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Epson SureLab Printer
Sales, Support & Connectivity



Running the colour gamut

APRIL 11, 2019

The announcement by Fujifilm US at the IPIC conference in Las Vegas last month of a [new silver halide paper](#) with (fairly vague) claims of a **broader colour gamut** prompted us to ask leading independent supplier of photographic paper, iPhoto, how the various photo printing technologies stack up in terms of colour range performance.

Their response included the chart below, showing how the premium Kodak photo paper, Endura (Fujifilm doesn't make its premium AgX papers available in Australia), stacks up against Epson Surelab inkjet and Indigo digital press printing:



Epson Drylab - Mapping inputs is easier in Epson Surelab Inkjet, due the shape of the Profile & the overall larger Colour Gamut

NB - Kodak Endura Ag-x traditional, and Best in Market

We followed up with a few questions, and received the following replies, with this caveat from iPhoto managing director, Stuart Holmes: 'Naturally these are our opinions only, but are based on a combined knowledge base in the photographic industry of over 200 years, so I would contend they would be among the best available on the subject in Australia, if not internationally':

Inside Imaging: Is there any possibility that the current colour gamut of AgX paper could be improved, or is this as good as it can get?

iPhoto Technical Managers: AgX research & development probably reached its peak many years ago. With the overall decline in photographic print output following reduced consumer demand, newer drylab technologies have provided a more 'sustainable' system for high quality photographic printing. Further R&D in improving AgX wetlab printing would simply not be viable in today's reduced 'economies of scale' environment, particularly with the increased costs surrounding the sourcing of raw chemicals for the manufacture of dangerous goods (DG) liquid photo chemistry required for processing light-sensitive wetlab media.

These DG chemistry products are also being regulated out of some world markets now due to environmental concerns surrounding the shipping, storage and distribution of hazardous chemistry, increasing the costs on an already sunset technology.

At the same time, wide format printers and minilab drylab equipment is relatively inexpensive compared to complex wetlab minilab equipment, at around one-third of the setup costs. In fact, compared to the initial setup costs of, say, a Fuji Frontier Digital Wetlab some 15 years ago at in excess of \$240K, today's drylab technology could be fully fitted out for less than \$40K! And the quality of the output will arguably match and exceed traditional AgX in many regards. Its ability to do this at a fraction of the cost on hardware and at similar consumable rates is why print professionals are choosing new drylab technology over the old wetlab AgX hardware.

For these reasons alone, it would be difficult to imagine any further AgX R&D investment could be considered economically viable going forward.

The relatively large colour gamut of Indigo printing might surprise some readers – by the chart it looks to perform better than AgX – any comments on how that relates to ‘real world’ printing?

iPhoto: The gamut chart does not tell the whole story: It is a measurement of the gamut at the midpoint of lightness only. Other factors influence how the print looks. The Indigo has relatively wide gamut at this point but may fall off more at low or high lightness values. Contrast may be lower as well. That would explain why Indigo prints lack ‘pop’.

Many screen display devices now are capable of ‘soft display’ of a much wider gamut (matched with a high contrast ratio). Apple has adopted the wide-gamut ‘Display-P3’ standard for iPhones and computers: See more info at <https://appleinsider.com/articles/16/09/09/apples-wide-color-screen-on-the-iphone-7-will-lead-to-more-faithful-color-reproduction>

Android has followed suit: <https://en.wikipedia.org/wiki/DCI-P3>

Display-P3 and AdobeRGB have a similar gamut and are significantly wider than sRGB, which has been the default standard colour space until now. Today’s customers will expect prints to have the same bright colours that they see on their smartphone and tablet screens now.

The Epson Surelab D700 and D3000 inkjet printers have a gamut that closely matches the AdobeRGB/Display-P3 colour spaces. Silver halide has a gamut closer to the sRGB colour space. As you will note, AgX is particularly limited in the red region, whereas AdobeRGB and P3 extend well into the red area.

Of the three printing technologies, which do you think has more potential for improvement?

iPhoto: Investing to further develop AgX technology is somewhat risky considering the shrinking user base, and rapid development of inkjet and other dry technologies. It’s sort of like why fewer companies want to invest in coal-fired power stations – they can see that new, more eco-friendly technology is coming.

What was seen in at Kodak R&D in AgX film and paper in the 1990s produced diminishing returns as the technology reached its limits. Inevitably the focus had to be on reducing costs rather than improving performance, as digital technology started to have an impact in the market. AgX probably hit its limit around the release of the Digital LED/laser exposure technologies in the late 1990s/early 2000s (replacing optical enlargers in minilabs) and is limited by the ability of emulsions and chemicals to produce a greater gamut and finer grain.

So, it is certainly not AgX that has more potential for future improvement.

Inkjet technology that would have to have the most potential, considering the recent advances. Inkjet printhead nanotechnology is still developing, so higher dpi is still possible. We still see inkjet breakthroughs such as ‘full print width fixed heads’ that are starting to enter the market. As this technology is further advanced the quality and reliability will improve to the point where it will be applied to higher quality imaging applications. The side-benefit will be a smaller equipment footprint, much higher speed and fewer moving parts, resulting in improved duty cycles.

On that point inkjet technology, or more specifically dry minilabs, could still have a potential card up their sleeve should companies like Epson ever choose to add Light Black (L/bk) or Light, Light Black (L/lbk) ink cartridges to expand and improve monochrome tonal performance. In that same vein there is always a potential to add even more colour cartridges.

There are currently six inks in the Surelab system – Cyan, Light Cyan, Magenta, Light Magenta, Yellow and Black. Significant print quality improvement lies with the addition of the Light Cyan ‘LC’ and Light



Epson Surelab D3000 inkjet 'drylabs' daisy-chained to create a high volume photo printing installation.

Magenta 'LM' inks, which allow for subtle tonal gradations in both colour and black & White printing. Including six colours allows the Epson SureLab to rival continuous tone (AgX) print outputs for smoothness in skintone whilst not compromising sharpness in text. (In fact, the micro piezo head produces droplets as small as 1.5 picolitres for sharper text than is possible with AgX

technology.

So why do professional wide-format printers run to eight or 10 or more colour cartridges if four or six are adequate?

iPhoto: Traditional pigment-based inks tend to have a lower gamut than dye-based inks, so more individual colour inks are required to attempt to cover the same or similar colour gamut. The latest pigment inksets for the Epson SureColor P10070 (44-inch) wide format printer, for instance, include the following 10 colours: Light Grey, Photo Black, Cyan, Vivid Magenta, Yellow, Light Cyan, Vivid Light Magenta, Dark Grey, Matte Black & Grey.

11 Comments

 Trevor
MAY 7, 2019

I am not sure but from what I understand that while a fresh print will have a slightly larger colour gamut when printed on the Epson Suresolor D3000 drylab, that is not really the whole story. Once the print is displayed in a typical home or office environment with both light and dark conditions, with an average level of 5PPB of ozone, the larger print will begin to deteriorate substantially and the overall image quality will degrade quickly. compare that with silver halide (agx) paper, that has lasting image quality without noticeable degradation weather measured on day 1 to greater than 36, 500 days (100 years) in a typical home environment.