

### FLEXO- A PROCESS ON THE MOVE!

A strange thing has happened to what was thought of as a rubber stamp process. You know, the same rubber hand stamp and ink that some of us still use to stamp IN on that pile of new mail. The rubber stamp process that always seems to have that extra border of ink squeezed out around the edges of every line and letter. Well, no more, technology has changed the process so much that today Flexo printing competes head on with gravure and offset litho.

Surprisingly as that sounds, it's true in every sense. Innovation has resulted in amazing advances in rollers, anilox rolls, plates, inks, presses, pre-press, substrates, and materials handling.

Flexo, is one of the fastest growing printing processes, capturing important niche markets in flexible packaging, tag and label, direct and pre-print corrugated, and even folding carton.

Flexo now consistently competes directly with gravure and offset, producing printing equal to and sometimes better than either. UV flexo is a large factor with the majority of new narrow web presses delivered with UV capability. While attractive to wide web printers for environmental benefits and gains in print quality, other issues regarding central impression cylinder IR heat build-up, etc., have slowed progress. However, there have been installations in Europe and the U.S. is expected to follow now, in 1996.

Flexo is both a wide web and a narrow web printing process. Currently the narrow web camp of manufacturers are producing wider presses to target long run narrow web business, and the wide web camp is producing narrower presses to accommodate short runs. The narrow web printer will be targeting packaging, can and beverage wrap, and in-mold label market business. The wide web flexo printer, traditionally a snack food flexible packaging printer, is expanding into new markets too, such as folding carton, with mid size presses that offer in-line creasing, lamination, die cutting, cold seal, etc. Wide web flexo produced pre-print linerboard has also developed into a significant market both in the U.S. and Canada as a result of the demand for high quality packaging. Currently there are available 8 to 10 color central impression presses capable of UV or aqueous gloss top coating. Narrow web pre-print is also coming on to address the need for high quality, short run, competitive, just-in-time delivery, packaging.

Historically, the Flexo process, initially known as aniline printing, was literally a rubber stamp printing process using a smooth roller and double rubber doctor blades to produce an ink film. Flexo early on, was found useful in the printing of bags and envelopes as it remains today. Inks were in large part developed as a necessity to the parallel development of new packaging substrates, i.e., cellophane in the 1930's and polyethylene in the 1950's.

One of the major developments that advanced the Flexo printing process was the development in the late 1930's of the engraved anilox roll to meter ink. The small ink carrying cells gave much better control of pigmented solvent based inks that were developed about the same time. The continual development of improved anilox rolls from machined steel, to engraved chrome, to ceramic coated, to chemically etched, to laser engraved ceramics have allowed greater accuracy of ink volume control with each improvement. Today's quality striving printers more and more demand ever increasing high line count anilox rolls. Only a few years ago the majority of high quality flexo printing was produced using anilox line counts in the 350 to 450 lines/inch range. Today line counts are seen reaching 800 lines/inch and even 900-LPI. The laser engraved ceramic anilox roll at 800-LPI with a shallow etch, lower volume, hexagon cell, allows a thinner ink film to give more control in producing highlight dots, thus higher quality printing. While line screen is still talked about the anilox roll should be looked at in terms of optimum ink film, optimal cell geometry and volume with differences observed in consistency of high quality print graphics. The latest dramatic leap in technology is perhaps the ability to certify cell volume by computer controlled scanning.

Inks have also continually evolved, across a myriad of solvent based systems targeted to provide acceptable performance on a variety of packaging substrates. Water based inks came on strong as early as the 1950's for paper and paperboard. More recently the concern for environmentally clean systems has accelerated aqueous ink systems into high speed, high quality performance applications on even the most difficult of non-porous film, foil and metallized substrates. Today there are aqueous inks and coatings that will print on virtually any substrate and yield performance results equal to solvent based products. Additionally, there are UV inks that surpass the product resistance properties of water and solvent based systems, and they are zero VOC.

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The green, clean, environmental and regulatory positioning of the recent past and present has also been responsible for the latest advances and adoption of ultraviolet curing inks and coatings. These non-polluting environmentally friendly systems have found great acceptance especially in narrow web flexo markets.

The premise of competitive print quality that initiated this article could not have resulted were it not for the development of improved plates. Early flexo plates were of natural rubber composition. Later synthetic rubber plates became available which resisted solvent swelling and produced less print distortion. Plastic plates, followed and allowed some further improvement. However, while these

evolutionary developments were important to the advancement of flexo as a print process some would say none were of the quality improving magnitude of the photopolymer plate. Photopolymer plates are thinner and are able to very accurately reproduce fine line type, screened tones, and produce true process printing. Thin plates for a number of reasons print better than thicker plates therefore this quality improving technology continues to be advanced. A competitive alternative are laser engraved rubber plates, also now capable of being produced direct from digital input data. Eliminating the film stage and produced in the round, greater accuracy results. Electronic prepress already impacting heavily on gravure and offset will in the near future, become the standard method of producing flexo plates.

Frequency modulated (FM) or stochastic screening is another advancement used to produce higher quality, finer detailed printing. The process prints with uniform, single sized, smaller dots, in random order, eliminating angles and a set structure for the dots. As the density of the image changes the quantity of the dots changes.

Suffice it to say that flexo printing quality has been advanced by many technological improvements in all of the elements that make up the flexo printing process. Printing technology is presently being affected by three important developments: the use of UV in flexo, electronic printing and electronic prepress. Improvements in printing quality have and will come from the creative use of all of the factors that make a contribution to the flexo printing process.

Included with these are both aqueous and UV top coatings, which not only enhance but also contribute to Flexo printed product performance acceptance.

Keep your eyes on Flexo - Technological change has made it a high quality printing process on the move!

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