DIGITAL PAPERS: WHAT YOU NEED TO KNOW, PART 1

By Hal Schmitt

There is a wide selection of digital papers made for photographic and fine art prints on the market. Understanding the basics will help you choose the right product for your print job. Photo credit: Hahnemühle

Never in the history of printing has the individual printer enjoyed such a huge selection of different media upon which to create fine art and photographic images. As a digital printer, almost all media available are compatible with the easily purchased and operated inkjet printers of every size and price point.

With so many media choices, however, today's printers face a challenging and intimidating landscape of options. Barraged by conventional wisdom (that may or may not still be applicable in the rapidly changing print world), digital media advertising, and well-informed but demanding customers, what does the printer need to know about media? This article aims to fill in some of the blanks and offer guidance to digital printers so they may easily navigate the sea of options and deliver print performance and value to their fine art and photography clients.

At the most basic level, the digital printer must find media options that deliver performance, consistency, and longevity. Let us examine each of these characteristics briefly to build a solid foundation. (To keep things simple, I will use the word "paper" instead of "media" from here on out.)

Performance is the overall ability of the paper to accept ink and render tone and color. Each type of paper is designed with an inkjet receptive layer or coating. This layer accepts the ink deposited by the printer and "holds" it in place. Strong performing papers do not allow the ink to either pool on the surface or bleed deep into the substrate (the material out of which the paper is made). This is important because only with proper ink droplet reception will we be able to effectively quantify the paper's tone and color characteristics.

Tone is how we refer to basic light or brightness levels rendered on the paper. In theory, the darkest tone we can render is no tone at all, or zero percent brightness; this level is perfect black. On the opposite end of the spectrum, the lightest tone is 100 percent brightness; this is perfect white. When combined with an ink set (the ink in your printer), each paper has a specific ability to reproduce tones from black to white—but not all papers are able to reach perfect black or perfect white. An important thing to know as you start printing art and photographs for clients: to render the source image most accurately, the ink and paper combination needs to reproduce as close to pure black and white as possible. This delivers what is called a wide dynamic range and offers the best contrast and color.

D or L* values are used to rank a paper's performance in terms of dynamic range. These values are variable and depend on the printer, ink set, and paper, so most manufacturers will list the D values for a specific paper/printer/ink combination. If you're offered D numbers, the term Dmax conveys the maximum density, or the deepest black, possible. In short: the higher the Dmax number, the darker the black.

Dmin, on the other hand, is the minimum density, or the lightest tone possible. As you

Epson's Hot Press Bright fine art paper has a smooth cotton base and a bright white surface.

would expect, the lower the Dmin number, the lighter the tone.

Interestingly, an inkjet printer renders white by not printing any ink at all; so, in effect, the brightest possible tone for any given paper is determined by the brightness of the paper itself.

As digital measuring systems continue to become more available, you may see L* numbers given, which tell you the darkest and brightest possible tones for a paper and are more intuitive than D numbers. For reference, an L* value of zero is pure black and an L* value of 100 is pure white. When taken together, the Dmax and Dmin or L* numbers define the dynamic range of a given paper. As a basic rule, a wider dynamic range is better, especially for photo prints.

Epson's Velvet fine art paper is a cotton, bright white paper with a velvet texture.

Hahnemühle's FineArt Inkjet Paper collection features various smooth and textured surfaces.

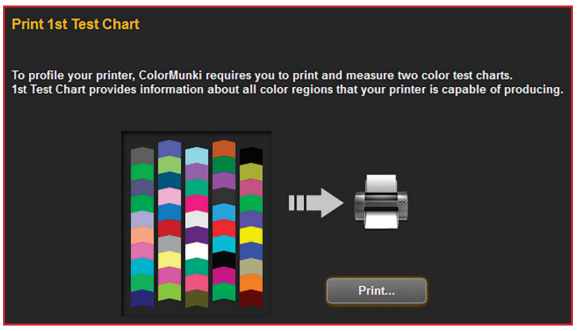
A fine art print created with a Canon iPF 8100 printer.

Just like each paper has a specific dynamic range, each paper also has what is called a color gamut, or footprint. Color gamut is more difficult to quantify with numbers, but it is just as important. Having many colors possible with an inkset and paper combination means you can more accurately render a client's image. The rule here is: the wider the gamut, the more colors possible. Often, you will see a paper's label refer to color gamut as a percentage of a known color space such as sRGB or Adobe RGB(1998). As a basic rule of thumb, the wider the gamut, or the higher the percentage coverage, the better.

The second feature to focus on is consistency. Consistency refers to the relative similarity of the paper from sheet to sheet and batch to batch. Ideally, there would be no difference from a sheet/roll of a certain type of paper used today and a sheet/roll of the same paper purchased six months or a year from now. We often take this for granted and assume that a product will always be exactly the same, no matter when we buy it. Many items—your favorite beer or bourbon, for example—have enough consistency so that you taste a familiar flavor, but rarely are two bottles identical. With inkjet paper, though, you want as close to identical and perfect consistency every single time. Even a small difference can create major problems for your print process.

To measure how a paper performs and to accurately characterize that performance in terms of color and tone,

The dynamic range of a paper tells you the levels of darkness and brightness you can achieve when printing. The wider a paper's range, the better.



Software and hardware from companies such as X-rite create profiles that measure how a paper performs.

manufacturers measure output and build a profile for each paper and ink combination. This profile tells you exactly how a certain paper renders color and tone, and it is an incredibly important piece of the color management process. In the simplest terms, the color management process is the steps you as a printer take to ensure the most accurate color and tone consistency from original image to final print. As you switch from an image file format used for displaying on a monitor to a format for rendering on paper, you must use color management so tone and color do not shift. The process relies on profiles describing how each specific device performs. For example, in the final print phase, you will instruct the color management engine to use a certain rendering intent, or translation algorithm, in conjunction with the paper profile to convert the image properly before the first drop of ink is laid down.

Once you build a profile and use it for color management in your print process, the paper must be consistent. If there is any deviation from sheet to sheet, box to box, or batch to batch, the profile you are using is no longer accurate and your process will not work. Inconsistent paper performance will normally manifest as color or tone shifts from the original image. Sometimes it is easy to tell, but often, the changes are very subtle—and then you have an insidious problem on your hands. The fix is to build a new profile and apply to your color management process. With a consistent paper, you do not need to spend the extra time, energy, and resources building new profiles each time you resupply.

D values depend on a specific paper/printer/ink combination. Paper manufacturers, therefore, will often list general information, like "highest Dmax" or "outstanding black densities." Photo credit: Beale Ash

The final characteristic to focus on is longevity, or how long the print will last. The longevity of a paper is sometimes referred to as its archival characteristics. Whether a paper is long-lasting or archival is a combination of many factors, such as the paper itself, the inkset, where the image is displayed, and most importantly, how the image is finished for display. Looking only at the paper itself, the most critical and easily determined factor is whether the paper is archival or not. If acid is present in the paper, whether in the substrate or coating, the paper will not last as long as acid will degrade both the paper and the ink.

When looking at the archival characteristics of a final print, you will notice that most papers from reputable manufacturers are used with ink from one of the major printer companies, such as Canon or Epson, and finished under some form of UV glazing.

There are many other small details to learn along the way, but we have now established a solid foundation and are able to talk about paper in terms of performance, consistency, and longevity. These three characteristics will help us determine what paper is most appropriate for a given fine art or photographic print.

In our next discussion, we will define fine art versus photographic, look at individual papers, build a basic quiver of go-to options, and talk recommendations for optimizing prints. **PFM**

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