

Getting a Head in the Game

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INKJET STILL is used as a generic label for the latest class of digital production printing systems, but as the number of products in the market continues to grow, so too does the range of imaging technologies employed. This is a marked change from the decision potential buyers have been presented with in the electrophotographic (EP) press category. While there are competitive differences in toners, fusing systems, paper paths and more, the imaging technology is fundamentally the same.

In this aspect, inkjet is more akin to traditional offset technology than other digital printing solutions. Choosing between the standard, UV/hybrid, waterless, heatset and non-heatset variations of offset carries implications for the capital and production costs, stocks that can be run and applications produced.

Differences in the inkjet imaging systems now being employed can have an impact—to varying degrees and relative to each other—on head cost, failure rate and cleaning/maintenance requirements; substrate flexibility; print resolution; color saturation; print width; and more. It doesn't quite rise to the level of an apples to oranges comparison, but the technology has very distinct flavors.

Thermal and piezoelectric drop-on-demand (DOD) inkjet imaging systems were at the heart of the first web inkjet presses to be commercialized. Examples included the HP T200/300/350 series of thermal machines and, on the piezo side, the Océ JetStream family, Truepress Jet520/EX/ZZ line (as well as Ricoh/InfoPrint Solutions' InfoPrint 5000 implementations of the technology), and the Kodak Versamark VL-Series. Then came Stream continuous inkjet with the Kodak Prosper line, and now phase-change technology with Xerox scaling it up to a production-class implementation.

As a quick recap, thermal and piezoelectric inkjet both fall into the drop-on-demand category, meaning a drop of ink is only produced when needed for printing. DOD heads, particularly thermal, have benefited from a cost advantage because of their engineering

and mass production. The heating required for thermal units restricts ink formulations, while piezo heads are more mechanically complex.

Steady Stream of Dots

Continuous inkjet (CIJ) models produce a steady stream of ink drops, with only those drops needed for printing directed to the substrate, and the rest diverted into a capture system. Kodak originally brought this technology to the production printing category with the Versamark VX5000 press, which it continues to offer, but positions differently from Prosper because of the older technology's 300x600 dpi maximum resolution.

Xerox's generically named "Production Inkjet System" is said to build on its existing solid ink technology, which extends back to Tektronix color printers and is now used in the Xerox ColorCube office line. The granulated, resin-based ink is liquified for jetting through the piezoelectric heads and then immediately re-hardens around the fibers on the surface of the paper. The company is stressing the "waterless" aspect of the printing process and says it produces vibrant, consistent color on untreated offset paper with no curling or ink soak-through.

Pigment inks have been introduced for most inkjet systems as an alternative to dye-based formulations as a way to boost color saturation and density. The diffusion of dye inks into the paper fibers contributed to the washed-out look that had hindered broader adoption of inkjet printing.

Since stitching together multiple heads is the basic design concept of every inkjet press, the imaging technology employed, theoretically,

SINCE STITCHING TOGETHER MULTIPLE HEADS IS THE BASIC DESIGN CONCEPT OF EVERY INKJET PRESS, THE IMAGING TECHNOLOGY EMPLOYED, THEORETICALLY, DOESN'T LIMIT PRESS WIDTH.

doesn't limit press width. Relative costs and other factors do impact the decision to go wider, however.

Piezoelectric models and now Xerox's solid ink product cluster around the 20½" width size. HP was able to capitalize on its thermal technology to establish a point of difference in the market by first introducing a 30" model, but has since announced the T200 with a 20½" width. Kodak split the difference with the 24½" width of its Prosper line.

The "press" part of the product category label also has some give in it. As an alternative to an all-digital machine, the option of placing heads in-line with a traditional offset press is seeing renewed interest as technology advancements have expanded the color imaging and resolution capabilities of such systems. RR Donnelley is among the companies that have made recent investments in this area, while simultaneously being in the select group of printers taking the "roll-your-own" inkjet press approach.

Until now, the latter usually involved having an all-inkjet printing platform custom-built on top of a traditional offset press frame. That press development path is being opened up to the mainstream of printing companies with the recent signing of an agreement between Donnelley and KBA.

Under the terms of the agreement, the printing behemoth will license its Apollo and other digital imaging technologies to KBA for incorporation into the sheetfed and web press manufacturer's product offerings. While specific details are still to come, the companies said they are teaming up to "develop, manufacture and sell next-generation piezoelectric inkjet printing solutions," with KBA's new digital press(es) to be introduced in May 2012 at the Drupa exhibition.

To an extent, the same dynamic exists with putting the "inkjet" label on printing papers. There are similarities and differences in how characteristics of a paper formulation will mesh with the absorption/adherence requirements of a specific imaging technology. One

"inkjet" formulation may not fit all equally well, so testing on the various makes of presses is required to guarantee paper performance.

In cooperation with the Rochester Institute of Technology (RIT), HP has made an attempt to standardize the performance of inkjet papers by introducing ColorPRO Technology. It establishes a set of quality specifications for papers that are verified by RIT's Printing Applications Laboratory.

Coated Grade Challenges

The trend has been for press vendors to initially promote printing on uncoated papers because their fibers facilitate the absorp-

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tion or adherence of the ink, as the case may be. Coated paper support continues to evolve, either via the application of a bonding agent on the press or the manufacturing of coated papers that are more receptive to inkjet inks.

One exception to this trend is the Fujifilm J Press 720 from Fujifilm's Graphic Systems Div., which has been positioned as an inkjet press for coated paper from the start. It uses piezoelectric heads to deliver water-based inks with a "rapid coagulation" formulation, according to the manufacturer. Of course, the other big difference is that it's a sheetfed device that prints up to a maximum 29.5x20.8" sheet at a top speed of 2,700 sheets/hr.

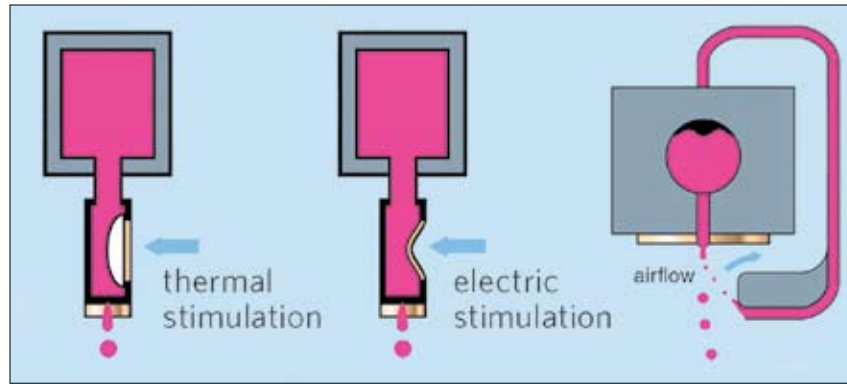
(It's worth noting that Screen has also shown a production-class cutsheet press, the 20.8x29.1" Truepress JetSX, and RISO offers the HC5500 inkjet printer with a maximum 12½x18½" printable area.)

For more on uncoated and coated papers designed to run on production inkjet web presses, see "The Paper Chase for Inkjet" companion article on page 28 in this issue.

Recyclability of materials printed

via inkjet has been raised by analysts as a potential consideration. The specifics, obviously, will vary depending on the consumables used with a given imaging technology.

All of the other due diligence that goes into any digital press buying decision—including weighing factors such as cost, vendor relationship, financing, servicing, etc.—of course, also apply to inkjet solutions. It's now more important to consider, however, that buying a press means betting on the technology that underpins it. **PI**



This conceptual diagram shows the basic process, in order, of a thermal, piezoelectric and continuous inkjet head.