

# Offset Lithography

You can choose from several different processes to print a publication: flexography, intaglio (gravure), screen printing, and offset lithography are the most common. The method you choose depends on your budget, your choice of a commercial printer, and the printed results you want. Because offset lithography is the most common printing process, we use it here to explain the basics of commercial printing.

Offset lithography involves printing from a flat printing surface. The printing plate holds ink because the image area is treated to make it chemically receptive to oil-based ink but not to water—not because the image area is raised (as in flexography) or etched (as in gravure).

A multicolor offset press has a separate printing unit for each ink being printed. For example, if you're using process colors and one spot color in a print job and your commercial printer's press can handle five inks, a printing unit will be set up for each ink. The paper will then pass through each unit in succession. If the press handles fewer inks, your printer will print two or three inks first, stop the press and change the inks, and then run the paper through again to print the remaining inks.

**Platemaking** Using a laser or photographic process, a printer exposes the document onto a flat plate with a smooth coating and then processes the plate to remove the nonimage areas. Nonimage areas are porous aluminum, which is attractive to water.

**Dampening** The plate is mounted on a cylinder. When the press starts, the plate comes into contact with dampener rollers first. Dampening solution (water plus additives) flows constantly from a fountain through a series of rollers to the plate cylinder. The last roller dampens the entire printing plate.

**Inking** Next, the ink roller applies oil-based ink to the plate. Thick ink flows from another fountain through a series of rollers, which distribute the ink thinly and evenly. When the last ink roller contacts the dampened printing plate, it smoothly distributes the ink across the water-resistant image area. The adjustment of ink and water must be balanced before printing can be done.

**Printing** The unique roller in an offset press is the *blanket cylinder*, which carries away a reversed image from the plate and transfers this image to the paper. The blanket has some resiliency and gives slightly when pressed against paper, so the image can transfer evenly to smooth or textured papers. The blanket is also formulated to accept ink but reject the dampener solution, leaving most of the water behind.

In the printing step, the paper—in individual sheets—passes between the blanket cylinder and the impression cylinder. The blanket cylinder carries the ink from the plate, presses against the paper, and transfers the ink onto the paper. On web-fed offset presses, two blanket cylinders belonging to two press units print both sides of the roll simultaneously, so there is no impression cylinder.

