An automated flexo proofer.

TISSUE INK "PHOBIA" CURED

IMPROVED WATER-BASED FLEXO INKS OPEN UP TOWEL, TISSUE, NAPKIN MARKETS

By Dennis Curtin

Napkin printing inks were initially formulated using petroleum-based materials. Typical oil-based formulations were functional in terms of runability, but often left an offensive odor on the printed substrate.

Some printers, while maintaining the old letterpress technology, tried to eliminate odor by using glycol (water-washable) inks. They encountered a few difficulties. Not only were there postprint ink-bleed issues with glycol, but also the press performance was less than optimal. These issues set the stage for flexo printers to take the market by storm.

Forward-thinking printers realized that the answer to solving customer complaints concerning napkin-ink odor was to move to flexo water-based inks. With these napkin inks, there was no residual odor. The oxidation that occurs in oil-based inks, causing odor, does not occur in water-based flexo inks. These inks dry as a result of press ovens driving off amines (high-pH chemicals that keep water-based flexo inks in solution); the ink film then returns to a solid state.

With the transition from oil-based inks to water-based flexo ink, other benefits were realized. Flexo inks are formulated with hard-drying resins and waxes that exhibit minimal pigment bleed and rub. The replacement of dyes with pigmented inks gave the paper-towel printer greatly reduced bleed.

A dye becomes totally soluble in the medium where it is dispersed. Because the dye is soluble, it becomes part of the matrix of the solution. With dyes, you cannot de-ink paper; the ink cannot be extracted. If you place a wet glass on dyed paper, the color will bleed; on pigmented paper, the color will not bleed.

Dyes are notorious for bleeding in high-pH solutions, which is what typical household cleaners are made of. Because waste ink—both water- and solvent-based—can be treated to remove the pigment, water-based flexo inks are considerably more environmentally friendly. With virtually no VOCs (volatile organic compounds), flexo inks enable printers and converters to satisfy continuing governmental pressure to reduce emissions. Additional benefits include price relief and greater control of inventory, leading to an immediate impact on the company's bottom line.

Printed Napkin Is Back

A visit to some of the major restaurant chains will reveal that the printed napkin is back. These restaurants realize the benefits of "in your face" advertising. On napkins, you will observe advertising that ranges from nutritional information to celebrating corporate anniversaries.

Producers of party goods also recognize the improvement that flexo printing offers. Party napkins have maximum ink coverage with detailed designs in vibrant colors that have the product flying off the shelves. Also, observe what is selling in the toweling aisle of your local supermarket. Consumers demand a product that is a part of their décor; they want color in their kitchens. The bolder the print, the faster the product sells. Consumers are purchasing printed paper napkin, towels and tissues for every occasion and holiday.

The booming napkin and towel markets reflect the dramatic evolution—just in the last 10 years—of the napkin and towel printing process. Ink systems have progressed and allowed napkin printers (who predominantly used oil-based letterpress inks) to move to the more versatile flexo inks, allowing for more full and creative printing designs on tissue. Paper-towel printers are realizing improvements from using pigmented inks rather than dyes.

The results of these changes have provided the consumer with a far superior product, with less odor and greater product resistance to ink bleed and rub. Ink manufacturers must continue developmental research to keep up with the hectic pace of the improved specialty print needs. Inks have to be formulated to print cleaner and sharper, with less strike-through, provide longer periods between plate washups and deliver maximum pigmentation.

Product Shapes Ink Choice

If you are considering entering the towel and tissue print market, you will need to know ink and how it relates to the finished product. Whether you will be printing on towel, napkin or tissue substrate, it is important to know the limitations this type of printing brings to the color palette.

Every company that prints on napkin, tissue or paper towel has probably dealt with issues relating to ink bleed. Inks bleeding onto the consumer's nice white table linens or clothing after the printed paper has been saturated with the beverage of choice is a sporadic complaint. The education of your sales force and customer service representatives concerning pigment or color limitations is, therefore, imperative. They should know, for example, that Rhodamine, Methyl Violet, Alkali Blue and Red Lake C pigments are not accept-

able for use on these substrates, as they will bleed in certain reagents, such as water and alcohol.

To avoid ink-bleed problems, it is also essential for the printer to become familiar with the end use of the product, and to know what it will come in contact with. Printers must put into practice a method to test the finished product for potential rub and bleed. The test should be standardized so that results are applicable to all possible scenarios. You must take into account, for example, that toweling inks will require resistances to products with high alkalinity, and that napkin inks must withstand reagents such as milk, water, alcohol, etc. The testing procedure developed by the printer must be repeatable and eliminate any possibility of tester subjectivity.

Also to be considered is whether the end product is required to be safe for skin and eye contact. It is necessary to become familiar with such terms as incidental food contact, indirect food contact and direct food contact, and to recognize what decisions need to be made in order to produce a product with inks certified for direct food contact. These choices may limit your color palette, dramatically affect the vibrancy of color printing and increase your ink costs.

Finished Inks vs. Concentrates

When choosing water-based inks, the printer has the option of using either finished inks or concentrated ink bases. Finished inks enable printing on just a few different substrates. The concentrated system, on the other hand, permits printing on an unlimited number of substrates utilizing one set of colorants and a variety of extenders (i.e., extenders for printing on poly, napkin, labels, non-woven, etc.).

The concentrated ink also permits the flexibility to move the print job to a variety of presses and anilox rolls. This is an important factor, as printing presses within a particular operation typically print an identical job in different ways. For example, to attain a color standard, one press may need a 120-percent water add, while another press will reach the same color with a 70-percent water cut.

If you have considered blending inks in-house, concentrated base colors are the key. They not only allow you, as the printer, to immediately change to accommodate customers' needs, but will also reduce excess ink inventories.

Define & Share Goals

It is imperative to define your goals when entering the towel or tissue market. Because printers and converters choose different methods to accomplish their finished product goal, it is also important to educate your ink supplier about your goals and needs.

Goals that your ink supplier can help you reach include:

High-mileage plates. Today's inks should be able to run a considerable amount of time before plate cleaning is necessary; the length of time varies with the substrate being printed. Demand that your ink manufacturer standardize colors, utilizing proven proofing methods, consistent substrate and a color spectrophotometer to ensure a reliable product.

A viscosity test is performed on an ink sample.

Quality control. All incoming raw materials need to be certified. This must include specifications for color, viscosity, pH, foaming and rub and bleed resistances.

Maintenance. Ask your ink supplier to educate press operators on the value of maintaining the ink system. Employ procedures to document viscosity, pH and any additions made to the inks. If operators are disciplined in documenting ink data, this will expedite any corrective action process needed.

Remember that supplier commitment is essential to meeting your goals as a printer.

Tools for Success

The following tests and tools can significantly improve the quality of the final product:

Press profiling. Prepress houses will provide test plates to profile your press in order to measure dot gain. This process is called press characterization. The purpose is to be able to create spot color and process images utilizing four-color process inks. Test plates will enable your prepress to obtain your dot curves to compensate for dot gain.

Ink lab analysis. Your goal should be to print up to 3,000 fpm. To support this goal, your ink supplier should implement laboratory analysis that duplicates the agitation, shear, ink-release and other characteristics of your press.

Banded anilox roll test. The flexo printer's objective is to achieve color using the thinnest ink film possible. You can help meet that objective by performing a banded anilox roll trial on your press. A banded anilox roll contains a variety of different cell depths and line counts. The results of this test will enable your ink manufacturer to optimize formulation for a particular print job, which will in turn minimize on-press color adjustments.

Automated plate-washing. Color adjustment can be a significant source of downtime. Automated plate-washing systems that constantly clean printing plates can greatly reduce downtime, as well, especially when printing fine-line and four-color process inks.

No longer a source of industry trepidation, water-based inks have given the printing industry a tremendous shot in the arm. The next time you purchase a printed paper product, there is a good chance it was printed with water-based inks, which continue to add color to our world. They can also add to the bottom line of a flexographic printer entering today's towel and tissue marketplace.

About the author…
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