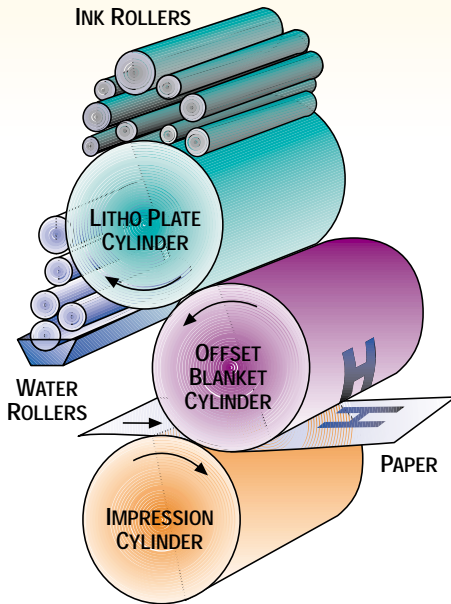


## THE MOST COMMON PRINTING METHOD — OFFSET LITHOGRAPHY



The basic principle of offset lithography is that ink and water don't mix. When plates are exposed, an ink receptive area is activated for the image. Water is applied to the plate and adheres to the nonprinting areas and ink to the image areas. The image is transferred from the plate to a blanket (see above), which subsequently prints on the paper. Relatively new on the scene is waterless offset requiring special plates and ink cooling systems.

Offset presses are classified into sheetfed (run from cut sheets) or web (run from rolls). Sheetfed press sizes may run up to 60 inches or larger in a few cases. Web presses, because of their high speeds, are generally used for longer commercial runs and publications. Web presses are further classified as heat set, where the image is dried by passing through an inline oven (principally used for commercial printing) or open-web used principally for production on newsprint. Web size designations include: "full webs" (approximately 38 inches wide), "half webs" (approximately 22

inches wide), and "mini-webs" (approximately 17 inches wide). Publication web presses may have even larger plate widths. Most web presses run both sides of the web simultaneously and offer inline finishing options not found on sheetfed presses.

### DIGITAL PRINTING

When an electronic file is output directly, with no intermediate film stage, the process is called digital printing. Digital color presses use electrophotography and print with toners or special inks, and all of them are capable of sheet-to-sheet personalization of images and text, commonly known as variable-data printing. Another output process, direct imaging, means a plate is imaged directly on a special lithographic press.

When color digital printing is wider than 24 inches, it's called large or wide format. The most popular machines are thermal or piezoelectric inkjets for short runs. Popular applications include banners, posters, point-of-purchase displays, bus wraps, billboards, and more. Fine art reproductions output digitally are known as giclées.

## OTHER PRINTING METHODS

### LETTERPRESS

Formerly the standard printing process, this is now used for specialty work such as numbering, imprinting, diecutting, stamping, and embossing. Letterpress is still used for fine art prints, limited edition books, and posters. The image area is raised above the surface of the nonprinting areas and prints directly on the paper.

### FLEXOGRAPHY

Often called flexo, this is a versatile process that uses molded rubber or etched photopolymer plates that carry the image, similar to letterpress, on a raised surface that prints directly on the substrate.

Advances in all parts of the process make flexo well suited to any substrate supplied in rolls including paper, films, box boards, and newsprint. Common uses are for labels, tags, envelopes, cartons, and newspapers.

### GRAVURE

In this process, all images, including type, are screened by tiny cells etched into cylinders. These cells vary in depth and width and are below the nonprinting areas. The cylinder rotates through a bath of ink and the nonprinting areas are wiped clean by a doctor blade before the image is directly applied to the substrate. Gravure is used for long runs including publications and packaging.

### SCREEN PRINTING

Formerly known as silk screen, this generally is used for short runs, but modern automatic equipment has increased the run lengths. Because the process lays a thick film of ink, it is ideal for brilliant colors and fluorescent inks that require a lot of pigment to be deposited. The image is carried on a stretched screen of fabric or fine mesh wire. Ink is deposited on the screen and forced through the image areas by a squeegee onto the substrate.

Some screen presses can print very large images on almost any material for point-of-sale displays, exhibits, posters, and even dimensional objects such as glassware and containers.

## VARIATIONS ON LITHOGRAPHY OR LETTERPRESS

### THERMOGRAPHY

By an inline attachment, this process deposits a resin on the wet ink and heats it, resulting in a raised image.

### STEEL DIE ENGRAVING

Used for securities, currency, and fine stationery. The image, applied directly to the paper and carried below the surface of the plate, is called a die. The nonprinting areas are wiped clean. A handmade counter die pushes the substrate somewhat into the die, giving a tell-tale impression on the back of the sheet and a raised image on the front.

GETTING TO PLATE

Computer-to-plate production (CTP) means that plates are prepared directly from computer files. This workflow is rapidly becoming standard for both large and small printers, even though film generated from imagesetters is still widely used. In either case, correct file preparation is paramount. When changes are made or mistakes caught after the plating step, costs rise rapidly.

Jobs generated from computer files must contain all the printing production requirements that the final composited traditional plate film contained. File preparers who choose to construct files for plate-ready film must include spreads and chokes (called "trapping" in computer terminology), bleed overwork, plus trim and center mark indications that were formerly accomplished by the "image assembler" at the printer. Printers with electronic prepress capabilities offer file manipulation services that cover things like trapping, low resolution image replacement, and more. They generally prefer handling these critical production details in-house to ensure proper preparation for their particular press and finishing lines.

The importance of proofs from digital files and plate film has increased because of today's speed of production and the opportunities to rapidly incur expensive remake costs at the plate stage. Proofs should reflect what is in the file or plate, film matching within industry tolerances, the printing process and substrate of the final job.

ELECTRONIC FILE CHECKING

Getting to plate is changing. While computer-to-plate in its many forms can be time and money saving, the importance of correctly prepared files that include all necessary elements becomes more critically the responsibility of the file's creator.

The three major page applications, QuarkXPress®, InDesign®, and PageMaker®, offer electronic checklists to aid in collection of the data necessary for output. However, for more complete evaluation of files, special preflight applications such as Flightcheck® or Preflight Pro® are recommended.

COLOR

Multicolor printing of some kind is now the norm. Matched color uses a designated ink color. Four-color process printing reproduces color photographs or illustrations by using only four colors of ink. Your original art is "separated" into cyan, magenta, yellow, and black (CMYK), each broken down into tiny dots. The size of these dots determines the appearance of the final printed colors.

The most convenient way to specify matched color is to use one of the color systems like Pantone or Trumatch. The newest page makeup, illustration, and photo editing software also support these systems. Each Trumatch or Pantone color has a formula for creating that color with printer's inks.

Preparing the full-color files on your Mac or PC in final high-resolution film or plate-ready images requires powerful equipment as well as vast storage requirements.

Electronic prepress providers, who have the equipment to create scans in high resolution, are able to supply their customers with low-resolution versions of image files that use far less storage and memory in page makeup files. Once the page file has been created by the customer, the prepress provider is able to automatically replace the low-resolution images with the high-resolution images to achieve the final file used to make plate film or to directly image plates.

Creating color files requires knowledge of the printing requirements for color including trapping and color balance. Use of computer color management systems by the file originator who wishes to go beyond low res images is an absolute requirement for quality and consistency.

Despite all the advances, the most important aspect of printed color remains: make sure everyone "sees" the same color and understands the limitations of four-color process.

Prepress color proofs that simulate color printing enable you to check composition, color breaks, registration, and separation quality and are an essential step for satisfying results.

PRINTING, FINISHING, AND BINDING

Once you have approved the prepress proofs your job is ready to print. (See pages 27 & 28 for print buying checklists.) If a press check is included in your bid, you'll be at your printer's plant when the first sheets come off the press. The final tweaking is done and the press operator takes over.

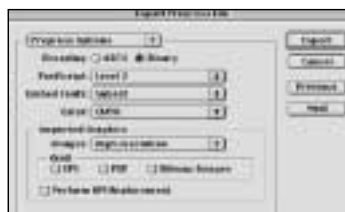
The final steps in converting a printed sheet to product are called finishing and binding. They are as equally significant a stage as everything that has gone before and must be planned into the original design. A printed piece starts in the bindery and ends in the bindery. (See page 19 for details on binding and finishing.)



QuarkXPress  
"Collect for Output" screen



PageMaker  
"Save for Service Provider" screens



InDesign  
"Export Prepress File" screen