



TRANSILWRAP COMPANY, INC.



Introduction to Offset Lithography

From Transilwrap Company, Inc.

Lithography — developed in the late 18th century, this process involves printing from a flat surface, whereby an image is first transferred photographically to thin metal, paper, or plastic printing plates. (Unlike other forms of printing, the image on the printing plate is not recessed or raised.) Also called “planographic printing,” the process is based on the principle that oil and water repel one another. Rollers apply oil-based ink and water to the plates. Since oil and water don’t mix, the oil-based ink won’t stick to the non-image areas (water-receptive areas). Only the inked image portion is then transferred to a rubber blanket (cylinder), which then transfers the image onto the paper as it passes between it and another cylinder underneath the paper.

To put it simply, think of the process in this manner: a drawing is made on the plate with greasy ink or crayon, and water is then applied to the plate. When the plate is inked for printing, the greasy parts accept the ink and the wet parts do not. Preparing a printing surface so that ink will adhere only to parts of it is the basic foundation of all planographic printing.

“Offset” is the term most commonly used when referring to lithographic printing, by transferring the image from the plate to a rubber blanket and then to the substrate being printed. (The image isn’t printed directly to the paper from plates; instead it is offset or transferred to another surface that then makes contact with the paper.) The terms photolithography, offset, litho-offset, and offset lithography are all synonyms in commercial printing for the most widely-used form of planographic printing.

Collotype, also called photogelatin, is a lithographic process that uses a gelatin-faced plate to achieve the same tonal distribution as obtained through the engraving process. This process is mainly used in the reproduction of fine illustrations or where accuracy of detail is needed, such as in scientific material.

Lithographic equipment is available for short, medium and long press runs, and much of today’s expansion in lithographic presses comes from the growth in web offset printing. Sheetfed presses can print 5,000 to 12,000 sheets per hour, and range from one-color presses to multi-color inks. Also, litho presses have become more efficient, allowing inks to run better and more efficiently and in addition, the prepress process has become much more streamlined, providing further production efficiencies. Through many technical refinements, lithography makes possible increased production speeds, improved quality in the reproduction of fine tones, and a substantial reduction in the number of impressions required to reproduce full-color copy.

As a printing process, lithography is probably the most unrestricted. It produces tones ranging from deep black to the brightest, fullest range of colors. The commercial printing applications of the lithographic process are huge in scope, and almost unlimited in number.

Lithography inks consist of a heavy, viscous paste similar to letterpress inks, but they also contain heavier concentrations of pigment, therefore color inconsistency may be present when using offset for long print runs. Also, litho inks tend to dry slowly due to low volatility. There is renewed emphasis today on new ink development; printers can improve the performance and appearance of their print product with the right inks, and it is important that the chosen ink helps reduce makeready times and waste.

A variety of inks are used in lithographic printing:

Conventional Sheetfed Inks – used for printing magazines, advertisements, card-based and metallic substrates. Expect to see new formulations that may include chemically modified vegetable oils and more environmentally friendly inks. Conventional inks basically consist of resin, pigment/additives, and solvent; they dry by evaporation.

Hybrid/UV Inks – used to provide UV (ultraviolet) coating in-line without losing gloss and print quality normally associated with conventional inks. UV inks consist of resin, pigment/additives, and monomers. The monomers and resin bond together to create cured ink as a result of photo-initiators employed by UV inks. Photo-initiators are the catalysts in UV inks, which trigger the curing process. (Curing is the drying/setting of the ink on the substrate, accomplished via exposure to radiant UV energy/heat.)

For many years, print jobs were finished with an overprint of a clear, protective enamel or lacquer to impart additional gloss and/or weatherability. When UV clearcoats were introduced, they became popular for use as a high-gloss protectant. Today, applying UV coatings over conventional printed graphics is so routine that it has become an integral part of the production process.

Today's demand for UV coated jobs is being fueled by designers and print buyers who are eager to use non-traditional substrates such as styrene, plastic or metallized paper. Printing on these materials can be difficult using traditional inks, but it's very manageable with hybrid inks and UV curing. Transilwrap understands the importance of matching the right material to the right ink for a specific application.

UV inks are closing in on replacing solvent-based inks, mainly based on quality and environmental issues. With no VOC's (volatile organic compounds), hybrid inks eliminate emissions problems and are much easier to handle with today's formulas.

Several variables can affect print and ink quality; some of which include:

- a.** Environmental factors such as temperature, humidity and barometric pressure.
- b.** The properties of substrates from unknown, different or unproven sources.
- c.** Characteristics from inks from different manufacturers.
- d.** The performance of different types of printing, curing, and drying equipment.

Lithographic inks have continued to experience steady growth in the heatset (web press) market; however, they are slowly losing market share to other printing processes, in particular flexography. The label market in particular, especially on difficult substrates, is exploding due to the need to create products that have super high shelf appeal in the personal care, beverage, and snack markets. In spite of this, litho inks and lithographic printing will continue to grow as they obtain market share from the gravure and letterpress segments, and they will remain the leading type based on their dominant use in publishing and commercial print operations.

In today's litho offset print arena, material selection is more diverse than ever. Add to this enhanced ink adhesion and the end result is better printability and a higher quality finished print product.

Transilwrap has been an industry leader for more than 70 years in providing the right substrate to fit the project parameters and end-use application. Please feel free to call us at 1.800.321.8544 if you need guidance or information on the material that best suits your needs.

Source: *The Rauch Guide to the U.S. Ink Industry, 2002-2004 Edition; About, Inc., 2003; The Columbia Electronic Encyclopedia, 2003; GATF World, Vol. 15, No. 1, January/February 2003; ScreenWeb.com; American Printer, June 2003; Dotprint.com.*