JetScreen Technology

by Phillip Canville and Dr. Jerry Waite

The field of offset lithography has experienced great cost savings in the press and prepress areas over the past ten years. Most of these cost savings are due to the introduction of computer-based image manipulation programs and advances in digital file technology. Increases in computer processing speeds and improvements in page layout applications have also reduced the time required for prepress operations. Sheet-fed and web-press printers have incorporated these advances into their operations along with computer-to-plate and computer-to-press applications. In doing so, they have reduced expenses in four of the most costly areas in the industry: labor, equipment, materials cost, and disposal of hazardous waste.

Sizable labor and materials savings are being realized in the prepress and press areas because of the minimization or elimination of stripping. In particular, computer-to-plate (CTP) applications eliminate the stripping operation and reduce the amount of money spent on the purchase of photographic film and processing chemicals. Since photographic film is not an integral part of the CTP process, no expenditure for the storage of old film files is necessary. In addition, CTP reduces the cost of disposing hazardous chemicals. And, in a CTP environment, dedicated imagesetters and process cameras are no longer necessary. These cost reductions have helped offset printers realize higher profits.

Application of Digital Technology to Screen Printing

The screen printing industry has not been able to realize the cost savings attributed to many of the new digital technologies. Screen printing is one of the most hands-on and labor-intensive processes of the printing industry. Screen printers are responsible for printing on, among other things, textiles, wallpaper, posters, billboards, ceramics, glass, and most any job printed on an irregular substrate. Unfortunately, technological changes have been slow in coming to the screen printing industry because screen printing has a lower market share than offset lithography.

Screen printers have obviously taken advantage of some of the advances in computers, image manipulation applications, raster image processors (RIPS), and imagesetters. These electronic devices handle the growing demand for processing digital images and files. However, the film positives produced by imagesetters are still mounted by hand to light sensitive, emulsion-coated screens, placed in a vacuum frame, and exposed to a high intensity UV light to set the image. Unfortunately, the screen printing industry has lacked a computer-to-screen (CTS) process similar to the CTP method used in other sectors of the printing industry. If a direct-to-screen process were available, screen printers could reduce their overall operating costs. Fortunately, a new CTS process has recently been introduced.

JetScreen Technology

LUSCHER, a Swiss company, recently introduced JetScreen technology to the screen printing industry. JetScreen is a CTS process that is similar to the ink jet

technology used by table-top printers. JetScreen technology uses a water soluble warm-melt wax to place the image on the emulsion-coated screen. A digital image file—which can be altered up to the last minute—is loaded into the JetScreen controller. The controller converts the file into instructions that are used to guide a spray-jet head. The image is sprayed, in perfect registration (±1/1000 inch), onto a light-sensitive stencil coating. In essence, the sprayed-on image takes the place of the film positives used in traditional screen making. After the image has been applied, the screen is exposed to high-intensity UV light to harden the non-image areas. The image areas are not hardened because the wax protects the emulsion from the light. After exposure, the wax and image areas are removed with high-pressure water leaving only the hardened non-image area on the completed screen.

Processes and Materials are Eliminated

Since the JetScreen process is direct-to-screen, the need for imagesetters, process cameras, film, chemicals, and stripping have been eliminated. Instead, all the processes associated with these production centers and materials are accomplished by the JetScreen. In addition, the associated labor costs and the cost for disposal of hazardous wastes have been reduced or completely eliminated. Furthermore, there is no need for a vacuum frame because it is not necessary to hold film positives in contact with the emulsion-coated screen during exposure.

Improved Screen Quality

Defects experienced in the traditional screen-making process— such as dot gain, tonal compression, center burn out, moiré, and the loss of detail at the edges of large screens—are reduced or eliminated because photographic processes are not used. Images are sent directly from the JetScreen controller to the wax jet head to be imaged on the screen—there are no intermediate photographic stages that can cause image degradation. Therefore, no image detail is lost or corrupted. In particular, there is no distortion of the image caused by light scatter during film exposure. Distortion is eliminated because the ink jet head is in direct contact with the screen. Also, since there is no film-to-screen contact, there is no static build-up that may cause debris to collect on the screen before printing. To avoid the possibility of moiré in halftones, the angle of the screen mesh can be changed before the image is applied.

The thickness of the emulsion layer on the screen is important and depends on the job to be printed. Thicker stencils give extended printing life while thinner stencils are required for halftone printing. The JetScreen system will work with any thickness of screen emulsion.

JetScreen Specifications

The JetScreen's maximum frame-handling capability is 63 inches by 138 inches (this is the operational area of the digital spray head). The digital jet spray head can transfer an image at the rate of one square foot per minute and produce up to a 100 lines

per inch (lpi) halftone screen. At that rate, it will take about one hour to apply a 100 lpi image to a 63 by 138 inch screen.

The maximum 100 lpi halftone screen produces a finer dot than most screen printing processes can currently accommodate. The finest line or dot diameter that the JetScreen can produce is 40 microns. Lines or dots this small are impractical for most screen printing applications because the ink will not be able to consistently penetrate such tiny openings. As a result, tonal values will be lost because the ink will accumulate and dry on the mesh.

Producing a stencil with a JetScreen spray head is somewhat slower than imaging a screen using film positives. However, the digital spray head is more accurate and less labor-intensive than the traditional method when multiple screens are needed or precise registration is required. Because the JetScreen produces images in precise registration, screens can be placed on the printing press with few adjustments. Therefore, screens imaged using the JetScreen reduce makeready time and cost. This reduction in makeready time more than compensates for the additional time required to image the screen.

Conclusion

JetScreen technology is not a cure-all for the screen printing industry, but it allows screen printers to exploit some of the technological advances that have been available to the offset industry for the past few years. The ability to reduce labor, material, equipment, and chemical disposal costs means an increase in overall profits. Profits equate to growth.

JetScreen technology is available in the U.S. through Fineline, Inc. in Ronkonkoma, New York. They have a web site on the world wide web at http://www.fineline.com.

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