Epson WorkForce 1100
Black & White Printing

Easiest Quad Workflow

www.PaulRoark.com
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The WorkForce 1100 is Epson's least expensive printer that can handle 13" wide paper. It is sometimes sold for as low as $130.[1]

The printer is designed for pigments and very fast text printing, with 2 black ink positions. It combines utility, low cost, and ease of maintenance when the inks discussed here are used.

The printer is capable of very good B&W printing with a number of different inkset options. While the Epson 1400 can be a more flexible photographic printer, for those who need fast text printing and also the ability to easily and economically print photos that can be up to 13"wide, the 1100 may be a good choice.

The WorkForce 1100 uses 3 colors, all concentrated, with no light ink positions. In this respect it is similar to the Epson C88. Like the C88, it also lends itself to an ink arrangement where all the midtone inks are the same density. Thus one can use a setup that requires only 2 bottles of ink to refill cartridges – a black and a midtone ink. MIS has marketed this type of approach for the C82-C88 as its MIS "EZ" approach.

For the 1100, I prefer using a midtone ink that is a standard "Light Black" (LK) density; this is slightly different than the MIS EZ inks. The new WorkForce approach I discuss here uses MIS UT14 inks (or others) that are of the standard LK density. The profiles I make available for the WorkForce printers assume this standard LK midtone ink density.

To avoid confusing the approach here with the MIS C88 "EZ" inks, I have referred to my 1100 LK-based easy approach as using a "K2-Quad" or "LK-EZ" ink arrangement. There are 2 densities of B&W ink – black and light black -- with 4 channels.[2]

With matte paper ICCs can be used for top quality printing, but they are not necessary. With glossy paper ICCs are recommended for good prints. These are currently available at http://www.paulroark.com/BW-Info/MIS-WF1100-Profiles.zip.[3]

While this approach is the easiest, I personally prefer and use an approach that uses 2 LK inks and one LLK ink.[4]

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[1] http://www.epson.com/cgi-bin/Store/jsp/Product.do?BV_UseBVCookie=yes&sku=C11CA58201
[2] The setup is not a "quad-tone" printer because there are not 4 different neutral densities of ink.
[3] ICCs are stored at different locations for different computers. For Windows 7, the location is: C:\Windows\System32\spool\drivers\color. Note that QuadToneRip does not support this printer. However, the ICCs made for the 1100 were made with QTR's Create ICC-RGB, and serious photographers who want to make custom ICC for their setup and favorite papers will want to purchase a copy of QTR. See http://www.quadtonerip.com/html/QTRoverview.html
[4] See, for example, http://www.paulroark.com/BW-Info/1100-HpGO.pdf

A. **WorkForce 1100 Easy LK Ink Positions**

       K = Eboni MK for matte or UT14 C (for neutral tone glossy)
       C, M, and Y = UT14 LC[5]

Note that UT14 LC is a neutralized (carbon blended with color inks) Light Black density ink. This LK-EZ approach can support a broad range of different LK inks. For very warm (sepia tone) prints MIS K4 100% carbon LK can be used. For medium warm matte prints, 100% carbon Eboni-6 M/LK can be used.   The 100% carbon inks make the most lightfast prints possible. Any time color inks are blended with carbon, the longevity of the carbon is compromised. But neutralized, blended carbon-color inks are fine for most uses.

If one uses the printer with no profile or ICC, MIS neutral/cool and warm LK inks can be installed at the same time to obtain intermediate print tones. ICCs that can also be used this way will have "no-cv" in their titles. ICCs are made for UT14-LC unless stated otherwise, and this ink is the recommended ink for most users.

B. **Matte Paper Printing Procedures/Workflow**

      1. **Printing with a B&W ICC**

A worthy goal of printing workflows is to have the print match the monitor. This is what a "color managed" workflow is supposed to do.[6] It assumes a properly calibrated monitor, which may or may not be what arrives from the computer seller. Commonly, LCD monitors are much brighter than would be ideal for prints. As such, while I use the results of a color managed workflow as the baseline to compare others, what works best for a particular setup may vary.

The graph below shows the "ideal" Lab L (lightness or luminace) distribution produced by an ICC that is printing a 21-step test file that is in the workspace Gray Gamma 2.2. Gray Gamma 2.2 is, in effect, a subset of Adobe RGB and sRGB, which are the most common color spaces.[7] As such, Gray Gamma 2.2 is the default gray working space I use. Likewise I use Adobe RGB (1998) for my color working space. This working spaces are set in Photoshop (Edit>Color Settings). If a different workspace is used, the ICC will read that workspace and make a print that matches what it displays on the monitor – ideally.

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[5] A 4 oz. bottle of MIS UT14 is $18 at http://www.inksupply.com/ut14_black_and_white.cfm .
[6] With B&W, I deal only with attempting to match the relative grayscale densities, not the colors or hues of the print.
[7] sRGB uses gamma 2.2 but has a very slight variance in the deep shadows, using a small linear section there.
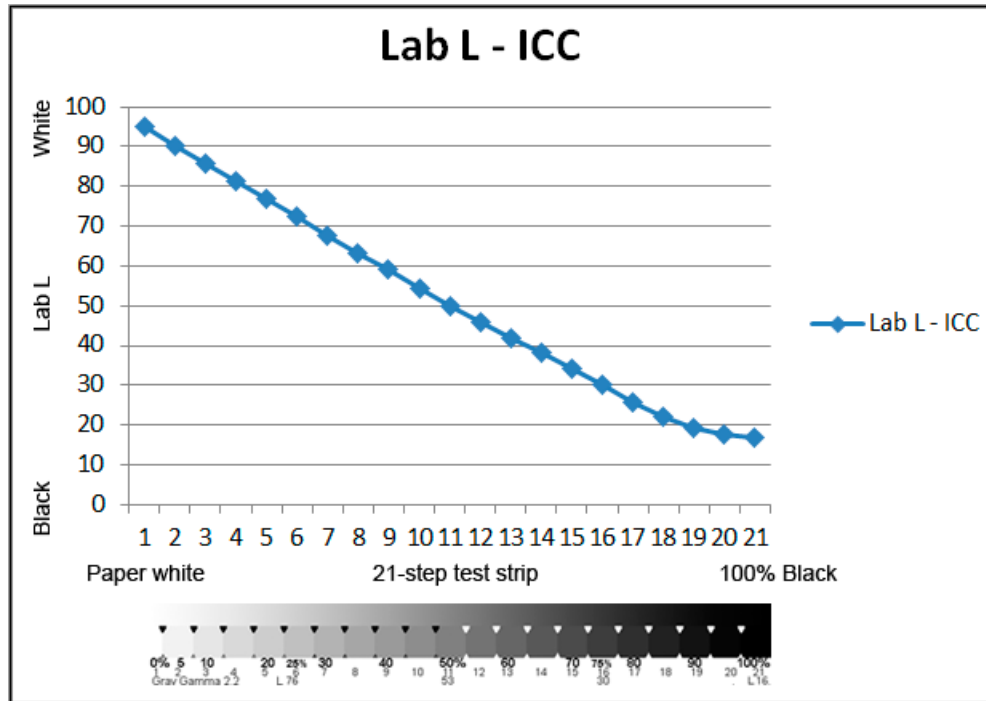
The graph above was generated by reading the Epson Ultra Premium Presentation Matte test strip with a Datacolor/Colorvision Spyder 3 Print spectro. It is also possible to use a flatbed scanner to do this,[8] but a spectro is a very good investment for avid printers.

The print was made from Photoshop CS5. The first settings in the print preview screen are shown below.

[8] See http://www.paulroark.com/BW-Info/Making_B-W_ICCs-GrayCard.pdf
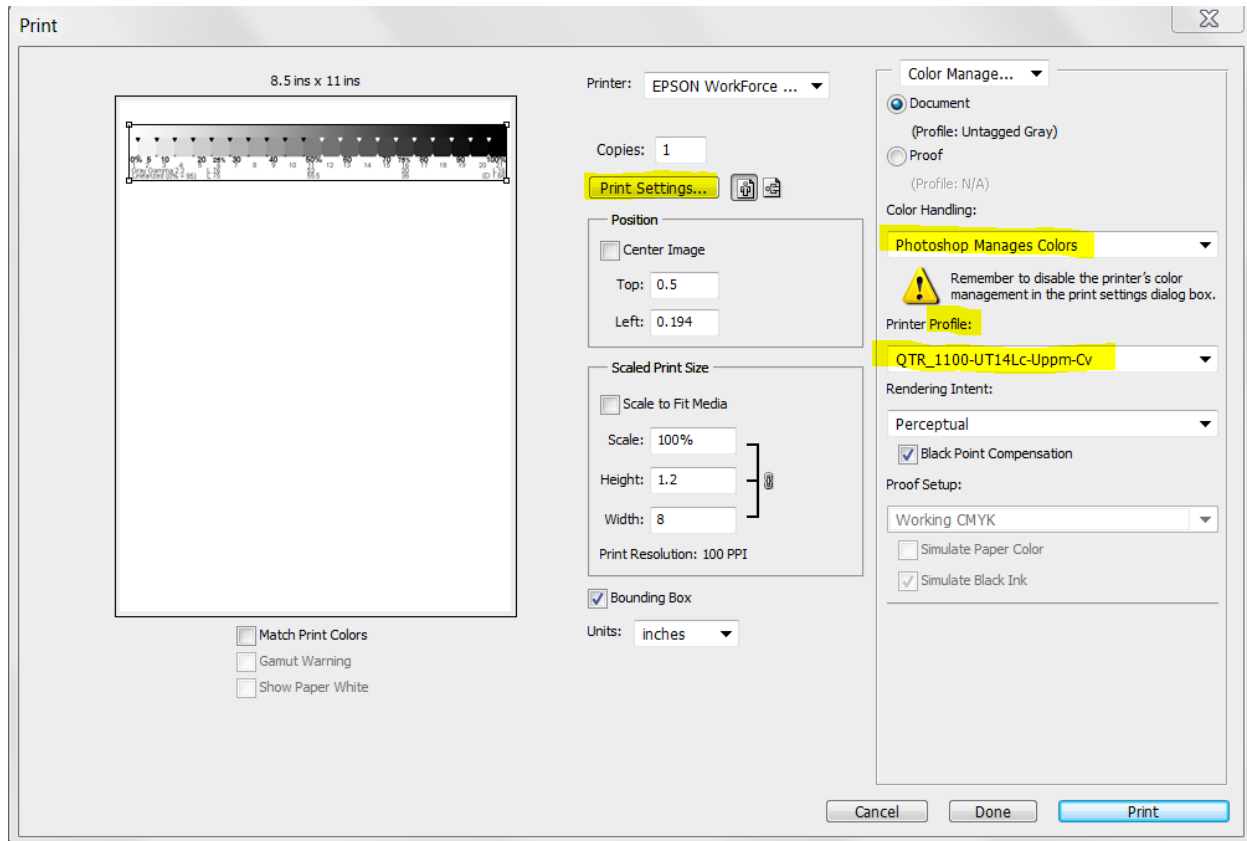
The ICC loaded here was "QTR_1100_UT14Lc-Uppm-Cv." This indicates the curve was made with QTR Create ICC-RGB. It is for the Epson 1100 using UT14 LC (neutralized LK) in the midtone positions, Ultra Premium Presentation Matte paper, and the ICC contains a curve (in this case to make smoother highlights).

The Photoshop print preview allows 2 types of color handling: Photoshop Manages Colors (that is, an ICC or profile will be inserted in the "Profile" box), or Printer Manages Colors. Photoshop appears to have a preference for profiles being entered in the preview. When ICC or other profiles are selected in this print preview, the current version of Photoshop automatically sets the Epson driver to "ICM/No Color Adjustment."

If one prefers to use the Epson driver to adjust the print characteristics, "Printer Manages Colors" must be selected. Watch that Photoshop does not change this back to "Photoshop Manages Colors." In CS5 the best way to have the setting "Printer Manages Colors" stick is to set that in the preview and then press the "Done" button at the bottom of the box. Then start over and go to the diver settings.

The Epson driver settings are accessed by pushing the "Print Settings" button in the PS print preview, shown above.

The following settings were used to make the print with the ICC, graphed above. These settings are the assumed settings for all paper types when an ICC is used. That is, for the ICCs I've made, these settings should be used regardless of paper type used – matte or glossy. I find the glossy paper settings call for too low an ink limit to result in a good black (dmax).
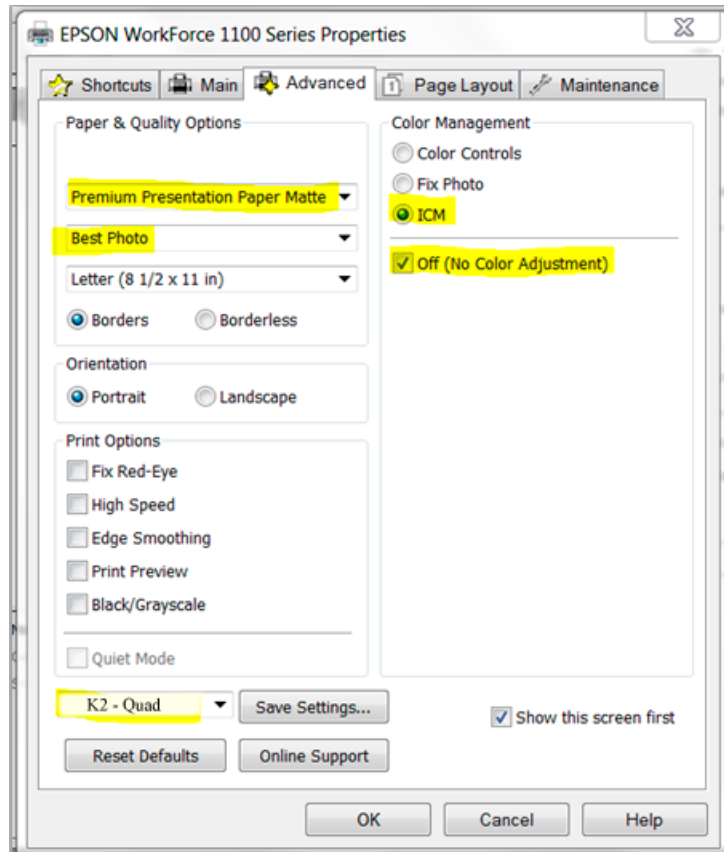

It might be a good idea to save these settings with an appropriate name.

When glossy paper is used these settings would result in too high an ink limit without a special curve that holds the ink down to what makes the best dmax and also avoids too much ink in the midtones. This will be dealt with further when discussing glossy printing.

2.   Printing Matte Papers with No ICC

Printing with no ICC can work quite well. Two options are discussed below.

First, the default settings that appear in Photoshop CS5 are "Photoshop Manages Colors" and profile "Epson IJ Printer 07." This is at the top of the list of possible profiles. It results in a print that is lighter than the ICCs when a gray gamma 2.2 file is printed. Typically LCD monitors are very bright – too bright; no paper print can match the LCD monitor default brightness. However, if the monitor is at the manufacturer's default setting, the Epson default profile may actually match it better than an ICC. It's an option for un-calibrated monitors that users may want to explore.
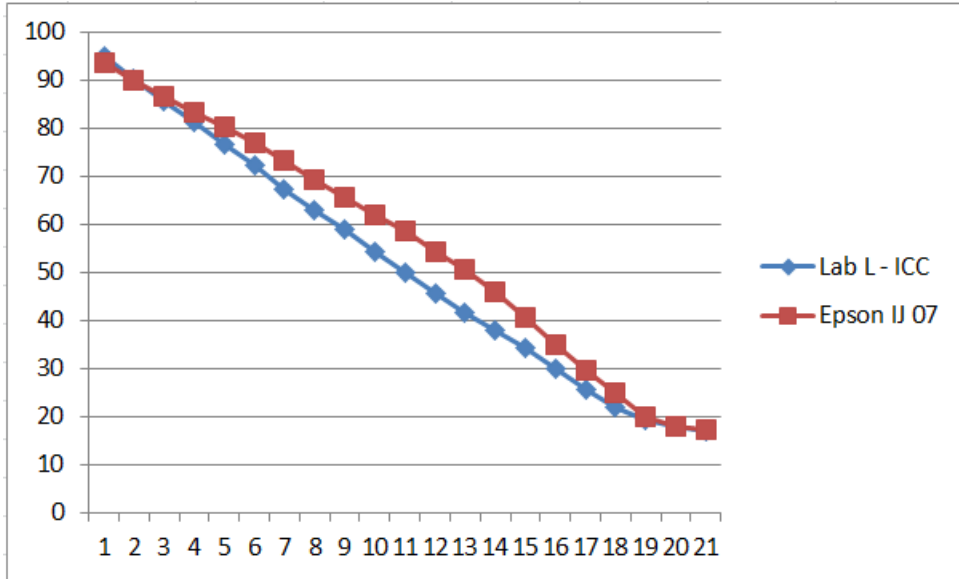

Second, one might choose to use the Epson driver to control the print. The default settings result in a print that is lighter still. See the graph below.
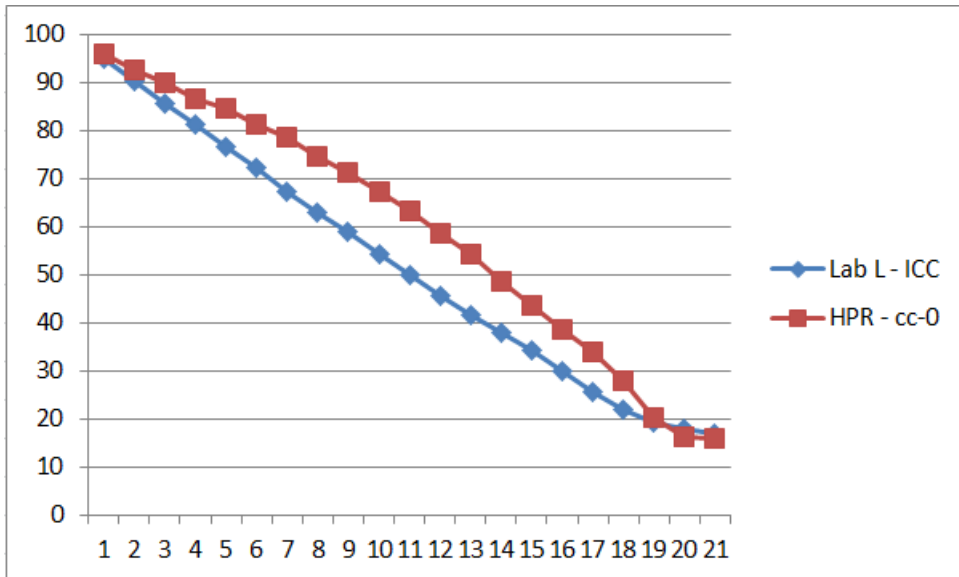
I do not recommend using the Epson driver controls because they tend to cause the maximum black to be reached too soon, eliminating detail in the very deep shadows. If one tries to offset this with sliders the print becomes too light. The paper used for the test strip shown above was Hahnemuhle Photo Rag, which has an ability to handle a very high ink load. As such, it prints reasonably well, but lighter than the "ideal" ICC output. It's possible that with more experimenting one could find settings that worked well and matched the monitor, but I was not impressed with the quality of control the Epson driver sliders gave.

The typical print tones – color hues – for matte papers are illustrated by the graph below for H. Photo Rag.
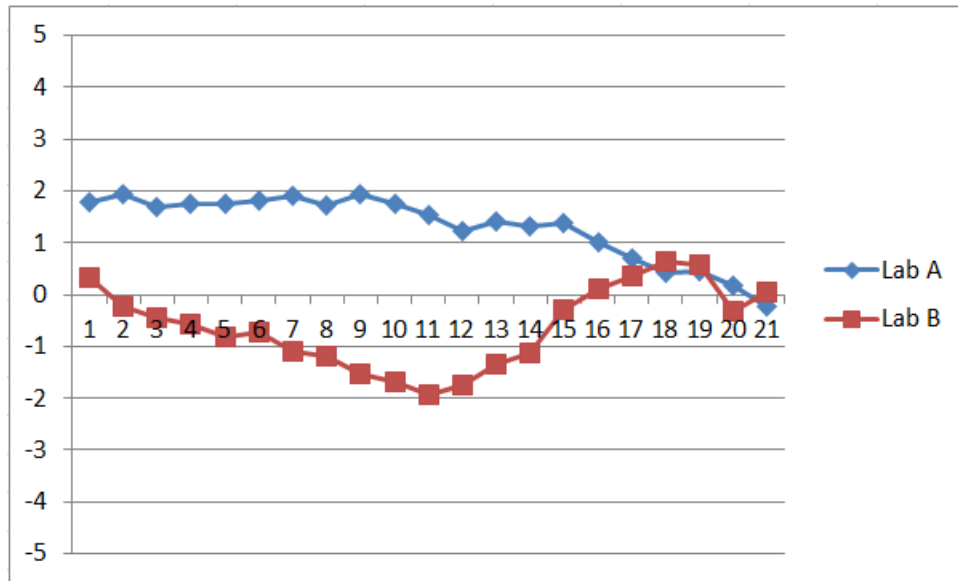
As the graph above shows, the print will have a slightly positive (warm) Lab A and slightly negative (cool) Lab B. Together they make a print that looks relatively neutral.[9]

C.   Printing Glossy Papers

1.   Printing Without a Custom ICC

The Epson driver by itself does not have a paper type that sets an appropriate ink limit for glossy papers. If a glossy type of media setting is used the dmax is very weak. If a matte media type setting is used the glossy paper will reach a good, deep black at about 90%. The detail beyond that point will be lost.

I have found no combination of settings that results in what I would consider good glossy printing without an ICC to deal with the dmax issue. The obvious solution seems to be to make a curve that prints the incoming file 100% black values at 90% for most glossy papers. An ICC can do that, and printing with an ICC, as discussed below, is what I recommend.

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[9] See http://www.paulroark.com/BW-Info/Color-basics.jpg for information on the Lab color model.

2.   Printing Glossy Papers with an ICC

The use of an ICC is the easiest way to solve the problem that the 1100 driver sets the black ink limit too low if a glossy paper type setting is used and too high if a matte paper type setting is used.   When the Epson driver paper type setting is put to Premium Presentation Paper Matte, as shown above for matte paper printing, a Photoshop image adjustment curve that simply went from 0 to a maximum of 90% (when the input is 100% black) sets the ink limit very close to what is needed for most papers. This can be used by on the file prior to printing, or it can be embedded in the ICC, for an easier and "linearize" and "color managed" output. Rather than a straight line curve (which would be needed if the midtone inks were a combination of warm carbon LK and cool UT14-LC) the curves that are used can smooth the highlights by sequentially starting the inks.

The resulting Lab L for a Gray Gamma 2.2, 21-step test file printed on Epson Premium Photo Paper Glossy is shown in the following graph.
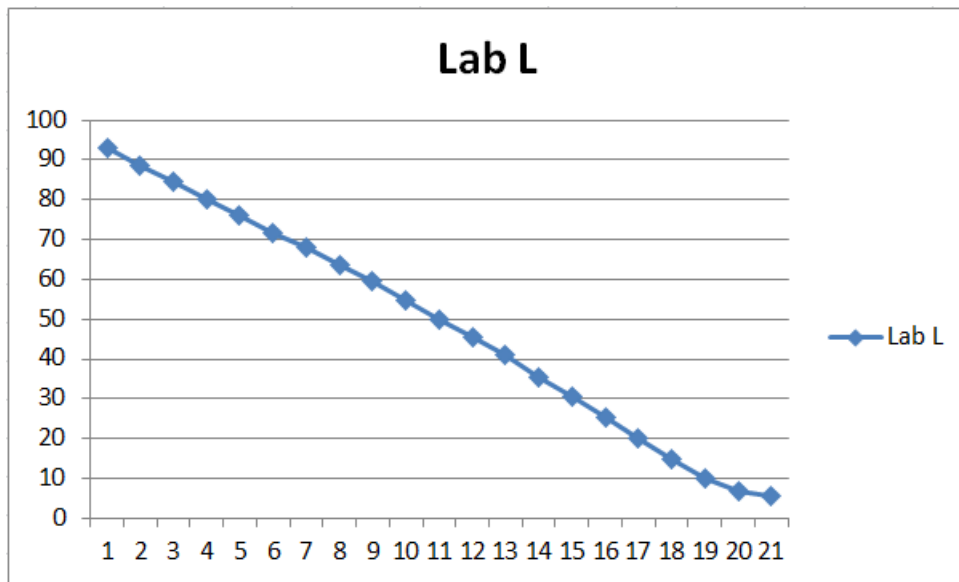

The color tones – Lab A and Lab B – for this paper and UT14 inks are shown in the graph below.
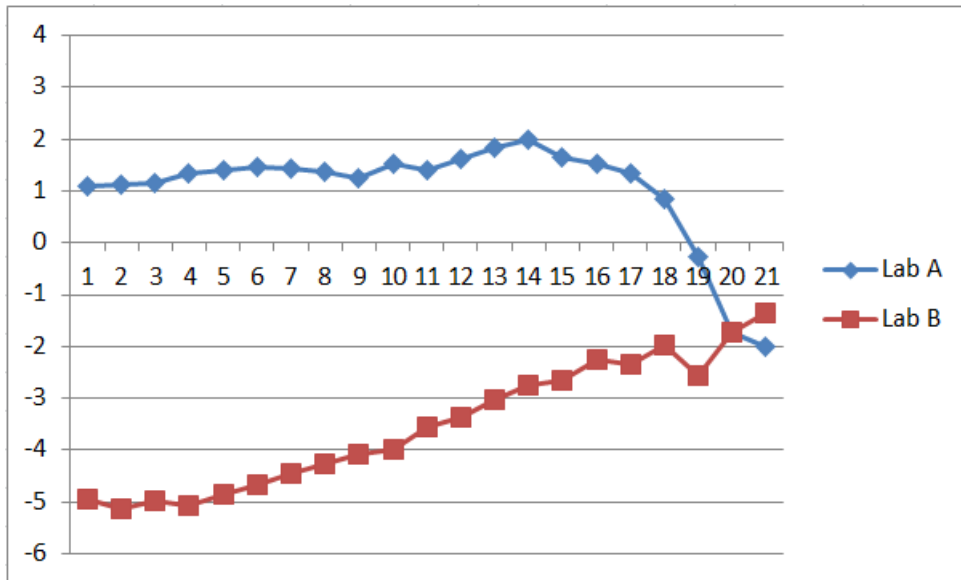
Red River glossy papers generally print well with the "1100-PppGlossy-seq-90" ICC as well.[10] The unique Red River Polar Metalic Pearl prints with the end point set at 93, and an ICC has been made for it.

Different types of glossy paper will need different curve to optimize their printing. For example, the Canson Photographique Baryta paper reaches a very good dmax of 2.25 at 94% of the matte paper ink limit. With UT14 inks it prints with an even, quite neutral tone, graphed below.

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[10] See http://www.redrivercatalog.com/browse/photo-gloss-inkjet-papers.html
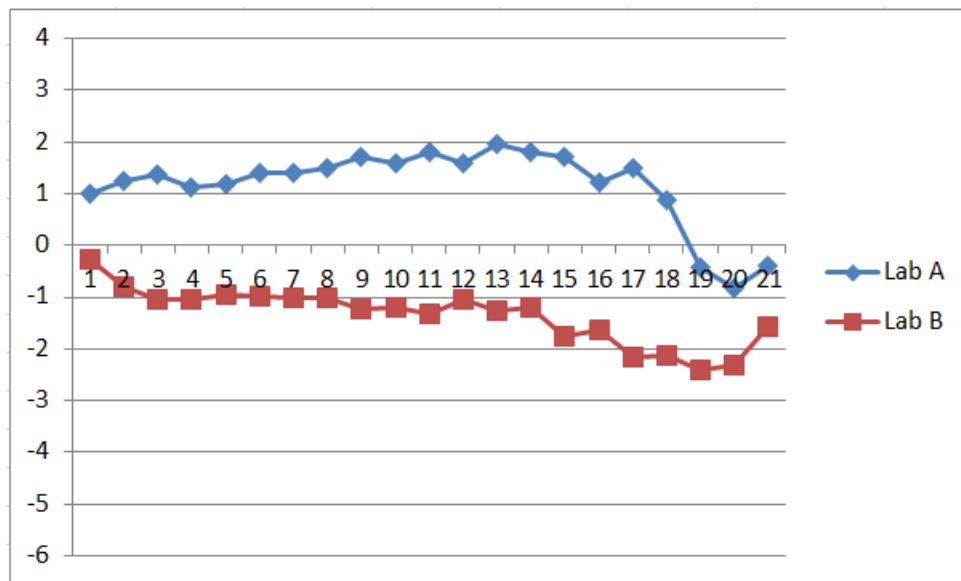
D.   Other Possible Inks and Ink Arrangements

As mentioned previously, any LK density ink will probably work well with this setup. Favorites of mine are the MIS 100% carbon inks: K4 LK and Eboni-6. Additionally, for the highest quality glossy neutral prints, HP Z3100 PK diluted with MIS amber base is the high end approach that will come the closest to carbon in its image stability.[11]

The MIS K4 carbon inks, such as the K4-LK, make the best "sepia" tone prints I am aware of. On a non-brightened paper like Museo Silver Rag they will print with a Lab B of about 14, which is very warm. It is not quite as warm as some of the old sepia prints or the sepia toner ink used in the MIS UT2 and UT7 inksets. However, being 100% carbon, the MIS LK will be far more lightfast than any of the other sepia tone prints. I have used the MIS LK (usually with MIS PK and LLK) to print sepia tone old photo reproductions that have been digitally restored and displayed in museum displays. The 1100 with MIS LK and the LK-EZ setup is what I use in workshops with the museum to demonstrate how people can make similar sepia tone restorations/reproductions of their fading family photos with the easiest setup.

Another favorite is MIS Eboni-6, which is my standard 100% carbon fine art print ink. With the usual LK-EZ setup it prints warmer than the full Eboni-6 inksets. I have used the Epson C88+ printer with this setup – Eboni-K + Eboni-6 M/LK – with a CIS for my kids in college. One has gone 3 years with only a need to refill the in the summer. The dilute Eboni mid-tone inks, being for matte paper only with virtually no binder, are the most clog-free inks I've ever used. They do need to be agitated if in a CIS, as dilute Eboni inks settle more quickly than the other MIS pigment inks.

Note that the 1100 can also be set up as a quadtone printer. That is, rather than all the midtone inks being the same, they can have 3 different densities in them. This makes the printer a classic quadtone B&W printer. [12] Photoshop image adjustment curves are needed to partition the inks, since QTR does not support the printer. However, such curves can be put into ICCs so as to make a simple workflow. This is not the same as the K2-Quad setup and is not recommended for most. It is discussed further at http://www.paulroark.com/BW-Info/1100-Eb4.pdf

I will continue to develop systems based on the WF 1100, as I think they provide very good value. The 1100 acts as my general home office printer, in part, because of its very fast text printing. Its price and the extent to which it is also capable of excellent, and in some configurations, the easiest, B&W photo printing with a number of different approaches adds to its appeal.

Enjoy

Paul
www.PaulRoark.com

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[11] See http://www.paulroark.com/BW-Info/1100-HpGO.pdf
[12] For the best sepia tone prints, I use an MIS K4-LLK in the Y position, MIS K4-LK in the M and C positions, and MIS K4-PK in the K positions. This "MIS K4-Quad" makes about the smoothest, most archival warm matte or sepia glossy (no OBA) prints possible.