

The Packa

The smell of burnt rubber hangs heavy in the air, and motors thunder so loudly that you can feel the noise resonating in your sternum. Men in dirty overalls swarm everywhere, cigarettes hanging from their mouths in defiance of the No Smoking signs. Their lips move, but no one can hear them. There's just too much noise. >>

BY CONSTANCE J. SIDLES

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FLEXOGRAPHY HAS UPGRADED YOUR BAGS TO FIRST CLASS

>> A monster-truck rally? Maybe so, but 20 years ago you would have found the same scene at just about any flexographic printing plant—where the process had a reputation for being coarse and crude, where the presses used to print little more than simple designs on corrugated boxes, grocery bags, and cans. Back then, the method used to make flexible printing plates involved molds and melted rubber, so the odor of the plants was distinctive, to say the least. The printed pieces, too, were down-and-dirty, ones that clients had to have but that would never grace a designer's office wall.

But times have changed. New plate materials, better inks, and more precise imaging have made flexography much more appealing to designers. Today, it's just as likely to be the process of choice for the label on an expensive pinot noir as it is for the design on a bag of cat litter. In fact, flexography has captured 18 percent of the world's printing market, and because its flexible plates can transfer ink to almost any surface, it now dominates the packaging industry. When you brush your teeth, open a can of ground coffee, grab

a quick lunch at a fast-food joint, or drink a cool one after work, chances are you're handling material that's come from a flexographic press.

Despite the fact that flexo is everywhere, however, industry leaders say that more than 90 percent of the prepress materials they receive from designers have to be reconfigured for their presses. If the process is so common, why is it so misunderstood? Although the basic principles of flexography are simple—raised areas on the flexible plate press ink onto the substrate—in reality the process has so many variables that it becomes an art form, posing some interesting challenges to designers.

Flexible but quirky

"The process is still a little bit on the archaic side," says Jim Parker bluntly. Parker is creative director for Bonita Pioneer Design & Packaging, a design and manufacturing firm in Portland, Oregon, that produces elegant bags and packaging for clients all over the world. Parker explains that while you can do things on a flexo press that wouldn't be possible

For packaging printed on a roll, the repeat length lets you specify how often the pattern repeats itself on the substrate. Staggering the plate seam and the images helps avoid any obvious gap caused by the seam, and makes the printed pattern look continuous, no matter where the roll is cut.

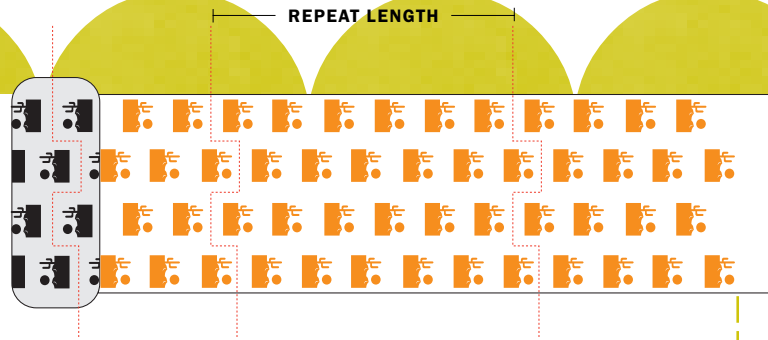


Plate tech-tonics

Because flexography employs a flat but flexible printing plate that is stretched around a curved cylinder, the image on the plate distorts when the plate is mounted on the press. A circle shape, for example, distorts into an egg. The amount of distortion depends on many factors, including the size of the cylinder, the size of the plate, and the amount of adhesive padding used to stick the plate onto the cylinder. As a rule, printers don't want designers to build appropriate compensations into their prepress designs; they prefer to do it themselves on site. However, they do need extra time to take care of this, so be sure to plan that into your schedule.

Another quirk of the process is that solids print differently than screens. That's because the printing plate is relatively soft and the ink on its surface must be pressed against the substrate to print. Thus the amount of pressure applied to the plate is crucial. For example, more pressure is needed to print a dense, heavy solid than to print a pale screen. Flexo printers can modify how hard the printing cylinder presses against the substrate, and they can also change the pressure requirements by selecting a plate material that is either softer or harder than usual. Solid colors print better when a spongier plate material is used; screens do better with harder material.

But whatever methods the flexo printer uses to set up the press, one design implication is clear: you can't expect to print one-color screens and solids on the same press unit. This is very different from offset printing, where the solid and tints of a given color can be printed with a single printing plate. On a flexo press, not only does a solid ink usually require its own press unit, but so too might a 50 percent screen and a 10 percent screen. The net result: a job that seems to be a one-color design might actually require several press units. And because trapping problems (see below) and

on any other equipment, the flexible printing plates make controlling the process tricky. You have factors that just don't exist with offset plates or gravure, all of which can vary considerably: the size of printing rollers; the thickness and the amount of "give" of printing plates; the amount of pressure with which the plate presses against the substrate; the size, quantity, and shape of the ink cells; the nature of the substrate (porous paper, nonporous plastic, or metal, for example); and the kinds of inks. Every one of these factors affects the quality of printing, and every one must be controlled well.

In flexo, experience and communication count for everything. Yet, says Parker, few designers are familiar enough with the process to even know what they don't know. "Most designers probably work on one packaging project every couple of years," Parker says. "Packaging tends to be an afterthought for most clients, where it really shouldn't be. It's one of the most important things. For example, take shopping bags. The average reuse of a shopping bag with a twisted paper handle is three to five times. That's a lot of advertising that should be in the forefront of clients' and designers' minds. But it isn't."

Parker says that there are a number of things designers can do to help flexo printers produce high-quality results. The most important is to allow plenty of time to work with a printer so that your designs can take into account the quirks of the process.

The Package Tour



Flexo is becoming an option for all kinds of jobs, especially those using colored paper, for which opaque inks are a big plus—the color of the paper can't affect the color of the ink, as it does in offset printing.

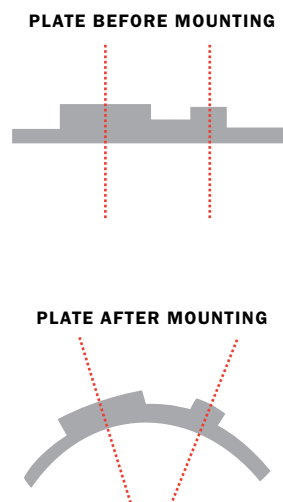
other technical issues limit flexo presses' ability to print built-up screens, most printing is done with custom inks. To accommodate customers' desires for full-color printing, most flexo presses are available as 6-unit or 8-unit presses, and 12-unit presses are not uncommon. Which means that you should always make sure your flexo printer has enough press units to print the design you want.

You should also be willing to consider forgoing certain design elements altogether. For example, you might not be able to print any vignettes at all, because the shading from solid dots to no dots requires many gradations in screens. Even on a modern four-color process flexo press designed to print halftones, you might not get the highlight dot or continuous-tone appearance that an offset press would give you.

Know gain, no pain

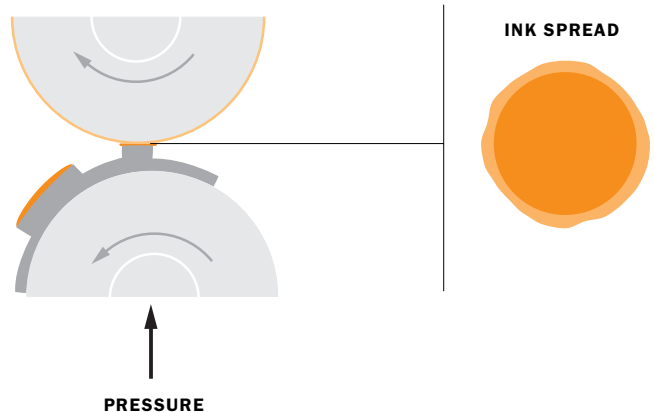
Because flexo plates are soft and flexible, dot gain is greater on flexo presses than you might expect. Depending on the equipment, the design, and the substrate, dot gain might be as much as 30 percent, which can significantly affect type, especially reversed-out type. In effect, white type reversed out of a solid color becomes a smaller point size, and the counters (such as the little circles within the letter B) begin to close up. With such high levels of dot gain, fine type is generally not recommended at all—Bonita Pioneer requires a minimum of 8-point Helvetica Bold and 1-point rules. If the type is to reverse out, they like a minimum of 12-point Helvetica Bold and 2-point rules.

The softness of the plates also affects trapping. Flexo plates cannot hold registration as accurately as offset plates can. Thus when two colors butt against each other, flexo presses require more of an overlap (or trap) than offset presses do. Bonita Pioneer's Jim Parker recommends that all traps measure at least 1/16 of an inch. At this size, you can't expect your desktop programs to figure out the traps, he notes. "With this size trap, funny edges start to occur when we use a trapping program. Instead, we primarily use the trap filters in Adobe Illustrator and then go back and hand-modify them all." In short, says Parker, leave the trapping to them.



Designs for flexography must take into account the behavior of the flexible plate. When wrapped around the cylinder, the rubber plate will stretch; designs must be squashed in the direction of the plate curve to compensate for such elongation.

Likewise, the raised areas on the plate, which transfer the image to the substrate, will compress and distort somewhat, spreading ink away from the image area. The problem can significantly affect fine details, so you need to be careful with reverse type (which tends to get filled in), small point sizes, and designs that require thin lines or precise dots.



The proof's in the packaging

And then there's proofing. Many packaging jobs are so large that conventional proofs are prohibitively expensive. Imagine a regular shopping bag, for example, unfolded for printing—it might measure 45 inches by 23 inches. Now imagine ordering a new Matchprint proof each time you tweak the color. It's no wonder that many flexo printers still use color keys made with layers of photographically exposed, colored acetate as their proofing process. Yet color keys are limited to the colors supplied by the proofing manufacturer. In the case of Bonita Pioneer, the company stocks some 30 different colors. If a client asks for a

particular red, all the company can do is haul out its red acetate and use that. It gives the client a rough idea of how a design might look, but the nuances of color matches are out of reach.

This can be a particularly knotty problem if exact matches are important to the design, because—unlike those in offset printing—colors can't be adjusted on press very much. You can ask the printer to apply more pressure to the printing plate (to create a heavier ink film), or you can ask for less. But whatever you ask, the change must be across the full width of the roller. No changing the red in a bowl of cherries without affecting the model's face five inches to the left.

A century of the box

Flexography was originally conceived back in the late 1880s as a faster, cheaper way to print letterpress, the most common form of printing in those days. In letterpress, images and text were etched onto metal plates to create raised areas, and then the plates were mounted onto frames, inked directly, and pressed onto paper in a printing press. The process was expensive and slow.

Experimenting with new and cheaper materials, printers found that a form of natural rubber could be heated into a liquid, poured into plaster molds of letters and images, and turned into rubber stamps. It wasn't long before the stamps were transformed into rubber plates.

A big problem with the new process (called aniline printing, after the aniline dyes used in inks) was that printers could not accurately control the amount of ink applied to the plates. It wasn't until 1938 that two employees of the International Printing Ink Corporation got the idea of engraving millions of ink cells into a metal roller, which was mounted next to the ink fountain on a printing press. As the roller (called an anilox roller) rotated, its ink cells would scoop up a load of ink and deposit it onto the raised images of the rotating rubber printing plate. Because the same cells on the anilox roll could transfer ink to any rubber image, the process was cheap and efficient, and it remains the central mechanism on flexographic presses today.

In 1952, after the government banned the use of toxic aniline dyes in food packaging, one of the leaders in the packaging industry decided to sponsor a contest to rename aniline printing, and "flexography" won.



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Why bother?

With all of these problems, you might wonder why anyone would fuss with flexographic printing at all. The answer is that flexo offers advantages no other printing system can match.

The most obvious is probably the range of substrates. Flexographic inks are made of fast-drying fluids available in water-based, solvent-based, or UV-cured solutions that can be formulated to print on almost any kind of material. By contrast, web-offset inks must be heat-set and can't print on nonporous surfaces such as most poly films. Many flexographic inks are also completely opaque, so they produce fully saturated colors on even the darkest substrates.

Because you can vary the diameter of flexo's printing cylinders, you can design jobs with different repeat lengths (see illustration on page 34). Offset printing, however, is limited to one standard format on each press. And flexo presses are available in widths from 6 inches to 120 inches. Offset is generally limited to a 60-inch maximum.

Also, flexo presses can print roll-to-roll—meaning that you can roll up the substrate as it prints off the press, and then unroll it later onto machinery that can die-cut, glue, and assemble each box or bag.

Many designers clearly see flexography as a viable and cost-effective solution, even for subtle work. "We had a large bread producer in the Midwest as our client," says Richard M. Owens, design director and conceptualist for TDC/The Design Company, an agency in San Francisco. "The bakery has four basic categories of breads—traditional, fancy, variety, and sweet—and eight types of bread in each category." TDC came up with a system of four color families, with slight differences in color shades assigned to each bread variety. "We worked on the principle that people can really differentiate fairly minor differences in shades," says Owens. Flexographic printing was the most cost-effective way to print 32 different custom colors, all with perfect color fidelity and consistency.

Box to the future

Flexography continues to improve, especially in areas that will increase the presses' ability to print fine detail and hold better registration. Flexo presses can now reliably print details with the equivalent of 133-line screens. Plates made from polymers and laser-etched anilox rolls have also increased the reliability and predictability of color trapping. These improvements mean that flexo can print everything from four-color process inks to completely opaque ones, on materials as varied as polymer bread bags and cardboard. The process has moved into upscale markets, producing elegant wine labels and boxes, shopping bags for gourmet stores and museums, and fancy gift wrap. And as the industry shifts away from the older presses and materials, even the smell is improving. ♦

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