

B&W Printing with Noritsu D700 Dye

Epson R220 Variable Tone Option

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The Epson Stylus Photo R220 is a good development platform for most other non-1.5 pl Epson printers. As such, I would expect many Epson printers to perform similarly to the results obtained with this printer and the Noritsu-based B&W inkset described below.

The ink arrangement is as follows:

K = Noritsu K (NK)¹

C = 30% Noritsu K + 70% dilution base² (NVT-C)

LC = 30% NVT-C (9% NK)

M = 30% (26% Noritsu Magenta [NM] + 74% NK) + 70% dilution base (NVT-M)

LM = 30% NVT-M

Y = 6% (NK + 13% NM) + 94% dilution base.

In previous testing, a blend of 87% Noritsu K and 13% Noritsu M, diluted to make a midtone ink, has been found to be a very good compromise for a monotone inkset. It gives very good tones on the Epson premium RC series and many other glossy papers. However, many papers still print too green with only 13% M to 87% K. While Epson Ultra Premium Presentation Matte paper prints with very flat Lab A and B tonal response curves with this mix, it has a low dmax. The best matte paper with a 13% NM monotone blend is Red River Premium Matte.³ The popular Hahnemuhle Photo Rag need twice as much magenta in the blend to look neutral.

Thus, this variable-tone design uses the 13% target as an average with all channels used, but has a reserve of 26% Noritsu magenta (to 74% NK, and then diluted) in the M-LM channel for

¹ Dry lab photo finishing suppliers are numerous. This is a partial list of Noritsu suppliers.

<http://www.pfsny.com/M/Noritsu/Noritsu-Dry-Lab/Noritsu-D703.html> (NY);

<http://www.imagingspectrum.com/noritsu-d703-digital-dry-photo-printer-d703.html> (TX);

<http://serranorey.com/222-noritsu-dry-supplies.html> (FL);

http://www.desktopdarkroom.com/noritsu_d701_ink.html (FL);

<http://www.sgaimaging.com/catalog/printers-scanners/noritsu-compact-inkjet-printers> (GA & FL);

<http://www.southpointphoto.com/productcart/pc/viewPrd.asp?idcategory=115&idproduct=1064> (TX & TN);

<http://www.fotoclubinc.com/Departments/Printer-Media/Noritsu-Media/Noritsu-D701D703D1005-Inks.aspx> (Santa Fe Springs, CA). If purchasing on eBay and the price is less than \$187, check the expiration date.

² For information on the clear dilution base, contact me at roark.paul@gmail.com. I do not recommend the dilution bases used for pigments, such as the generic base discussed at <http://www.paulroark.com/BW-Info/Ink-Mixing.pdf>.

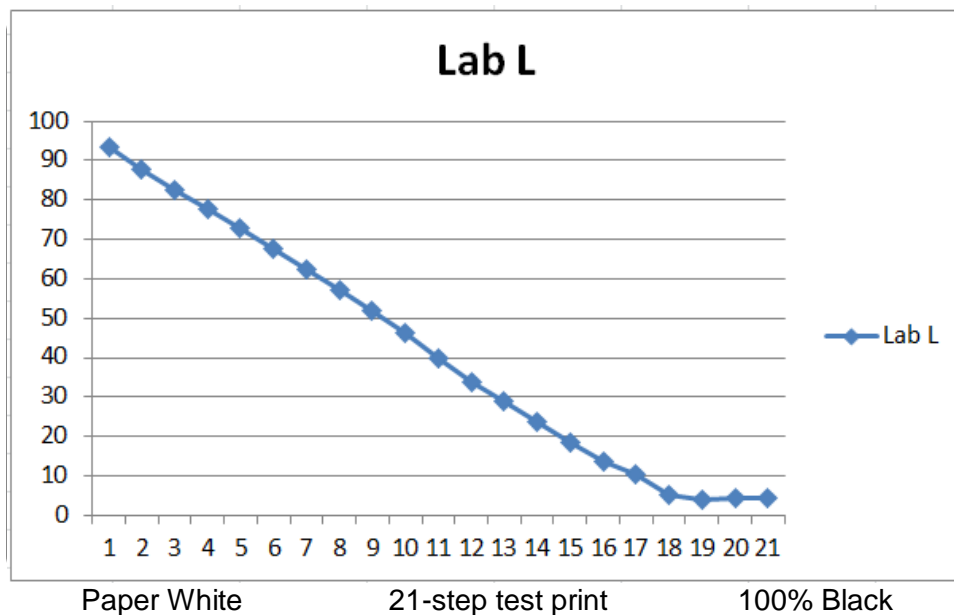
³ See <http://www.redrivercatalog.com/>

dealing with the papers that print too green with the 13% blend. This variable-tone approach is able print many more papers than a monotone approach while still looking very good on many papers with no special color profiling.

With respect to the gray ramp, the R220 native “No Color Adjustment” response curve when the Epson driver is used is typically very straight but with somewhat blocked shadows. For testing, the Epson driver has been used with the paper type as appropriate⁴, No Color Adjustment used, and the quality set to the highest settings.

Epson Premium Semigloss was used as a typical Epson Premium RC paper. See the graph, below, for the Lab L response with this paper.⁵

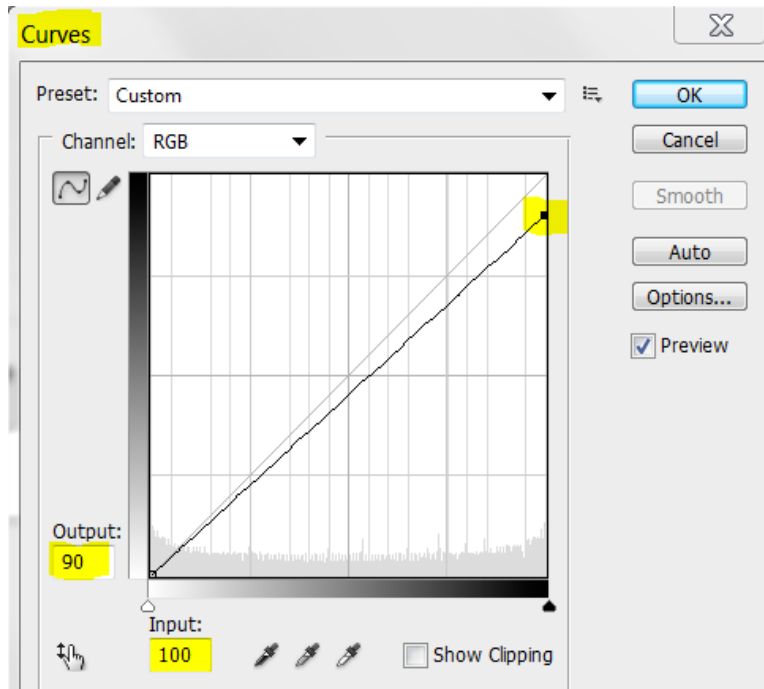
Epson Premium Semigloss, R220, Noritsu VT inkset, No Color Adjustment
Epson driver, “No Color Adjustment”



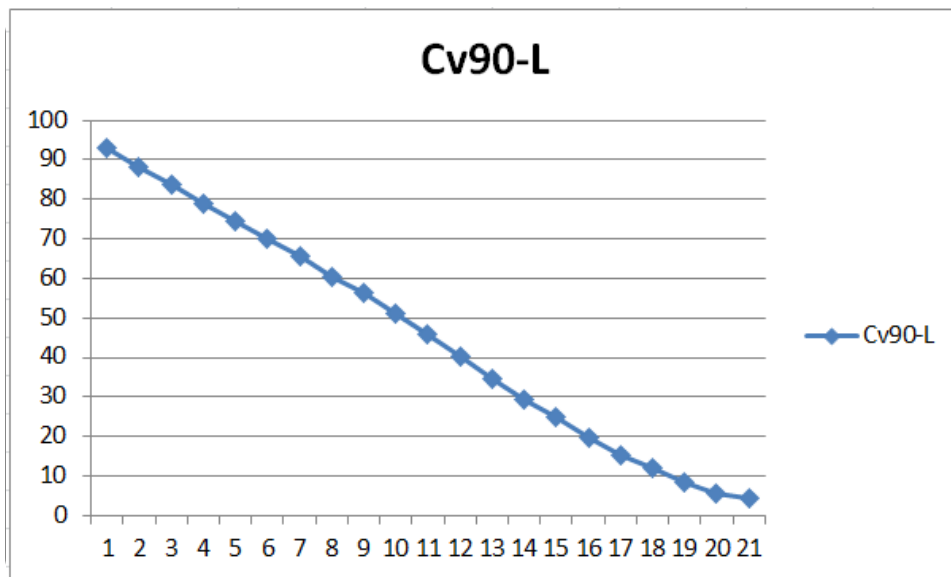
While this print will look reasonable, the blocked shadows can be corrected by an easy Photoshop curve, like that shown below:

⁴ The Epson driver has appropriate paper type settings for a number of its RC papers. For matte papers “Matte HW” is used. For glossy paper not listed, I’ve used Epson Premium Glossy paper type setting.

⁵ Note that I’ve tested this inkset with the Epson driver, but QTR could also control this inkset approach. QTR could also maximize the dmax better with more control of ink limits. The Epson driver, however, is fast and simple for those who do not know QTR. It also allows a “color managed” workflow with ICCs made with QTR’s Create ICC-RGB. Finally, the option for a fully color managed, small gamut, 3D workflow is part of the long term design. The Epson driver is needed for this.

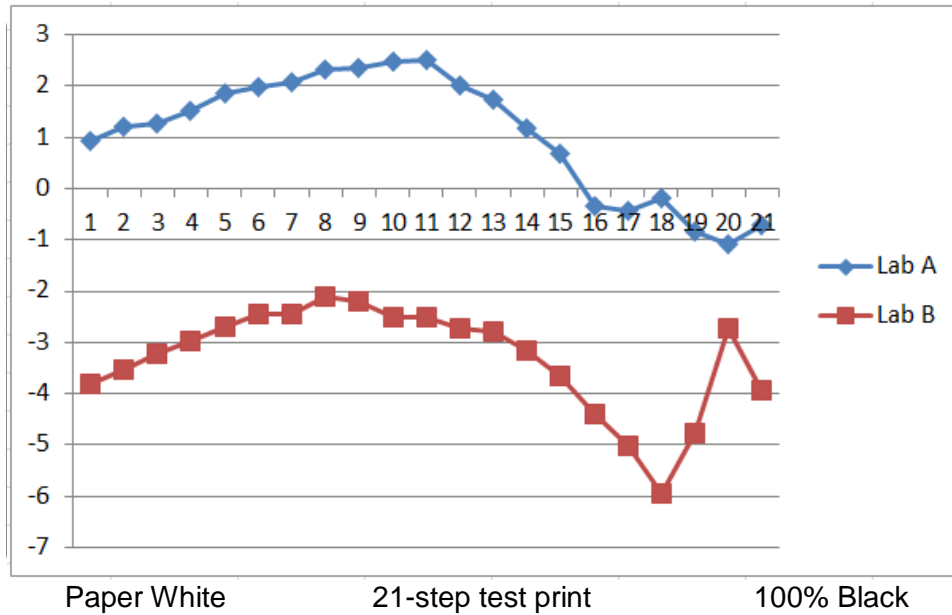


The grayscale ramp that results from the simply straight line curve above is quite good for printing directly.



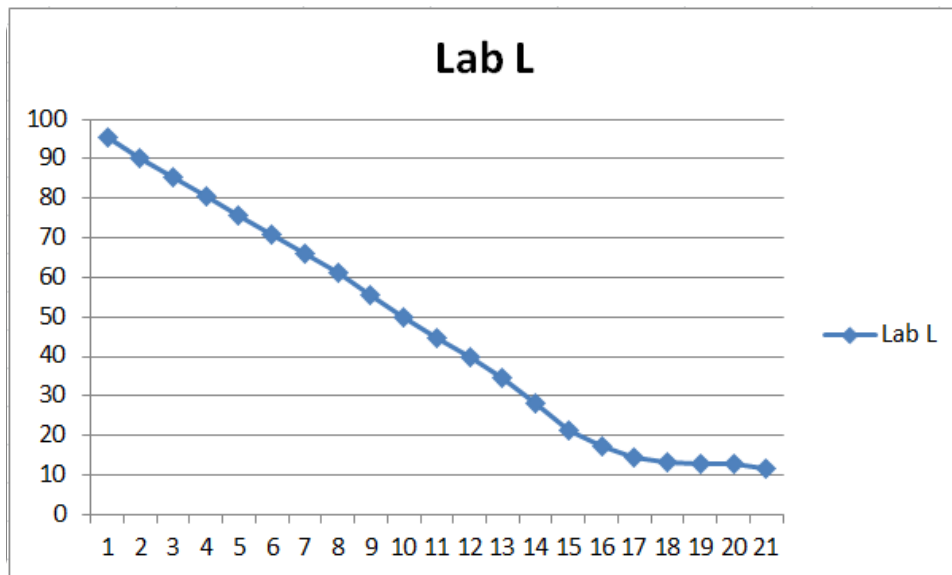
This curve would be perfected by using an ICC made with QTR's Create ICC-RGB. The Photoshop curve would be embedded in the ICC to correct the K ink limit and optimize the dmax, while the ICC would "linearize" the output in a "color managed" workflow that matches the print relative densities to the calibrated monitor's display.

The tonal distribution with no profile and Premium Semigloss is shown below:

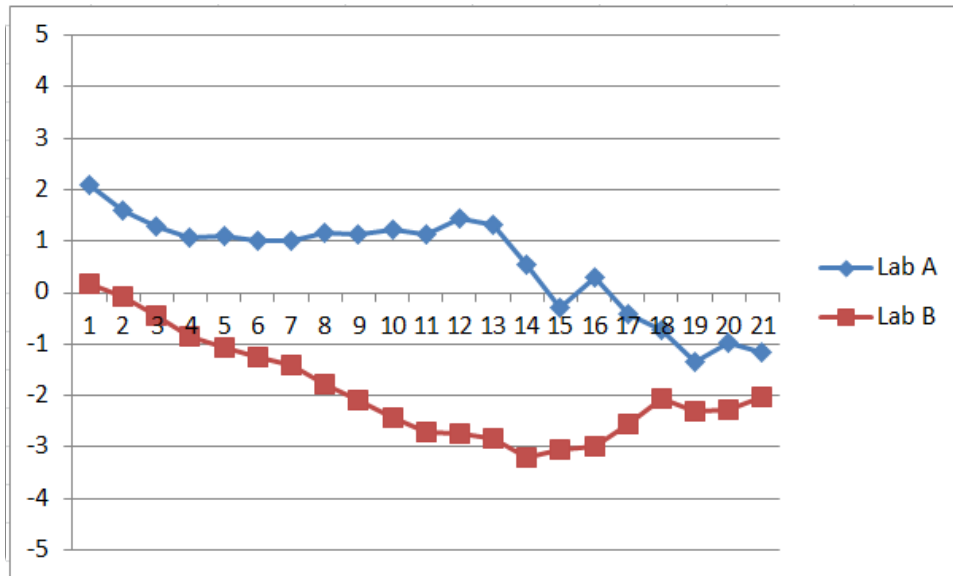


While the high lights of the 220 with this inkset are smooth with no further partitioning, the Y-position ink is a lighter, neutral (13%) ink that can be used for further smoothness in printers with larger dots.

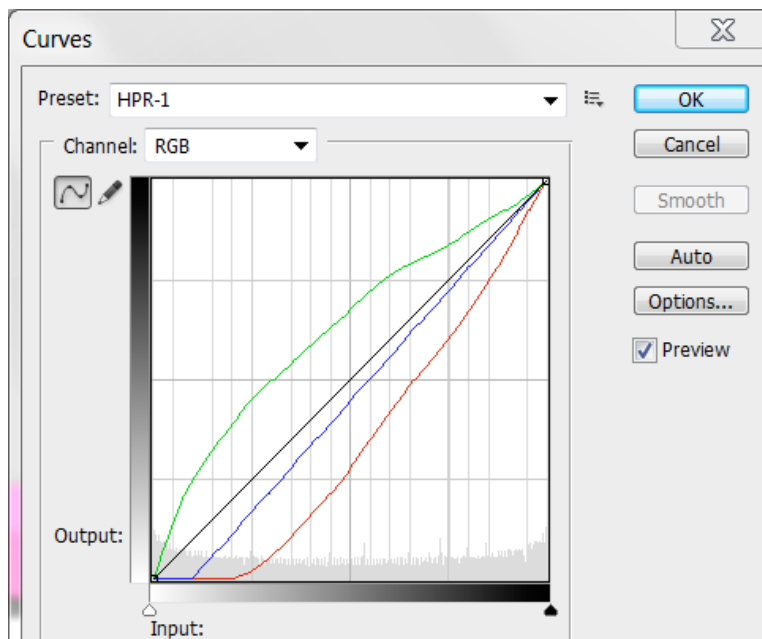
Hahnemuhle Photo Rag has the best dmax I've tested with Noritsu K. It prints with a rather typical – for this inkset and printer – compressed toe, as shown below.



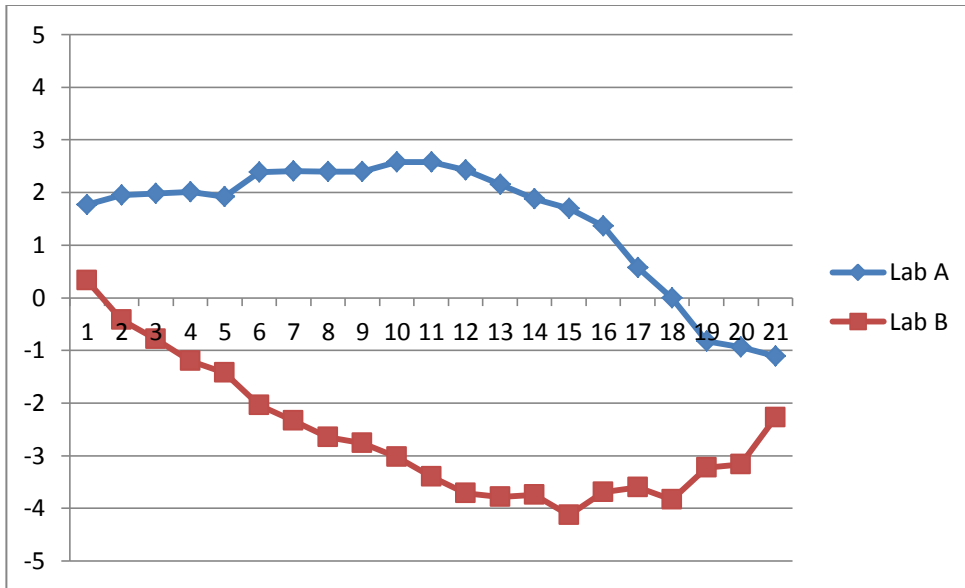
The tones of HPR tend to the green (Lab A declines from the paper white in the most visible lighter midtones. See the Lab A and B graph, below.



This greenish print tone can be curve by utilizing more of the M-LM (26% M) channel and reducing the C-LC used. This can be done with either QTR or by using a Photoshop image adjustment curve such as the one graphed below (HPR-1).

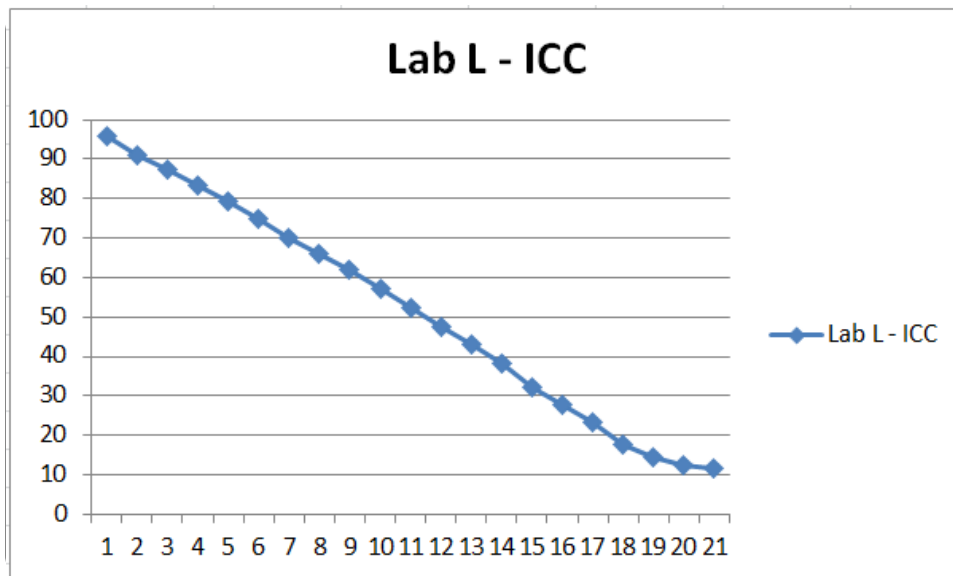


When the Epson driver is used with QTR's Create ICC-RGB, one ends up with a "color managed" workflow that matches the calibrated monitor to the print and has a high bit depth pipeline from 16 bit Tiff to print. The Lab A and B for the 21-step test file printed with an ICC with the above curve embedded in it is graphed below.



For those who like a cold tone matte print, this HPR print with its 1.9 dmax might be about as good as it gets.⁶

The Lab L of a 21-step test file in Gray Gamma 2.2 workspace printed with the ICC is shown below.



⁶ Note that I am not pursuing the **full 3D model** with the Epson R220. However, Noritsu yellow (or a blend that contained yellow) could be put in the yellow position to warm the print and achieve an inkset that could reach almost any normal B&W print tone. It might also be able to be profiled with color profiling software. For the glossy papers the tones seem appropriate without the need for any warming, and that would introduce more complexity to the approach.

While I will work with this setup a bit more, I think the viability of this type of variable-tone inkset using Noritsu inputs is clear. The R220 in the past has been a good predictor of performance on other Epson printers. I think there is a high likelihood that wide format printers will work in much the same manner as the R220. What LK to use (18% or 30%) is open. I believe the LK equivalent density 18% might be the first to test.

The profiles I've made for this inkset are at <http://www.paulroark.com/BW-Info/N-VT1-Profiles.zip>. Obviously, with different printers different profiles will be needed, but the Photoshop curves may be useful.



[All donations to the cause of free inkset designs and profiles are appreciated.](#)

Enjoy.

Paul

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