miraclon
Home of KODAK FLEXCEL Solutions

Effective ink transfer

A minimum of ink enhances shelf appeal and improves productivity

There is no question flexographic printing has come a long way. Flexography can hold density, maintain process stability and produce eye catching graphics with the best of them, and has evolved into a highly respected print category.

As flexo technology has developed, there has been a concerted effort to print ever smaller highlight dots and achieve ever better solid ink densities. However, the broadest color gamut, tonal range and especially image contrast have often eluded flexo printers in their quest to compete head on with offset and gravure class printing. Moreover, it is the ability to achieve these print characteristics while keeping presses at high speeds with minimal stoppages that has proven most challenging.

Experience in working with customers around the globe who are successfully converting gravure and offset designs to cost competitive flexo on a regular basis has taught us that effective ink transfer with minimal print impression is the key to success. Effective transfer is achieved by bringing a sufficient amount of ink to hit density and opacity targets with a minimum of anilox volume, and containing that ink only where it is desired. In this way, dot gain is held to a minimum and the plates will run longer without cleaning.

Approaching the obstacle

The quest for better ink transfer, however, does not mean getting as much ink on the substrate as possible. Stronger density and cleaner print will yield a broader color gamut, but too much density will actually reduce the range of colors that can be reproduced, and too much ink will reduce the tonal range that can be printed. This diminishes contrast and muddies the appearance of halftone work. Therefore, the goal must be to print at target levels of high density or opacity while achieving the broadest color gamut and tonal range possible.

Implementing this successfully on press entails optimizing the entire mechanism for ink transfer, all the way from pulling the ink from the anilox roller onto the plate, to transferring it effectively to the substrate. Many factors influence this, including:

- The shape and condition of the anilox cells
- The plate material itself
- The properties of the plate surface
- Ink and substrate dyne levels
- Environmental conditions

Technology developments from a broad range of suppliers have contributed to refining and improving the process. Ink manufacturers have optimized pigment load, viscosity, pH and other properties of the ink. Anilox manufacturers offer a wide range of cell shapes and sizes, ceramic materials, and are constantly developing new lasers and engraving processes. New substrates and coatings have become available, and converters utilize flame and corona treating to improve ink laydown and adhesion.

Perhaps the greatest contributor to improved ink transfer is flexographic plate technology. Plate suppliers offer solutions for plate surface texturization through imaging or mechanical means designed to spread ink out more efficiently, rather than building up thicker films. Each approach brings improvements in density or opacity levels, but they are not all equal in their ability to drive expanded gamut (EG), tonal range and contrast with maximum press throughput, or even in their ability to completely cover the substrate with ink.

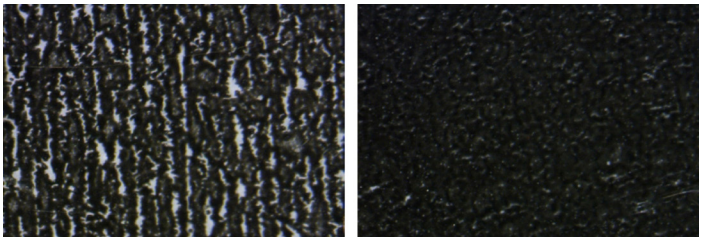

Figure 1: Traditional flexo (left) vs. flexo with digitally applied surface texturization (right).

The ink transfer problem

A magnified view of a solid black ink patch printed on clear film shows many gaps, pinholes or voids in the print (Figure 1). This reticulated look can be affected by the dyne levels of the material and properties of the ink, but it is primarily the result of the separation of the anilox cells by the cell walls. As the contents of the cells are deposited onto the plate surface, the ink is able to run in the machine direction because of the rotation of the press. The ink is not able to spread in the cross machine direction as easily, unless print conditions are ideal. Typical actions to try and correct these issues are to add more ink volume and press harder on the plate.

The ink transfer solution

This problem is solved through digitally applied micro surface texturization of the plate. The very latest advanced plate patterning options include a set of six patterns (Figure 2) with technology that plays a crucial role in controlling ink flow at the edge of objects, and is key to reducing impression.

This patterning technology is digitally controlled and, unlike plates with a fixed texturized surface, is employed in targeted areas and applied only where it is needed. The patterns are expertly engineered to work with increasing anilox volumes and are selected based on the ink/anilox/substrate/tape combination for optimum ink transfer. For process print, the finest surface patterns can be selected in accordance with the lower volume of the anilox roll. For spot colors, larger patterns can be selected where anilox volumes often carry twice the amount of ink as required for process work. There are larger patterns for whites, coatings and adhesive, which can use two to three times—or more—volume.

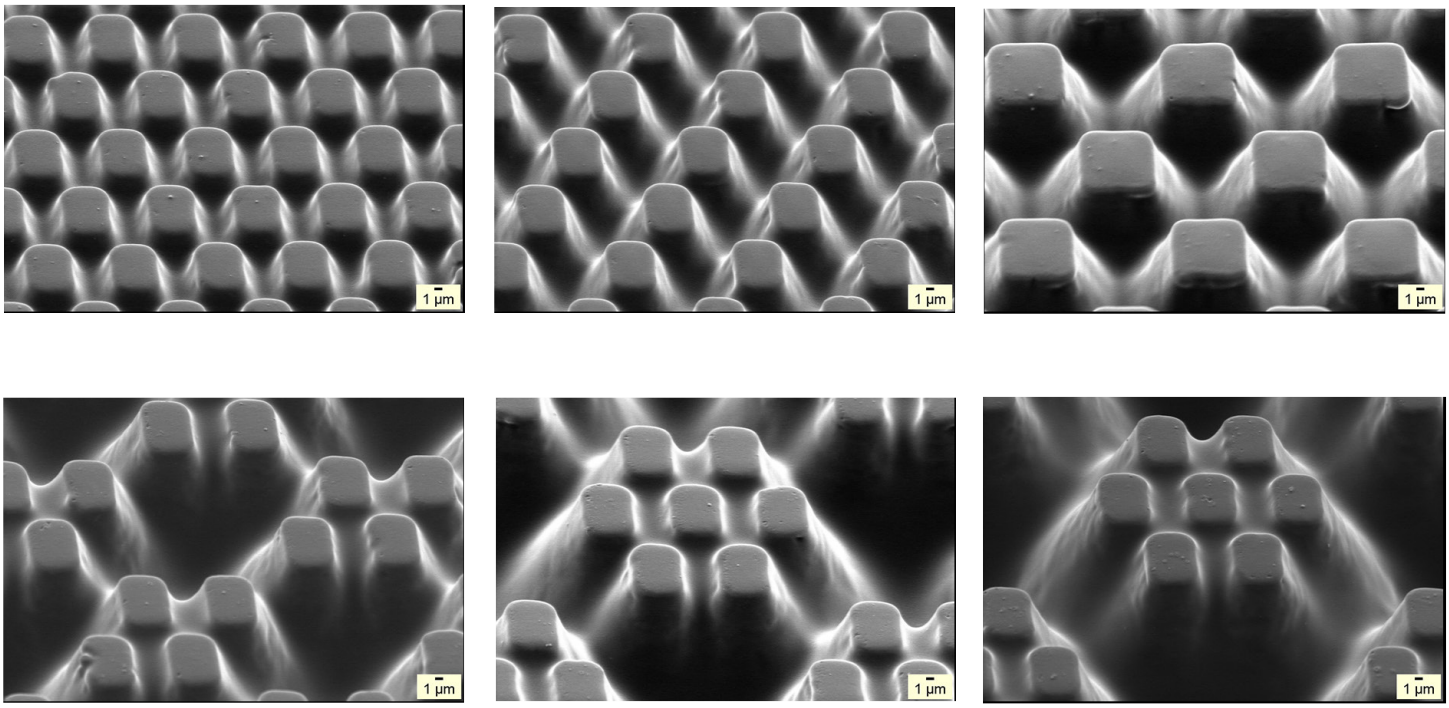

Figure 2: Miraclon's DIGICAP NX Patterning: The appropriate micro surface pattern is selected based on the ink/anilox/substrate/tape combination for optimum ink transfer. The individual pattern elements range from 5-µ. to 30-µ. Each of these images is approximately the diameter of a human hair (70-µ.).

With these technologies, users can create application specific plates (for process print, spot colors, whites, adhesives, metallics, etc.), utilizing only one polymer type. These different, application specific plates can be combined on one sheet (as size allows). This minimizes the number of plate materials that have to be inventoried, eliminates the possibility the wrong type will be utilized and reduces the process time needed for making different plate types.

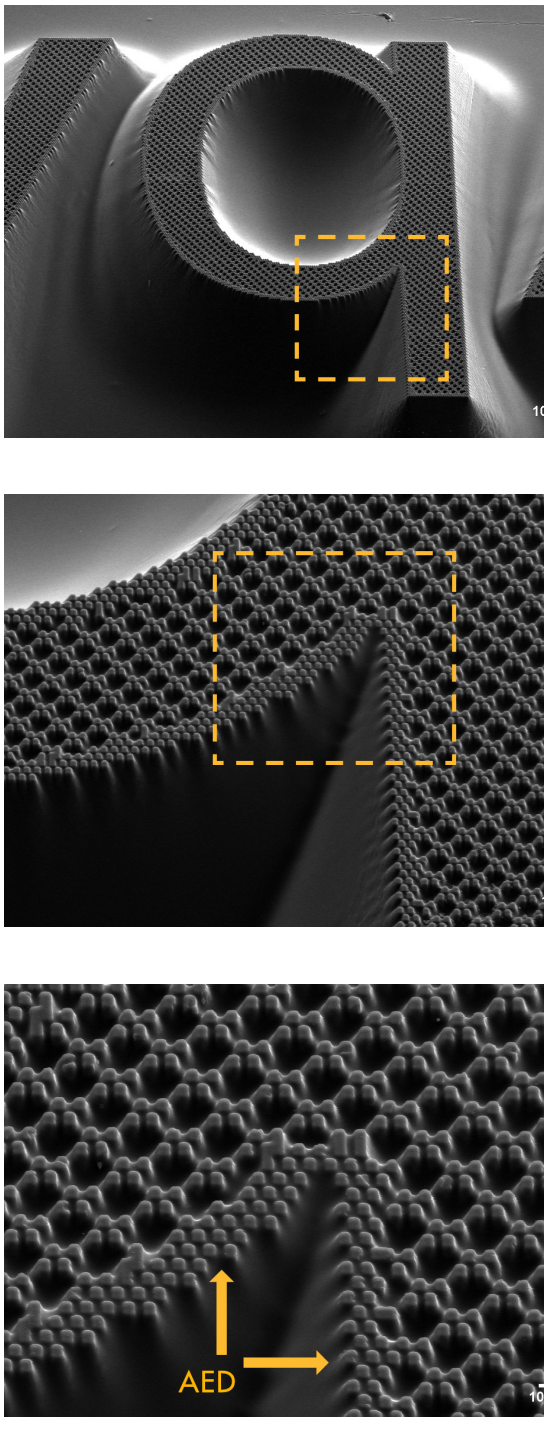

Figure 3: Miraclon's Advanced Edge Definition technology combines larger patterns to carry ink for strong density and smaller patterns around the edges to contain the ink only where it is desired.

These digitally imaged features utilize an ink carrying and spreading configuration to produce strong density in the halftones, solids and text areas, and automatically apply a smaller pattern on all edges (Figure 3), to keep the ink only where it is desired. This barrier capability keeps print edges clear and sharp, and prevents reverse text and fine positive text from filling in, while allowing trapped air to be released. The ink release properties, combined with a plate that has the appropriate flat top dot structure, allow for lighter impression pressure. This yields finer highlights and enables press operators to stop and clean the plates less often, reducing substrate waste and extending plate life.

This technology enables ink to be applied where it is needed and contained where it is not. The result is superior ink coverage with maximized color gamut and tonal range. The approach not only allows for the smoothest white ink foundation for vibrant overprinted colors, or for blocking product or substrate from showing through the print, but it opens up the mid tones and three-quarter tones to give halftones that realistic, continuous tone look that truly enhances shelf impact (Figure 4, next page). This is where image contrast has its fullest effect.

Effective ink barrier technology requires advanced imaging and reproduction capabilities which can operate at 2,400 dpi but creates each pixel in a 4 by 4 matrix, resulting in each pixel being comprised of, effectively, 16 laser spots. The ability of the imaging system to selectively turn these groups of laser spots on or off allows the accurate and precise creation of the micro fine patterning features. When it is coupled with a plate making process that enables 1:1 reproduction of the image file to the printing plate, it ensures the imaged pattern is fully and accurately reproduced on the plate every time.

> Experience in working with customers around the globe who are successfully converting gravure and offset designs to cost competitive flexo on a regular basis has taught us that effective ink transfer with minimal print impression is the key to success.

Achieving effective ink transfer

In summary, effective ink transfer with minimal impression is the key to achieving offset and gravure class flexo printing. This can only be achieved by utilizing a minimum amount of ink to completely cover the surface without filling in non print areas or causing excessive dot gain.

The goal is to print strong, smooth colors on a solid foundation, with whites that will block the product or color of the substrate, so as not to detract from the graphics. It is essential to keep the color gamut and tonal range open to gain the maximum contrast and shelf impact. Seek out a solution that delivers gravure matching quality through optimal ink transfer, expanded gamut and tonal range, and dynamic contrast in pictorial work.

Change the game

Superior ink transfer is just one of the transformational innovations delivered by the KODAK FLEXCEL NX System, a fully-integrated digital flexo plate making solution that enables exceptional print quality and enhanced production efficiency.

Figure 4: Advanced Edge Definition (right) adds contrast to images by holding open the shadow details in the halftones. This provides strong colors and great shelf appeal.

For more information on how flexo printers are matching and exceeding gravure and offset quality, visit **www.miraclon.com/go/flexcelnx.**