HOT TECHNOLOGIES

High-Tech Benefits
Laser-Imaged Anilox Benefits Revealed

By Alexander James

In today’s flexographic printing marketplace, process limits once established are now experiencing a certain degree of elasticity with the continual evolution of technological breakthroughs. Progress is evident in virtually every aspect of the flexographic printing industry. We are seeing new presses; stronger inks; new imaging and screening technologies; improved prepress software, proofing devices, polymers and polymer processing; and new lasers for engraving polymers and aniloxes.

Wide- and narrow-web presses are outfitted with a variety of up-to-the-minute technological achievements that enable such efficiency improvements as shorter make-ready times, quicker job changes and much faster production running speeds. Incorporated with the mechanical advancements are new software technologies that enable automatic monitoring of registration and color matches. Any necessary changes can, for the most part, be made on a computer console and stored on a hard drive. In some instances, settings for each job can be logged in a computer data bank for future recall with the next job reprint.

Over the last three years, the industry has experienced a flood of high-density inks of every type—UV, solvent-based and water-based. Evolving technology has enabled the size of pigments for mixing inks to be as small as 0.04 microns. The result of having pigments crushed at much smaller sizes, in combination with other formulation improvements, is significantly higher pigment gloss and sheen. This means that achievable solid ink density has gone up—which, in turn, drives the proliferation of high-density inks now common throughout the flexographic industry.

Availability of improved polymer has also boosted plate quality. Better polymer composition—in conjunction with laser technology—has greatly advanced print fidelity for the wide- and narrow-web segments. This combination has not only greatly heightened what is achievable on press, but also shortened the time it takes to get to press.

This is significant because the biggest cost center for most printing companies is that of running the press. One advantage of having these new technologies is that when (not if) mistakes are made, it is now possible to minimize down time and get back to press quicker than ever before. Production schedules can also be created with the comfort of knowing that last-minute rush jobs and unforeseen changes can now be accommodated.

Updated laser-imaging technology has vastly increased print quality and production speed. Many of these technologies are available in a variety of configurations based on printers’ individual needs and budgets. Digital lasers and plate processors now feature smaller footprints and are more affordable than ever—especially when considering their benefit of enhanced productivity.

Another example of technological advancement is the continuing improvements in digital proofing devices. Digital proofing has greatly expedited the time it takes to generate consistent sample proofs. The speed, accuracy and consistency of the latest digital proofing devices have enabled printers and customers to be confident of each proof sample received. Conducting in-house testing with these devices will ensure a high degree of consistancy, resulting in a majority of proofs matching actual press runs.

New achievements in anilox-engraving laser technology have resulted in the availability of anilox rolls with very high line-screen cell counts with never-before-achievable volumes.

Testing New Technology

When considering any changes in your printing environment, it is very important that you take the time to conduct testing in order to be confident that your desired results will be possible. Following is an account of our own test of the new-technology anilox rolls.

The press trials we conducted tested the rolls with both conventional and digital polymer plates on a narrow-web press. We ran numerous banded anilox rolls with varying line screens and volumes:

- 500 line screens with 4.0, 5.0 and 6.0 BCM.
- 700 line screens with 2.5, 3.0, 4.0 and 5.0 BCM.
- 1,000 line screens with 1.5, 2.0, 2.5 and 3.0 BCM.
- 1,500 line screens with 1.0, 1.5, 2.0 and 2.5 BCM.

Each banded roll was printed with high-density, water-based inks. Individual samples of cyan, magenta, yellow, black and PMS 485 inks were saved for analysis. The digital plate used for this press trial was uncompensated “linear” and included a variety of plate line screens—120 lpi, 133 lpi, 150 lpi—within each band. (See Figure 1.)

Figure 1. All art courtesy of Harper Graphics Solutions.

A low-density foam stickyback was used on a medium-gloss, coated stock. All data were quantified with a spectrophotometer (status T, absolute setting, CIE 94) at a D50/2-degree viewing angle.

Press samples gathered were evaluated based on the following criteria:

- Achievable solid ink density.
- Print contrast percentage.
- Minimum dot.
- Quartertone, midtone and three-quarter tone dot percentage.
- Dot print quality.
FFTAs Annual Forum & INFO*FLEX Exhibition
April 30 – May 3, 2006
Kentucky International Convention Center
Chair: Matt Moffett, Meyers Label
Vice-Chair: Ed Dedman, SICPA North America

We’ve changed the face of Forum.
NEW PRICING makes attending even more affordable! EXTENDED INFO*FLEX HOURS provides more opportunities to showcase your latest offerings and view what others have on display. NEW SESSIONS that go beyond ordinary presentations will excite and engage your thinking. Join us at the industries premier educational and networking event of 2006. We’ll show you how you can get on THE INSIDE TRACK TO SUCCESS.

Full Forum Registration Fees:
Register before Jan. 20, 2006:
FTA Member $795.00 | Non-member $1,590.00
Register between Jan. 21 and April 28, 2006:
FTA Member $895.00 | Non-member $1,790.00
On-site Registration:
FTA Member $995.00 | Non-member $1,990.00
INFO*FLEX Only Registrations:
FTA Member $40.00 | Non-member $80.00

EXTENDED INFO*FLEX HOURS!
Sunday, April 30, 2006
1:30pm - 5:30pm
Monday, May 1, 2006
1:30pm - 5:30pm
Figure 2 shows an example of analyzed test results for the magenta ink. On a digital plate printed at 150 lpi (linear), the anilox band evaluated is 1,500 cells per inch, with a 2.0-BCM volume. Solid ink density achieved was 1.60; print contrast was 43 percent.

The digital plate data are compared with the printed percentage gain of this magenta sample in Figure 2. Printing the minimum dot (1) at 9 percent right out of the gate is quite good. The 20-percent quartertone, printing at 36 percent, indicates room for adjustment; it is just a little high. The 50-percent midtone, printing at 64 percent, is right in the ballpark. Depending on your environment, it could be adjusted up a bit. The 70-percent three-quartertone, printing at 82 percent is generally on target, as well.

Holding the upper end of the three-quartertone open is desirable, especially as you can achieve high density in the solids. Keep in mind that these numbers will vary depending on your ink system, substrate, anilox, press, environment, etc.

Spot Color with Vignettes

Figure 3 shows a sample of the L*a*b* comparison of the desired PMS 485 swatch target to the printed PMS 485 ink press sample. The anilox roll was engraved with 1,000 cells per inch and a 3.0-BCM volume. The press sample was printed using high-density inks on a digitally-engraved polymer plate. This was a visual match to the on-site spot swatch. The acceptable variance for spot-color comparison is plus or minus a delta E of 2 percent.

In the past, it was not possible to have an anilox roll with such a high line screen and volume that was capable of matching a spot color swatch. Typically, the anilox line screen that could deliver a 3.0-BCM volume would range anywhere from 500 to 700. Used in combination with the additional technological advancements in inks, imaging devices and polymer plates, the option of achieving a desired spot color and holding open the spot vignette is now possible.

A quick look at the tone scales of the PMS 485 print sample (using an anilox with 1,000 cells per inch, 3.0-BCM volume) in Figure 4 indicates that the transition from shadow to midtone and quarter-tone was very clean. Visually, the tone held open quite well. In order...
of what we had in the critical areas: minimum dot, quarter-tone, mid-tone and three-quarter tone.

These are encouraging results and warrant further testing. Additional trials using UV inks and solvent inks on other substrates still need to be conducted.

With all the latest advancements within our industry, it is obvious that past boundaries are just that—in the past. Every printer will be greatly surprised at what is now possible with today’s technology.

**Targets Are Critical**

Now a note of caution: Having the latest technology is no guarantee of flawless productivity. It is critical that procedures, tolerances and workflow be clearly established in order to ensure consistent success. For example, when using these higher-line-screen aniloxes that have greater volumes, if you don’t have a stringent anilox maintenance and cleaning program, you are simply setting yourself up for failure. These types of rolls require consistent cleaning as part of your everyday procedure in order to deliver consistent results.

Because process printing is becoming commonplace in our industry, measurable targets and procedures must be established for consistent results—regardless of which technology you are using and where in your workflow it is being implemented. These targets must be based on press characterization data. Film should be measured. Each plate, whether it is conventional or digital, has specifications for thickness, relief and floor that must be monitored and measured as part of daily production quality checks. Once targets are defined, you now have the means for quantifying process controls, thereby assuring desired results.

Parameters once commonplace throughout our industry continue to evolve with each technological progression. The elasticity of these boundaries demands that each company do its homework to quantify and establish new tolerances. What was not possible at 133 lpi or 150 lpi may now be possible using a combination of the latest technologies. Blending new technologies may open up new opportunities and raise your level of efficiency and productivity.

Change is on the horizon in our industry; those of us who do not continually evolve and adopt some of the latest technological advancements and procedures will be passed by like yesterday’s news.

---

**ABOUT THE AUTHOR:** Alexander James is prepress consultant for Harper GraphicSolutions, a division of Harper Corporation of America, Charlotte, NC. He has a Master of Science degree in graphic communications from Clemson University and more than 14 years of experience in the graphics industry.

**EDITOR’S NOTE:** This article is based on the author’s presentation, “Benefits of New Technologies,” at the FTA Ink and Color Reproduction Conference, Oct. 19.