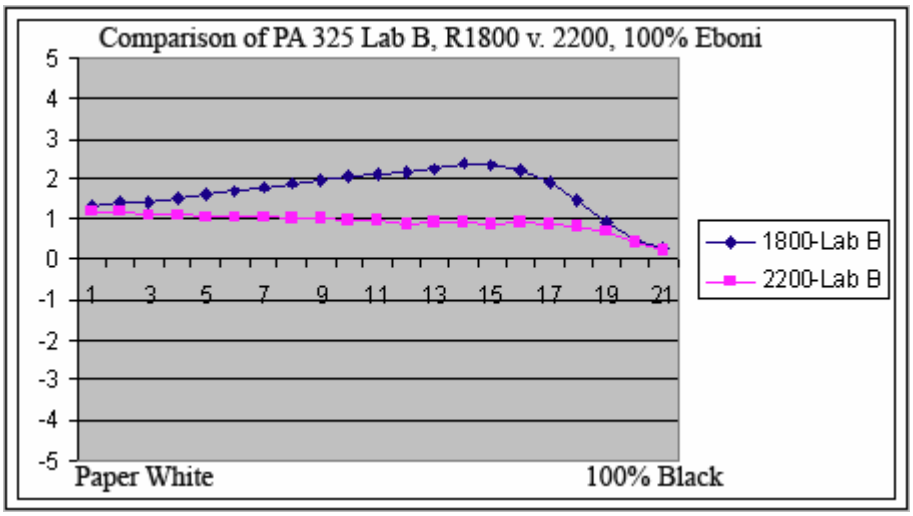
Those photographers who print with the R1800 and 100% carbon workflow are limited to 13" wide paper. As such, another printer is needed to make display prints of larger sizes. I typically display 16 x 20 and larger. Unfortunately, there is currently no large format printer that has the small 1.5 picoliter drops of the R1800. While I can print large B&W display prints on my 7500 with a B&W inkset, and many K2 and K3 large format printers can use a variety of technologies to match the R1800 print tones, all of the existing approaches that are able to print relatively neutral, medium warm images use color inks to cool the warm diluted carbon inks. Some R1800 carbon printers will want large display prints that are also 100% carbon. The question is whether there is any workflow that can use existing large format printers to make an acceptably smooth100% carbon pigment print that will match our R1800 print tones.

The Solution: Eboni + LK

I've found, using an Epson 2200 as a test bed, that the standard Epson K2 printers can make quite good (for large display) 100% carbon prints using MIS Eboni and LK in their standard K2 UltraChrome (equivalent) positions. Thus there should be a number of service bureaus and individuals who will be able to make our large prints, allowing us to make and market only 100% carbon prints with no color ink compromises.

The basic approach takes advantage of two characteristics of the 100% Eboni MK carbon printing: First, large dots of Eboni print cooler than the smaller ones. Second, some papers print cooler than others. The idea is to find the coolest combination on the K2 printers so that LK can be added to increase the smoothness of the K2 all carbon prints.

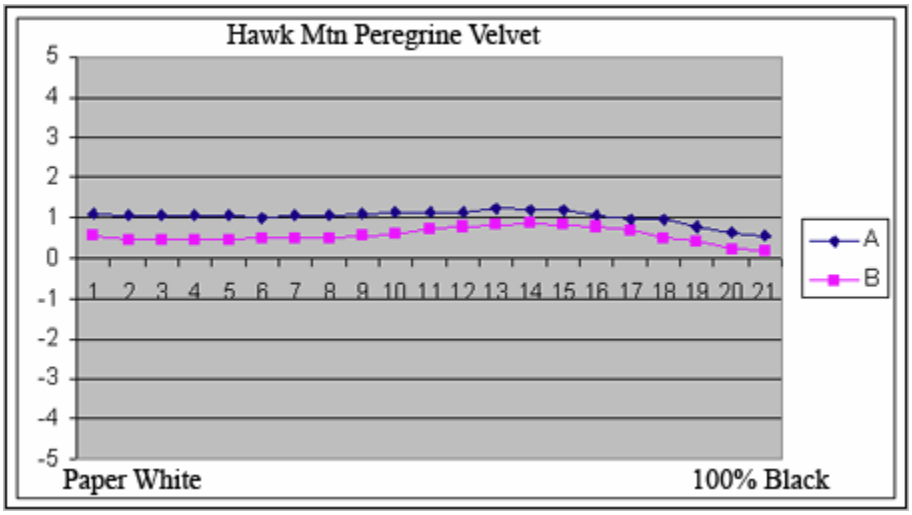
The graph below shows the extent to which the 4 pl dots or the 2200 are cooler than the 1.5 pl dots of the R1800. Most of the tonal differences we see among these prints is reflected in the difference in the Lab B values. As such, I've shown these values on the same graph, below, for Premier Art Smooth 325 prints made with the R1800 and 2200.

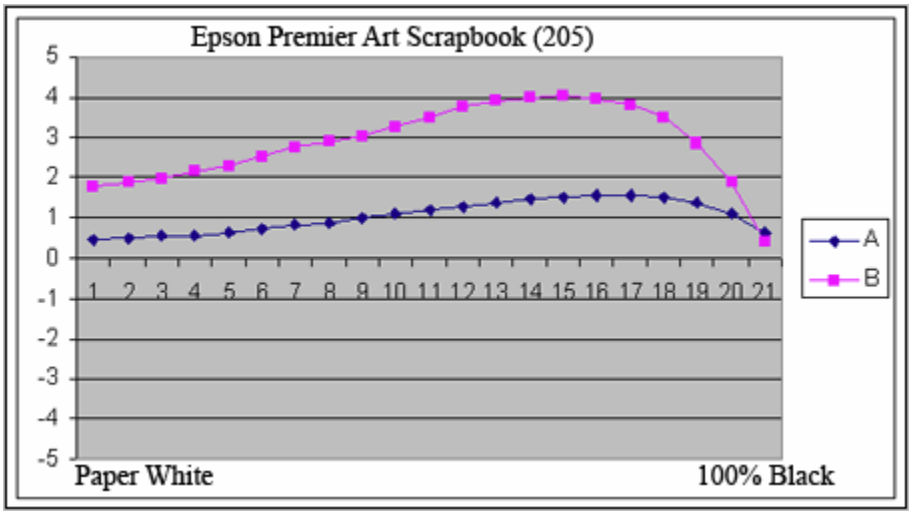


With this cooler printing, LK can be added to bring the Lab B up to the warmth desired – in my case matching my R1800 Eboni MK prints. This added LK reduces the contrast between the Eboni and paper, and it reduces the amount of Eboni in the image. LK is also pure carbon, so it'll have bout the same longevity as Eboni. (Note that rips that can control the dot size might be able to use that control to a limited extent to control the tone of the print.)

Selected papers also print relatively neutral or cool, due to their particular coatings.

Compare the tone graphs, below, of the Lab A & B of Hawk Mountain's Peregrine Velvet 255 and graph of PA 205/Scrapbook.





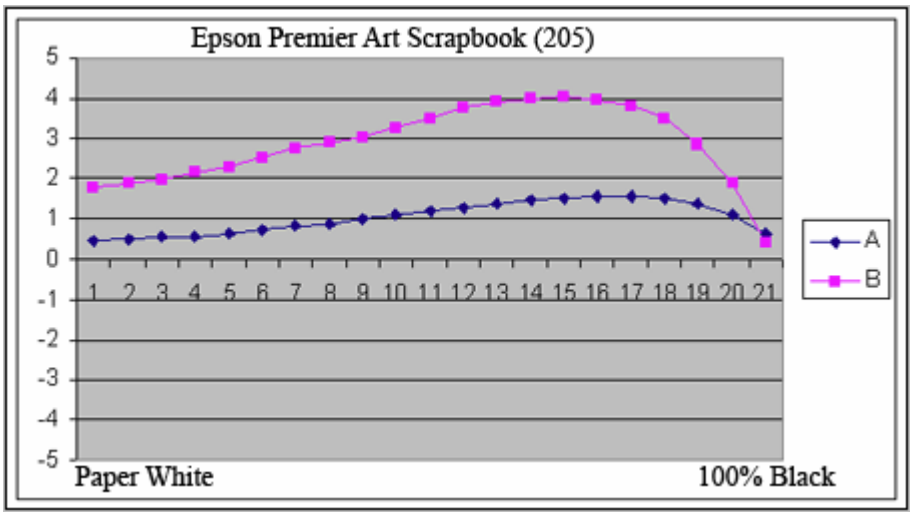
Again, this allows us to use the LK like a toner to warm and, at the same time, smooth the image somewhat compared to what it would look like with 100% MK.

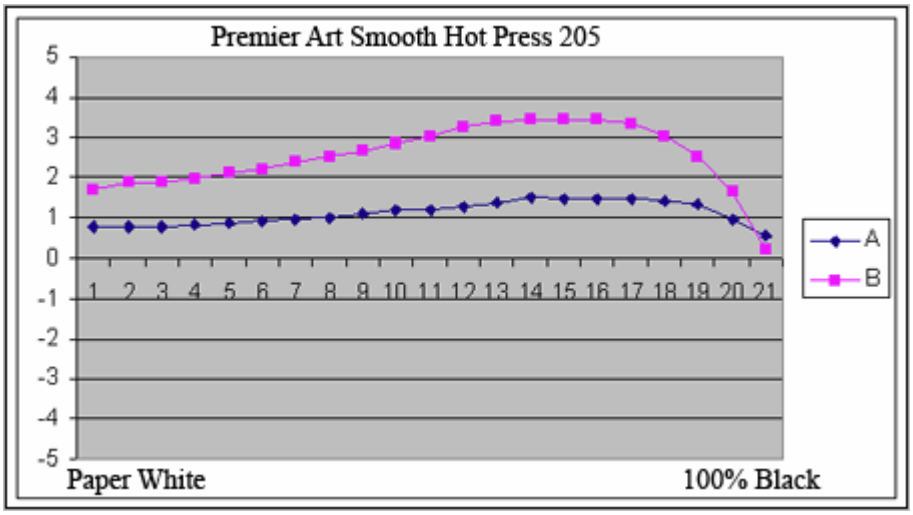
The Target Papers & Tones

The two papers I've initially profiled for the 2200 are Premier Art Smooth 325 ("PA 325") and Hawk Mountain Peregrine Velvet (255). Tentative QTR profile information for these are at the end of this pdf. So, large format K2 printer owners should be able to easily duplicate these results.

Which of these papers is best may depend on the circumstances (and future fade test data and experience). PA 325 is about the best smooth matte paper I know of for large display. It has no OBAs and a relatively high dmax. Peregrine prints cooler and thus allows the use of more LK, making for smoother prints. The Peregrine uses a very small amount of OBAs. I have not tested it to see how significant the tonal shifts will be as these OBAs fade, nor do I have enough experience to know if the Peregrine is as free from flaking as the 325.

Epson Premier Art (205) Scrapbook and the Premier Art 205 version Premier sells through other outlets are my targets for tones. PA Scrapbook is Epson's most archival paper. It is also thin enough to feed well in most printers – and a bargain that I use. As such, I've initially made draft QTR profiles for the 2200 that roughly match the tones of these papers when printed with the R1800 and 100% Eboni.





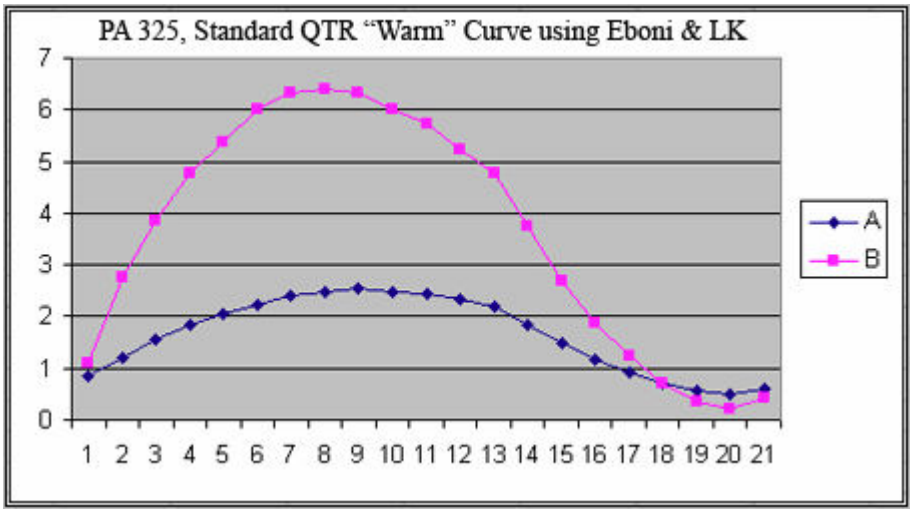
Note that my samples of Scrapbook and PA 205 print just slightly differently with respect to tones. The above graphs are the Lab A & B distributions of 21-step test prints using the R1800 and 100% Eboni workflow and these papers. It's likely the differences in these graphs simply represent the differences one can expect from 2 different batches of the same paper.

Most papers that one would use for fine art display can probably be matched. For example, Hahnemuhle Photo Rag prints with tones close to the "LensWork" tone that many like. This is significantly warmer than PA 205. As such, even more LK could be used to smooth the image if a paper like those initially profiled for PA205 were used for the large format printing.

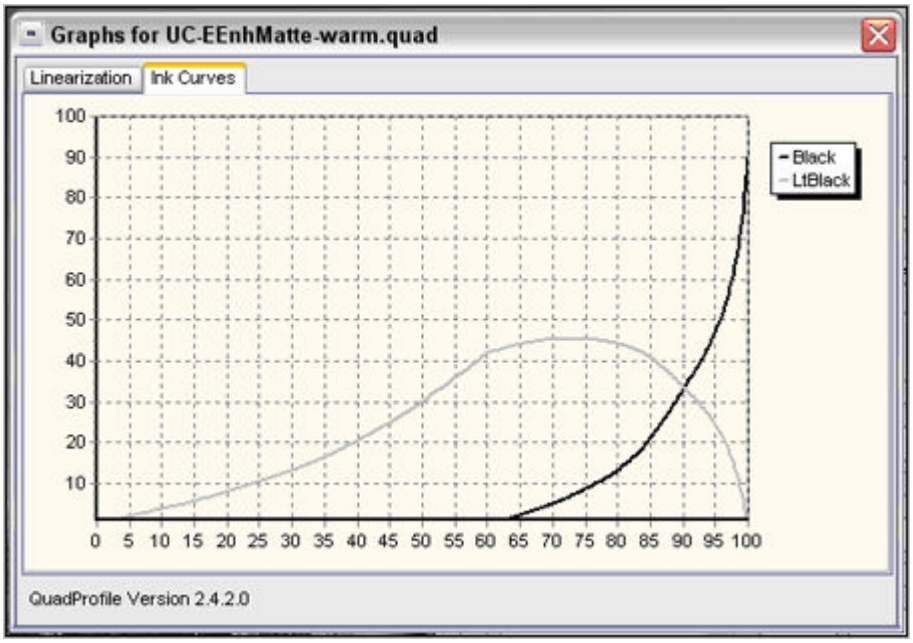
Note that for those who like warmer highlights, more LK can be used for this purpose – like a warm toner. This, of course, is true for both the 4 picoliter and 1.5 pl printers. One can also use Epson MK to make warmer prints overall.

The Profiling Approach

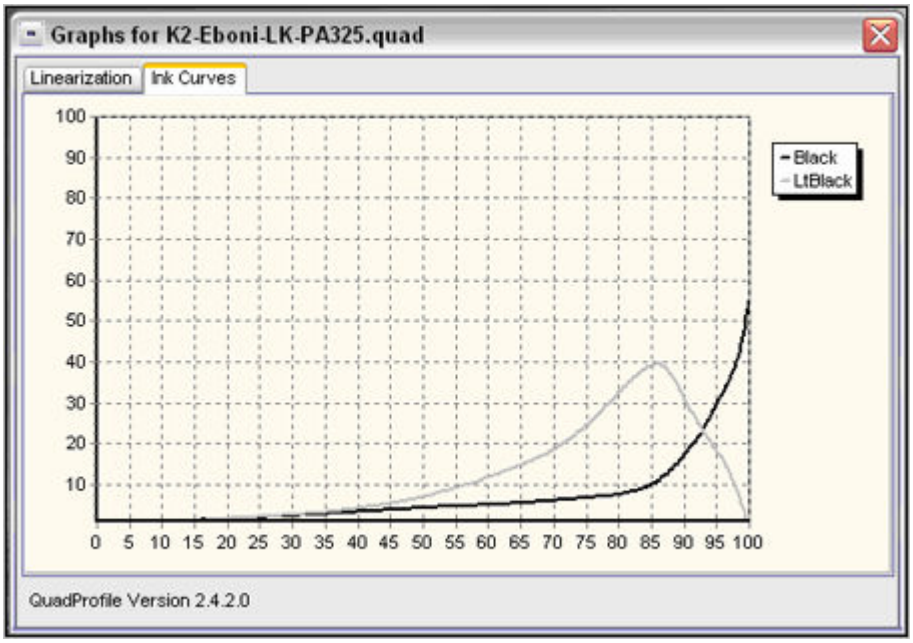
Standard profiles do not work well for the purposed I'm trying to accomplish – matching my relatively neutral R1800 Eboni carbon prints. For example, the standard QTR 2200 UC "Warm" profile is 100% carbon, but it was made for warmth and ultimate smoothness. As such, it is not a good match. See the graph below.



The graph below shows the typical curves used to make a warm UC print with LK and MK.

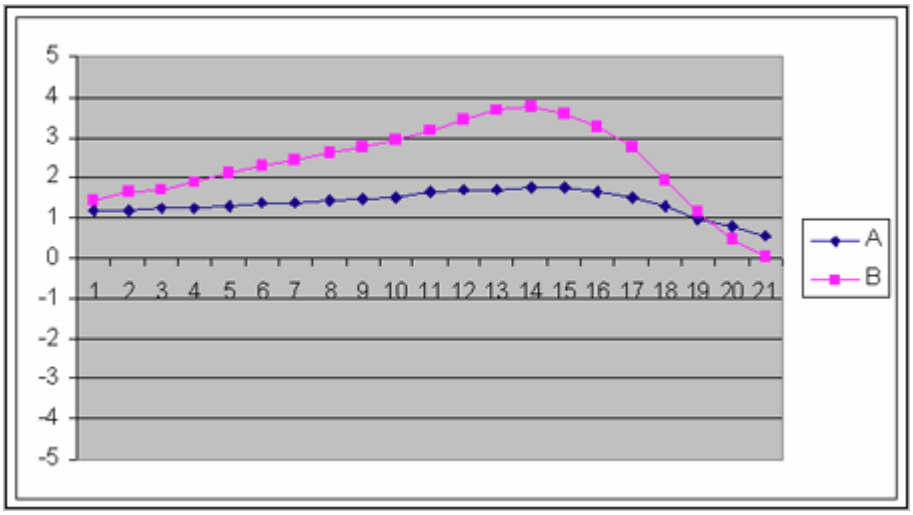


Profiles that match the R1800 prints must run the neutral Eboni much further up into the light midtones. See the profile for PA 325 below.



In the very lightest tones this profile still uses 100% LK, but by 5% very small amounts of Eboni are blended in.

The set of curves below shows the tones of a PA 325 printed with Eboni and LK, using QTR at 2880, uni-directional and the K2-Eboni-LK-PA325 profile, shown above.

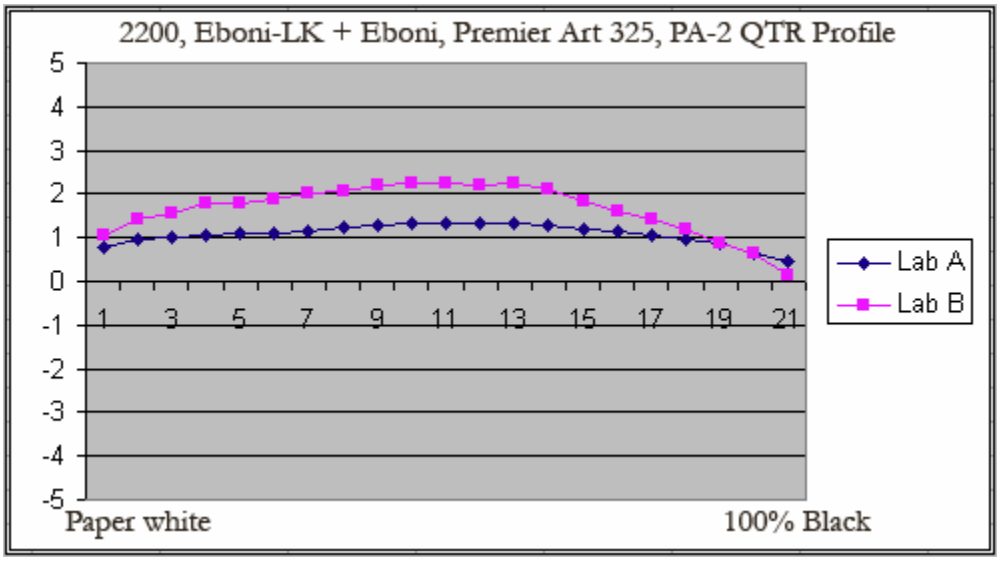


I think the tones are close enough that no one would see the differences in tones between a 325 print from the K2 printer using this profile and a Scrapbook print from an R800 and 100% Eboni.

Eboni LK

Of course, although what we can do above is probably fine for large prints, an LK that was as neutral as Eboni would be ideal. There is none, however.

On the other hand, while the dogma has been that Eboni cannot be diluted to make a more neutral LK, I'm doing it. While the "Eboni-LK" is still warm, it's not quite as warm as the current MIS LK (and not green like the K3 LK). Much more time is needed to see of this Eboni LK will be stable enough to use. However, below is the tone chart for the 2200 where Eboni LK is used in about 4 times the relative LK/MK ratio as above.



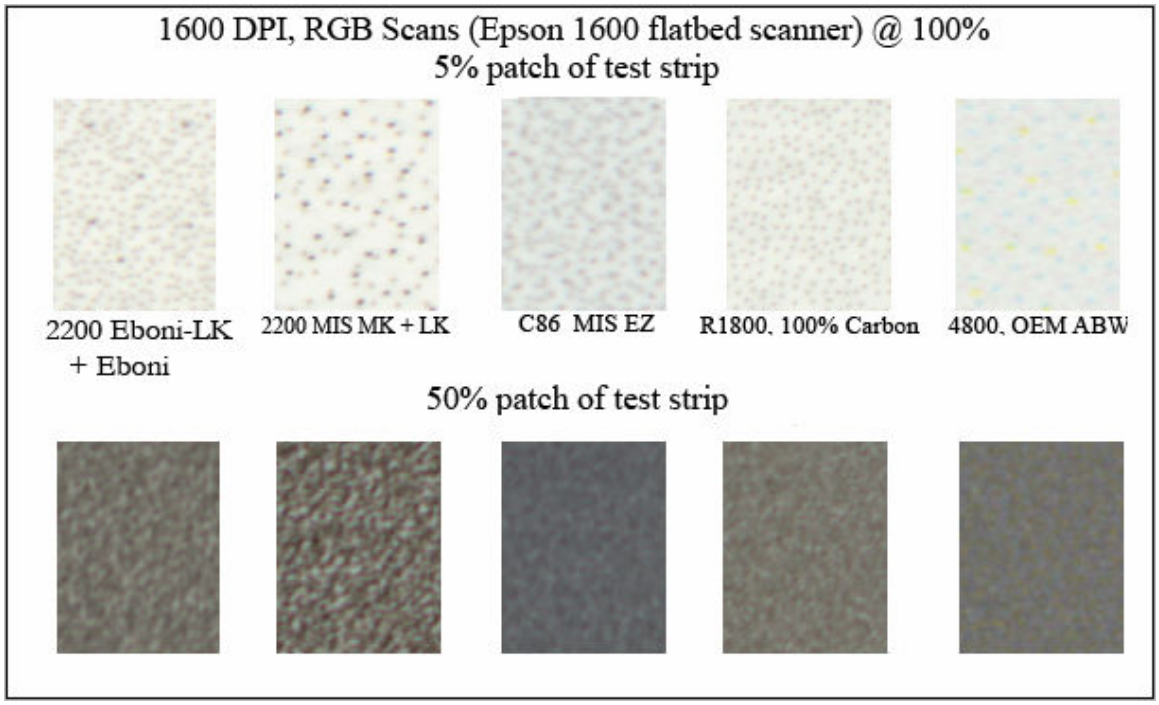
This makes quite a nice looking image. If the Eboni-LK is stable in longer term beta testing, it may be part of the answer for larger printers.

Relative Smoothness

Of course, the K2 print using this profile and standard MIS LK is not going to be as smooth as R1800 100% Eboni prints. However, with PA 325 the amount of LK that is used significantly hides or reduces the prominence of the MK dots. While I would not use this for smaller prints, for 16 x 20 and above, this may be what I'll be using. A very fine midtone grain is expected in even large format traditional silver prints of that size, and that is my target medium.

If the Eboni-LK proves itself to be stable, then the picture becomes even better. With the ability to put considerably more LK into the image, the Eboni dots recede in prominence significantly. The prints start to look smooth even at 8x10. See the scans, below.

High resolution scans give some indication of the relative smoothness. These are very small – 1.75 mm high – test patches enlarged via 1600 dpi scans.



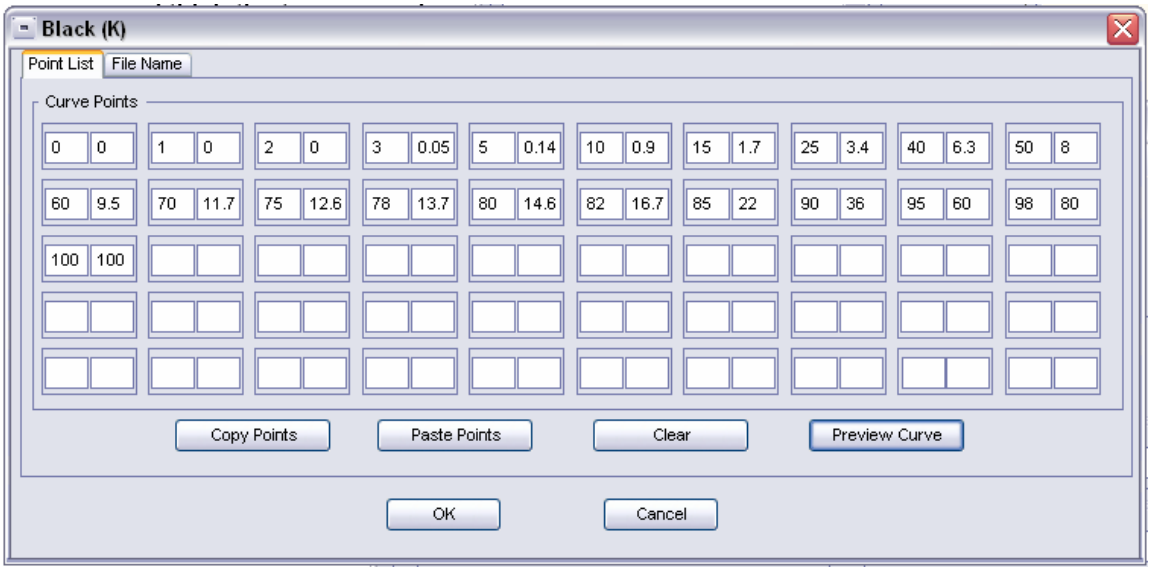
Overall, for large display prints, the K2 Eboni + LK approach makes sense for those who want to have 100% carbon prints. If standard LK is used I would not recommend it for small format desktop printing unless one likes the "Tri X" look to prints. Hopefully the Eboni-LK will be stable and the smoothness issue for k2 printers will be irrelevant.

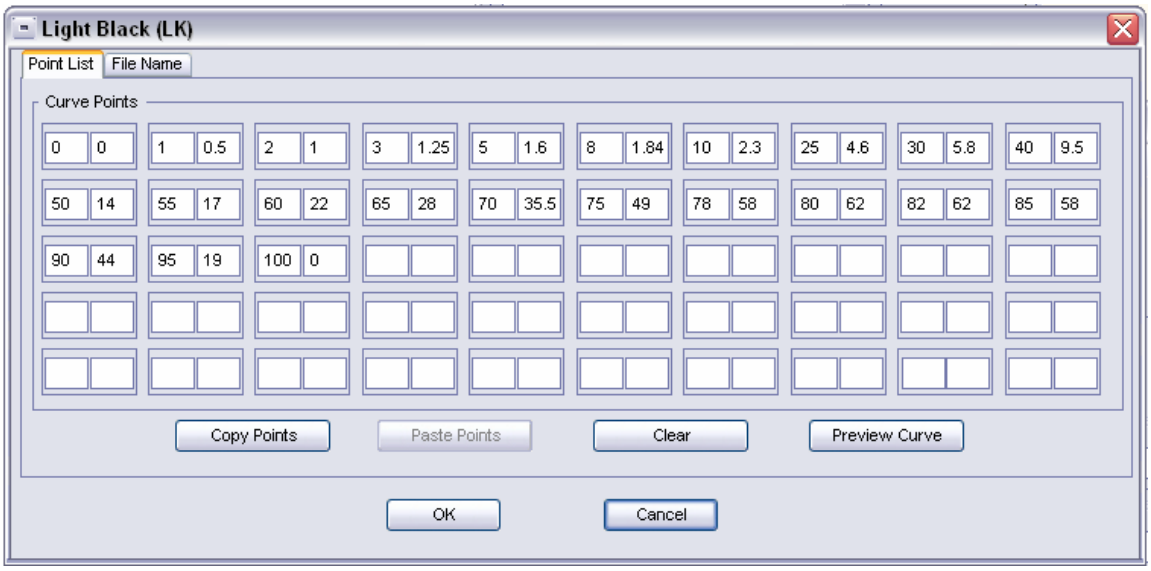
This is a work in progress, so profiles are in draft form only. See the QTR curve Points Lists for PA 325 and Hawk Mtn. Peregrine, below.

I'll be testing the approach on my 7500 next – with "Eboni-LLK."

Paul
www.PaulRoark.com

Premier Art 325: (Default limit 55, no others used, all tabs at defaults)





Hawk Mountain Peregrine: (Default ink limit 55)