

“1400-NC2” Inkset

For Epson 1400 Printer

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This inkset approach has similarities to both the MIS UT14 variable-tone inkset¹ as well as the Eboni-6, 100% carbon, monotone inkset.²

The “1400-NC2”³ inkset approach uses the basic format of UT14 (warm carbon channel, cool blended channel, and gloss optimizer in Y) but uses 2% Eboni (e.g., Eb6-Y) and 100% Eboni (e.g., UT14-K) in place of the warm UT14 LM and M inks. This allows relatively neutral, 100% carbon, matte paper printing with several workflows. Of course, the single Eboni K-position ink can be used. Additionally, a “2MK” format can be used to minimize the risk of microbanding. Finally, one can produce warmer and smoother prints by using the dilute 2% Eboni for the highlights. For the most lightfast prints, one of these 100% carbon pigment workflows might be preferred.⁴

NC2 contains glossy-compatible, neutral-cool, blended carbon-color, LK and PK density inks in the LC and C positions. These can be the standard UT14 inks, or HP PK and LK. In either case, the inkset allows relatively neutral glossy paper printing.⁵ These glossy prints are now my standard for brochures and other similar uses.

All inks or substitutes for them are commercially available. (One cartridge will need to be loaded from bulk MIS Eb6-Y ink.)

With Eboni-6 I found that the 2% Eboni light ink (Eb6-Y) and the full strength Eboni K were both the most neutral-printing and most relatively stable Eboni suspensions.⁶ I also found that a single 2% Eboni and two 100% Eboni positions were as good as or better than three of each in the 1400. Eboni-6 by itself does not print on glossy papers or allow neutral printing on most paper.

¹ See <http://www.paulroark.com/BW-Info/UT14.pdf> for a description of UT14.

² See <http://www.paulroark.com/BW-Info/Eboni-6.pdf> for Eboni-6 information.

³ “NC2” suggests “neutral” and “carbon,” and is a second version of both for the 1400, which I consider the printer of choice for 13” wide B&W printing.

⁴ See <http://www.paulroark.com/BW-Info/R1800-Lightfastness.pdf> for carbon pigment lightfastness information.

⁵ The elimination of the warmer UT14 M and LM inks does restrict the warm side printing. NC2-LM (dilute Eboni) is warm, but is also not made to be glossy compatible. Small amounts of it can be used on glossy paper where Gloss Optimizer is used to hold it down.

⁶ Midtone Eboni dilutions have been found to settle faster than most pigments; the 2% is relatively stable. Due to the importance of the settling issue, I now test inks with a centrifuge to predict suspension stability.

Ink Positions & Options

Y = MIS UT14-Y Gloss Optimizer (aka “Glop” or “GO”)⁷

LC = MIS UT14-LC or HP Z3100/3200 LK or 30% HP-PK⁸

C = MIS UT14-C or HP Z3100/3200 PK⁹

LM = 2% Eboni¹⁰ (Eb6-Y¹¹ with LM chip, or C6 blend¹²)

M = Eboni¹³ (e.g., UT14-K with a 1400 Magenta-position chip installed);

K = Eboni (UT14-K).

Print Tones

Matte Papers

These inks allow relatively neutral 100% carbon pigment printing with the Eboni MK inks, as well as somewhat warmer and smoother 100% carbon prints with the 2% Eboni added to the 2MK. When only carbon pigments are used, the print tones are very dependent on the paper used.¹⁴ When using just the 100% Eboni inks, the print tones are

⁷ For MIS UT-14 inks, see http://inksupply.com/ut14_black_and_white.cfm. In general, to find products at MIS, I go to <http://www.inksupply.com/searchpage.cfm> and use the “Search MIS Website” option.

⁸ The 1400-NC2 arrangement I’m currently using substitutes HP PK and 0.3% HP-PK in place of UT14 C and LC (or HP-LK). See <http://www.paulroark.com/BW-Info/Ink-Mixing.pdf>. These similar inks can be used somewhat interchangeably in this inkset. Re-linearization of profiles is recommended. While the UT14 C & LC are very good, the high tech HP Z3100/3200 Viverra PK and LK inks are probably the best neutral grey, blended (carbon with color) pigments of that type currently available. HP’s excellent Wilhelm Research fade test results should help with the acceptance of these prints in the fine art market. See <http://www.wilhelm-research.com/hp/Z3200.html>. However, for the vast majority of users, the MIS UT14 L and LC pigments are more cost effective and recommended. The MIS LC is a bit cooler and the HP-LK a bit denser than the 30% HP-PK used in this write-up.

For HP inks, see, for example, http://www.atlex.com/hp_designjet/z3100.htm. For mixing HP LK from HP PK, see <http://www.paulroark.com/BW-Info/Ink-Mixing.pdf>

⁹ In a comparative draw-down test on EEM, the LAB (L, A, B) spectro measures of the HP PK and MIS UT14-C inks were very close: UT14-C was (25, 2, -1.1), HP 3100 PK was (24, 1, -1.1).

¹⁰ This position must be hand loaded by the user. MIS has the required cartridges and syringes needed, and Eboni-6 Y (2%) is so light it is not a messy job that will stain sinks. See http://inksupply.com/inkjet_cartridges.cfm?search_getmodel=512 for the empty cartridges.

¹¹ See <http://inksupply.com/eb6.cfm> for Eboni-6.

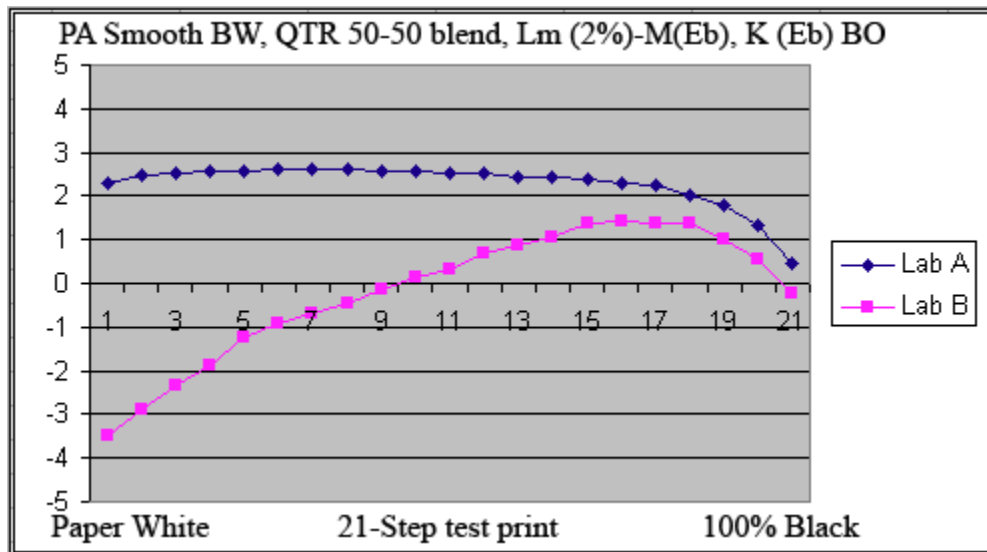
¹² See <http://www.paulroark.com/BW-Info/Ink-Mixing.pdf>

¹³ While a single Eboni “black only” profile makes the smoothest prints, it can exhibit minor microbanding, usually below what people can see in normal viewing. The addition of a second Eboni allows this minor artifact to be substantially eliminated, with much less graininess than the 3MK approach. Two Eboni positions are also needed for optimizing the dmax on some papers.

¹⁴ For the most neutral carbon pigment printing, I use Premier Art Smooth papers, with the Smooth Bright White being my standard for Eboni-6 in the 7500 printer. See http://www.premierimagingproducts.com/pm_smoothbwfineart.php

similar to the 1800 3-MK workflow.¹⁵ When the 2% Eboni is also used, the print tones will be similar to when Eboni-6 is used.¹⁶

I often print on Premier Art's Smooth Bright White paper. I use QTR to blend a 2% Eboni-Eboni channel with a K black only. This makes a 2%-2MK mix that is 100% carbon, smooth, yet the relatively neutral tone I like for my landscapes. See the tones below.



The inkset also prints neutral-cool, matte and glossy prints with the carbon-based but blended C and LC ink positions. This allows neutral or warm tone printing on a much wider variety of papers than when just the 100% carbon Eboni inks are used.

With the dilute HP grey and 2-MK one can get the highest percentage of carbon for a given level of coolness. The dilute HP gives very smooth highlights.

The following chart shows the Lab B values¹⁷ for 3 different QTR¹⁸ profiles¹⁹ for this inkset on Premier Art Smooth 325, a non-brightened paper. The 2% Eboni-Eboni profile prints with warm highlights, the 2-MK profile is just slightly warm, and the HP-Eboni profile is neutral-cool.

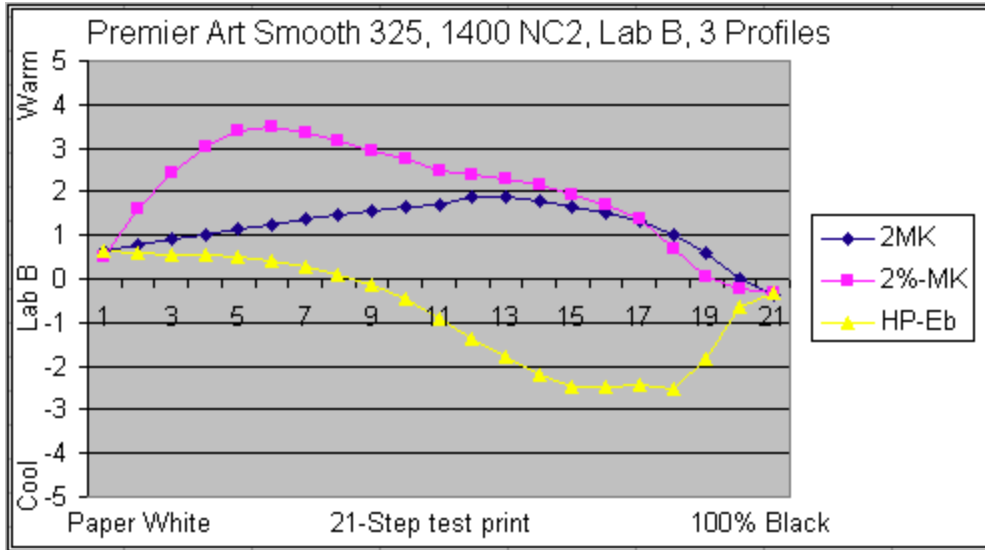
¹⁵ See <http://www.paulroark.com/BW-Info/R1800-No-OBA-Paper.pdf> for information on un-brightened paper tones. See <http://www.paulroark.com/BW-Info/R1800-OBA-Papers.pdf> for brightened paper tones.

¹⁶ See page 3 of <http://www.paulroark.com/BW-Info/C88-C13-5.pdf>.

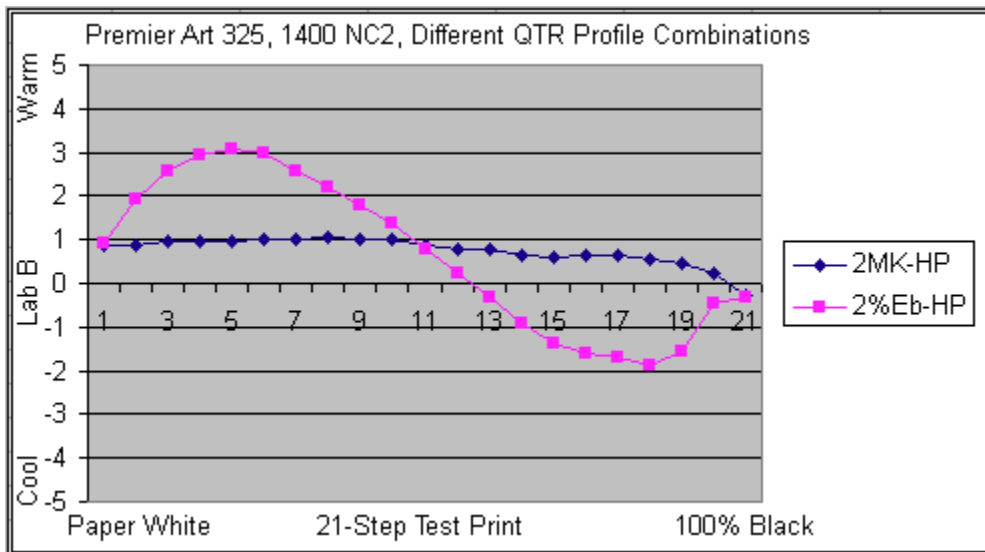
¹⁷ The Lab B values are the main variables. Lab A tends to stay relatively closer to the paper value, but follows the Lab B changes somewhat. The Lab L values remain linear with QTR. The higher the Lab B value, the warmer the print will appear. Additionally, for brightened papers, where the print tones rise above a straight line between the cool paper white and deep shadow tones, the print will appear to be warm. The eye tends to use the paper white as a reference point.

¹⁸ See <http://www.quadtonerip.com/html/QTRoverview.html>

¹⁹ As I make profiles, they'll be available in <http://www.paulroark.com/BW-Info/1400-NC2-Profiles.zip>

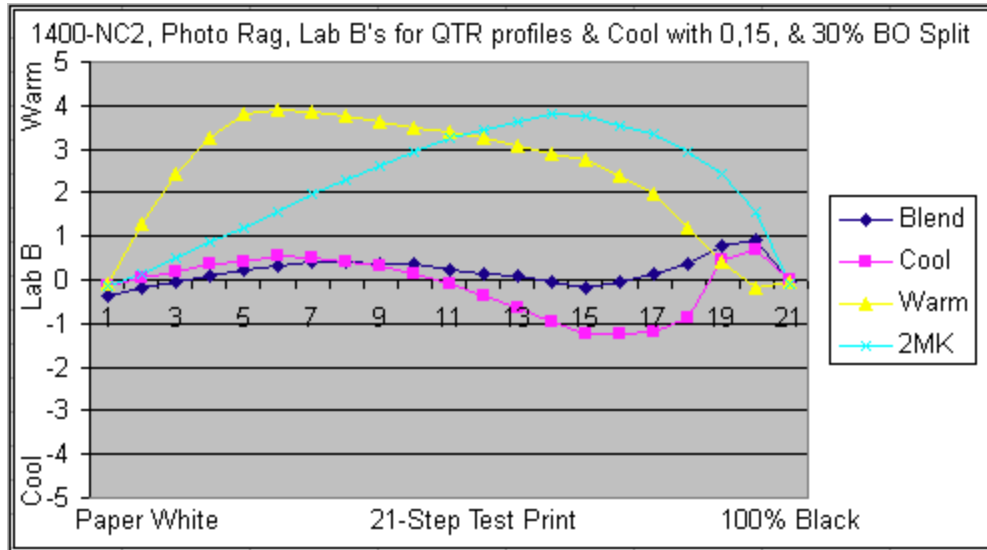


These QTR profiles can be mixed and matched with the QTR sliders to make a very neutral matte paper print or one with a distinct split tone. The chart below shows the Lab B values for two different blends on Premier Art 325 paper. The “neutral” blend uses the 2MK inks and HP pigments. (See the dark blue line, below.) The split tone blend uses the QTR sliders to select the 2% Eboni ink in LM (Eb6-Y) warm ink for the highlights and the HP pigments for the cool shadows. (See the magenta line, below.)



Another example of a popular matte paper – Hahnemuhle Photo Rag – is shown below. The “Warm” QTR profile (yellow line) uses the dilute Eboni for the highlights. The 2MK profile uses the K and M Eboni positions. The “Cool” QTR profile uses the HP inks for all but the very darkest tones, and it characterized by cool shadows.

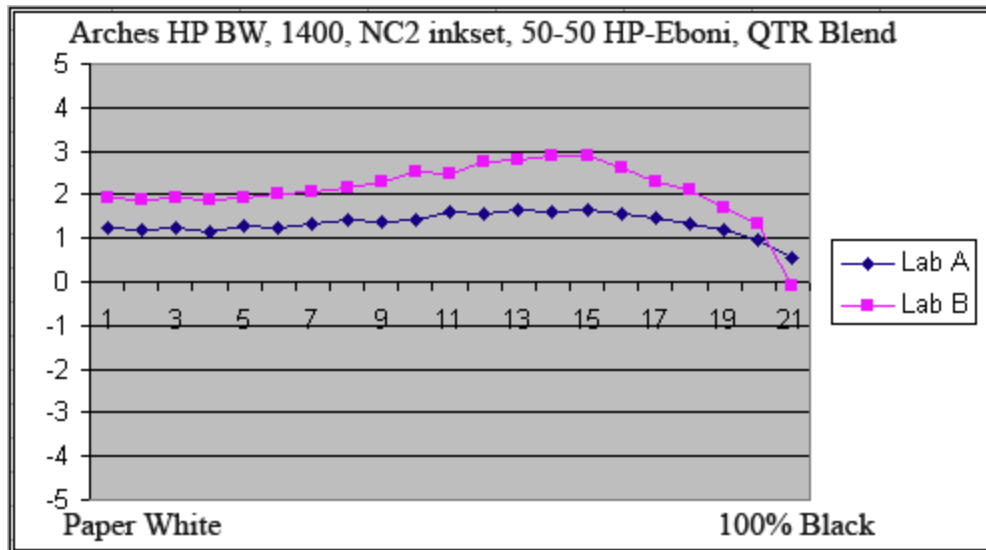
The HP inks (“cool” profile) can be warmed by blending in the 2MK profile with the QTR sliders. Here the 2MK sliders were set at 0%, 15%, and 30% for the highlights, midtones and shadows, respectively. (See the dark blue line.)



Arches Watercolor Paper

For artistic and potentially longevity reasons, some believe un-coated watercolor papers deserve more attention. I’ve always kept them on the radar, and found that Arches Hot Press Bright White allows the smoothest printing with the best dmax – still modest at 1.56 to 1.61 with Eboni MK – sometimes best if in 2 or 3 channels.

The NC2 with Eboni black only and HP PK (including its 30% “LK”) make the best of these types of prints that I’ve seen. A 50-50 QTR blend of the HP and Eboni makes a neutral print that, with the Arches deckle edge at the bottom, shows very well even without framing. If washed after printing, its surface appears to be, relative to other inkjet prints, very durable and abrasion resistant. Particularly with the 1.5 pl printer smoothness, this type of print may be very interesting for some markets.

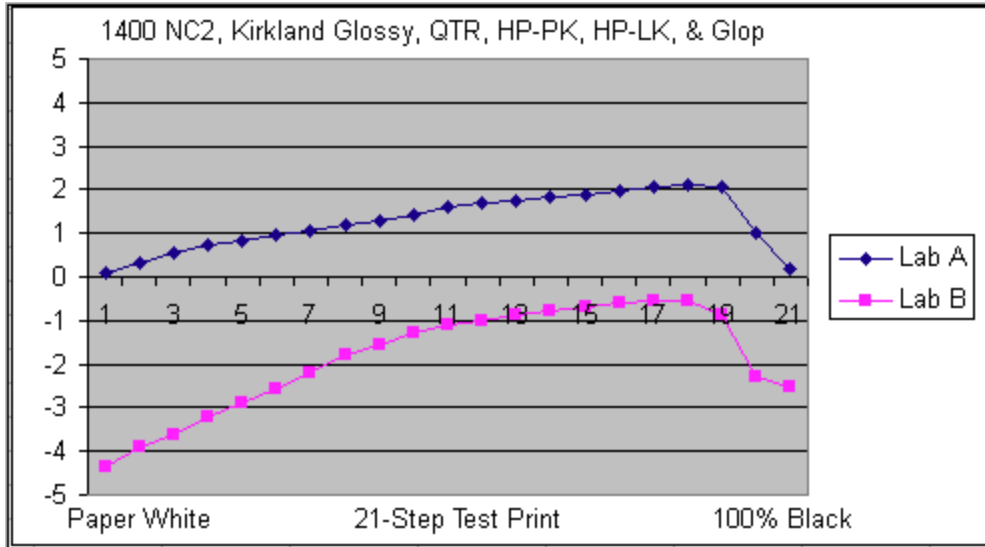


Some are also washing the surface of the print to largely remove the glycols, glycerol, and loose carbon from the paper surface. Arches paper is made for the wet watercolor medium and is very tolerant of having a shower-head type wash of its surface with warm water. The resulting print ends up with a surface that is quite resistant to carbon rub-off and abrasion.

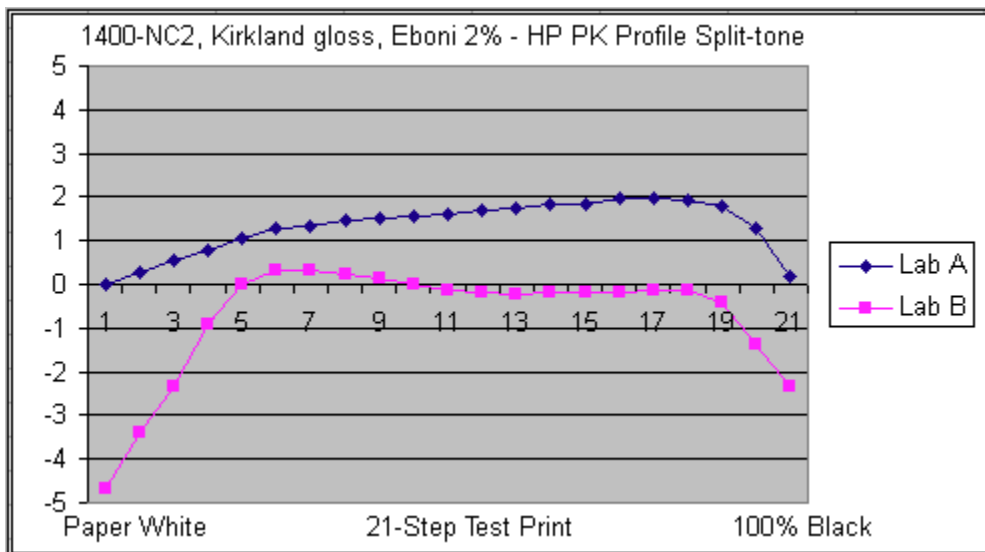
Glossy Papers

Neutral glossy papers are printed with HP-PK and HP-LK²⁰, with Glop used to substantially eliminate the bronzing that otherwise is a problem with the HP pigments. The chart below shows the tones of such a print on Kirkland Glossy paper, which is typical of the brightened RC types of paper. A dmax of about 2.4 is realistic with this combination.

²⁰ I diluted HP PK for this use: 30% PK, 70% C6 base.

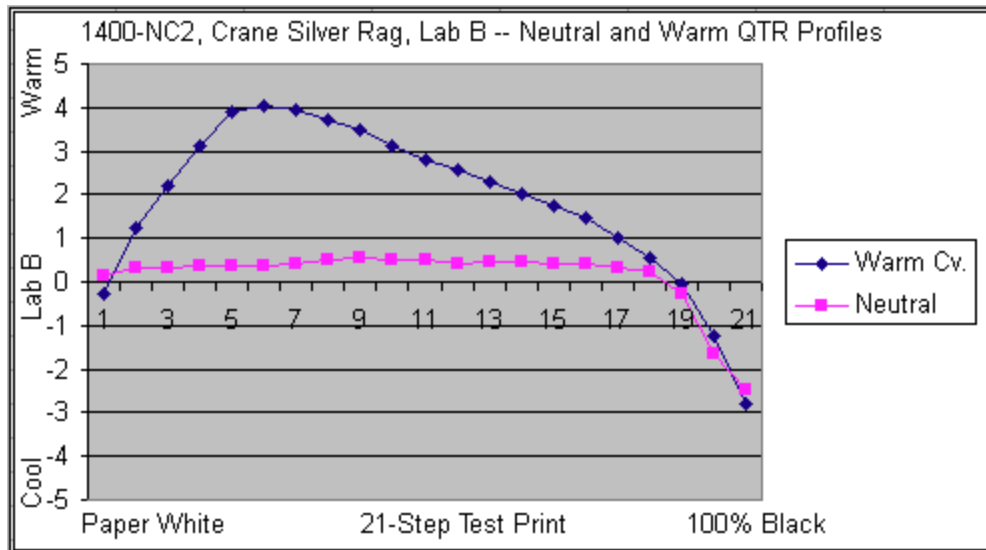


While the dilute 2% Eboni LM ink (Eb6-Y) is not glossy compatible, glop (NC2-Y) can be used to hold it to the paper reasonably well. Some care is needed to find the amounts of 2% Eboni and glop that are needed for the rub-off to be under control. However, with care NC2-LM (2% Eboni) can be used for warmer prints on glossy papers. The chart below shows the tones that resulted with 90% dilute Eboni was set in the QTR split-tone sliders for the highlights. For the rest of the print the split-tone mix was 50-50.



While the print tones are, in fact, mostly neutral, it appears warm relative to the cold paper.

With an un-brightened paper like Crane Silver Rag, the NC2 cyan channel (HP PK and LK) result in a very neutral print, and the dilute Eboni produces a relatively warm print. The chart below shows just the Lab B values for these 2 QTR profiles.

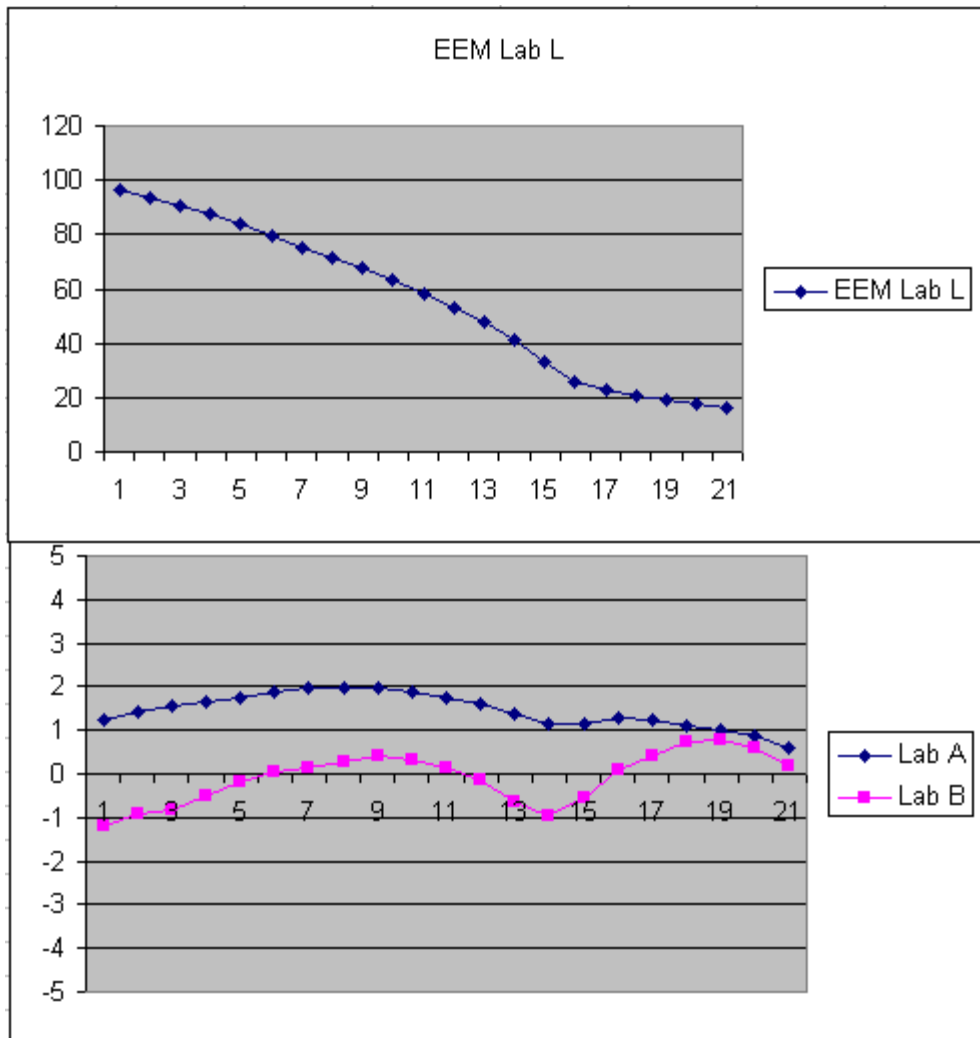


Printing Workflows

This inkset can be printed with either QTR or the Epson driver. However, unlike the UT14 inkset, where I supported primarily the Epson workflows, I'll support mainly QTR workflows for this one.

Epson Driver

With no profile and the Epson driver set to UPPM (old EEM) paper type and the highest quality setting, with Color Controls and Gamma 2.2 selected, the print is a bit light in the midtones with fairly high shadow contrast. The print tone is relatively neutral, with slightly cool shadows. See the charts below.



The settings above result in a grayscale ramp that linearizes well with QTR’s Create ICC, and an ICC for this matte paper is included in the Zip file of profiles.²¹ With “No Color Adjustment” selected in the driver the inkset prints a somewhat straight line response, but the toe has less information in it than if Color Controls, Gamma 2.2 is used. As such, the latter makes a better ICC.

With glossy paper and only the cyan channel used, and with the driver set to “No Color Adjustment,” the Epson driver prints with a very straight characteristic curve. To deal with the bronzing that will result, Glop can be added via a Photoshop image adjustment curve. A sample curve is included in the profile zip. These curves can be embedded in ICCs using QTR’s Create ICC-RGB for very simply glossy paper printing.²²

²¹ <http://www.paulroark.com/BW-Info/1400-NC2-Profiles.zip>

²² See http://www.paulroark.com/BW-Info/Embedding_Photoshop_Curves_in_ICCs.pdf.

QTR Printing

Note that I use Windows. As such, the interface and procedures will differ from what Mac users have.

QTR has sliders that allow up to 3 different QTR profiles to be used, including splitting tones by having different percentages of each profile used for the highlights, midtones and shadows. I'm utilizing these sliders and the approach they allow to make profiling simpler, yet allow more print tone flexibility.

I have been making profiles that deal only with a single channel – e.g., cyan for neutral/cool and glossy, magenta for warm carbon. Additionally, there are already many 1400 black only (K channel only) profiles pre-loaded in QTR. Additionally, the 2MK approach deserves separate profiles. With these relatively simple profiles, it appears that the same basic curves and cross-overs will be suitable for many paper of the same general type. As such, one can usually just re-linearize an existing curve for a new paper. For the best dmax, the ink limit of the K can be checked, but little else needs to be done.

(This is a work in progress. Among other things, I'll focus more on QTR and coming up with the simplest way to use it.)

Update – NC2b

I've found that the HP PK black only is all I need for glossy printing. So, I have gone to a 2-Eb-MK, 2-HP-PK, and 2-Eb2% setup.

Paul

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