

Production Inkjet: The Interplay of Paper, Heat, and Ink.

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by Fred Simonson

This is the first in a series of reports based on actual application research conducted by Gimbel & Associates – in cooperation with the major suppliers of Production Inkjet Products.

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Inkjet Technology – The Gimbel Approach

The hottest topic in production print since Drupa 2008 has been inkjet technology. A number of major manufacturers have introduced products utilizing this technology. Clearly, the discussions have been lively, and the major manufacturers' offerings have created significant buzz around real and projected opportunities. Rather than another technology primer, Gimbel & Associates have visited the primary Production Inkjet Products from an application perspective. In other words, *what works today?* What are the real life application opportunities and issues? What are the current impediments? Where is inkjet going? What are the future application expansion possibilities?

The Gimbel approach (methodology) was to work with one of our partners and create a test suite that was both demanding and real world, which would allow us – *and a user panel* – to examine various applications, and the corresponding look, feel, quality, and applicability for their real and potential customer base. We then ran out test suites at various customers' and manufacturers' sites (HP, Ricoh-Infoprint, Kodak, and Océ), to produce test samples on two different paper categories: primarily treated and coated substrates.

Test Suite Observations

What we discovered when we took our project on the road and physically observed the products run the test suite was very enlightening. The quality of the paper, the amount of ink applied to the paper, and the application of heat in the drying process created significant variability which had an enormous impact on image quality, potential cost, and the ability to finish after print. Generally, image quality/vibrancy will vary substantially with the quality of the paper; the amount of ink used will also vary, as different papers absorb inks differently.

The amount of ink used has an impact on the look of the output, as well as the cost of the output. While there is no question that current inkjet technology offers digital color printing at a significantly reduced cost at the page level, that cost will be strongly affected by the quality/cost of the paper used, as well as the amount of ink used. Another phenomenon we observed was the tendency of the paper to wrinkle where heavier ink saturation was evident. This could also cause potential post-print finishing issues. Paper shrinkage from intense heat in the drying process can also have an impact on front-over-back registration.

Keeping It Real

How does this relate to real world applications and customers? Image quality/vibrancy is directly related to the quality of paper and how the paper takes the application of ink, as well as what changes in the paper occur during the ink drying process. The quality and finish of paper is directly related to the cost of the page, thus the cost of the same application can vary widely based on the substrate and application of ink to the substrate. This represents a challenging balancing act to both the printer and the end-point customer.

What is the best quality that can be achieved for the lowest unit cost, or said another way, what image quality is acceptable - at what price point? An application may meet the customer's requirements for unit cost, but not image quality, and vice versa, where quality/vibrancy is acceptable but the paper

cost has pushed the unit cost into a marginally acceptable or unacceptable area.

This also has an effect on what we call *"application opportunity,"* which we define as *"the ability to produce acceptable image quality/vibrancy on up-market applications that are currently being produced on toner based products and/or offset."*

Clearly a potential *"leveling factor"* is digital flexibility, individual page variability, and the opportunity to create digital one-offs at extremely high rates of speed and productivity.

Inkjet Technology – Raising the Bar

In summary, our initial premise was that inkjet could "climb the application food chain" and take on more sophisticated applications that demand higher image quality/vibrancy. We believe inkjet technology will continue to evolve. The paper manufacturers in combination with the hardware manufacturers will develop papers that produce better results and will not cost multiple times what today's offset sheets cost. Inks and the ink application technology will continue to evolve and improve, which will likewise open additional application opportunities that are currently not seen as eligible.

So which manufacturers have a leg up? Generally those manufacturers that have the greatest *control of their components and inks* will have "a leg up" in the race to bring technology enhancements that allow for expanded *"application opportunity."* An example of this would be a manufacturer who owns their head technology. Developing the technology in-house allows the manufacturers to be more nimble in responding to advances. When improvements in the technology are available, the inks may need to be optimized to take advantage, or vice versa. We see this as a distinct advantage for those manufacturers who control their own destiny and are not potentially hamstrung by third party suppliers.

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