Ink Jet Plate Creation: Promise or Present?

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Abstract

When, and if, digital printing makes significant in-roads on traditional press printing, the idea of generating flexo or off-set plates by jetting images directly will be considered pass. However, today only a very small fraction of commercial printing is accomplished via digital printing. As a result, it is reasonable to discuss the practicality of directly creating plates using an ink jet print engine.

The criteria for direct creation of plates are both technical and commercial. In the simplest technical sense, one requires a hydrophobic image on a hydrophilic surface or an oleophilic image on an oleophobic surface. In the commercial sense, direct computer-to-plate is competing with both old and new technologies in productivity and total cost of ownership. This presentation will discuss approaches to achieving technical and commercial success.

Spectra has cooperated with SunJet (formerly Coates Electrographics) and OLEC Corporation to develop a printing system comprising two Spectra piezo printheads and an ink that combines both the limited spreading characteristics of hot melt inks and durability of UV inks. Spot sizes of approximately 30 micron diameters were obtained on plain aluminum plates. A production print shop used these plates to produce more than 50,000 images without significant degradation.

Results of these practical tests will be presented.

Introduction

A first step in the direction of completely digitizing printing is to make individual processes in the work flow digital. Already the presentation of information to the printer is almost always digital. This paper presents information relating to the digitization of other early steps in the printing process: the masking of UV sensitive plates and screens and the direct creation of plates using ink jets.

Equipment that uses ink jets and UV opaque ink to mask plates and screens is available from several manufacturers. The process reduces the number of steps and time required to generate press ready plates. The criteria for direct creation of plates are both commercial and technical. Direct computer-to-plate must compete with current technologies in productivity and total cost of ownership. The ink jet printing system must define a hydrophobic image on a hydrophilic surface or an oleophilic image on an oleophobic surface. The resolution required is determined by the application.

Plate and Screen Masking

The use of ink jets in plate and screen masking enables traditional CTP steps to be taken efficiently and rapidly. Luscher and STK (a Stork company), among others, sell systems equipped with piezo ink jet printheads. The UV opaque ink is water removable and appropriate for either flat or cylindrical textile screens. Because the ink is hot melt, the spot definition can be about 900 dpi even though the drops are relatively large.

Machines manufactured by Kiwo, CST and Polyfibron are being used to mask flexo plates for carton printing and other flat and cylindrical screen applications. For example, the Spectrum Digital Imager from OLEC masks at about 0.2 m^2/minute; addressable resolutions of 35 lpi and 85 lpi are available. This type of system can be used to create both positive and negative images on a vertical platform.

The basic steps for ink jet masking are to identify the print area, optimize the lay out for flexo, apply the mask with the ink jet print engine, expose and process the plate. Note that the precise print area can be identified and optimized to minimize waste of plate and masking materials. It is possible to accomplish the masking process at speeds of about 10 m^2/hr. After the application of the masking ink, then the plate is processed in the normal way, which removes the water soluble ink. No film, no special chemistry and no special disposal costs are required.

Ink Jetting Printing Plates

The digital printing of hydrophilic or oleophilic images onto plain or treated plates has the potential of creating a paradigm shift in the market place. One can compare the basic requirements for direct plate making to the characteristics of ink jet. By way of comparison with current competition, digital electrostatic plates are typically 105 lpi, metal plates are 120 lpi and silver halide plates are 175 lpi. Ink jet systems are now available in the 35 to 85 lpi range and will likely move to 133 lpi before the end of 2001.

There are several potential ink jet technologies for direct plate making. Continuous ink jets have been used at 300 dpi addressability, but as they have the potential of 32 levels of gray, they could generate very high quality plates. Thus far CIJ systems have been too slow to be competitive. On the other hand, piezo based ink jet printheads offer the possibility of reasonable resolution, good productivity and, with UV curing liquid inks, good productivity and cost.

Using ink jet based printing systems, plate creation is reduced to three steps: application of the mask to protect the emulsion from UV, exposure and process the plate. Beta site tests have demonstrated that OLEC's digital plate setter can produce direct-to-aluminum plates that produce useful prints for up to 50,000 impressions. Throughput is 10 m^2/hr at 85 lpi and about 7 m^2/hr at 120 lpi. The OLEC machine has an addressability of almost 1200 dpi.

Conclusion

Digital masking of plates and screens is already a commercial reality. We can expect the use of ink jets to directly create plates to increase in significance over the next year or so as equipment and inks become commercially available.

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Biography

Dr. Creagh is currently Business Development Director at Spectra, Inc., Hanover, New Hampshire. Spectra, a MARKEM independent subsidiary, designs, manufactures and markets ink jet printheads and inks for industrial, graphic arts and commercial applications. Linda joined Spectra in 1985 as Director of Ink Development after 10 years in ink jet development with Xerox R&D. Before Xerox, she was involved in liquid display research at Texas Instruments. Linda has a number of technical publications and more than 15 US and foreign patents in the fields of ink jet technology and liquid crystal displays. Linda has B. S. and M. S. degrees in Chemistry and a Ph.D. in Physical Organic Chemistry from the University of North Texas. Linda has been an active member of IS&T for the past 15 years. She is also a member of the Society for Information Display and American Chemical Society.