

Printing Processes

Relief Printing

This method of printing is probably the oldest process (screen printer might dispute this) and has been used for thousands of years.

A raised image is created, ink is placed in that image and it is then transferred, usually by applying pressure, onto a substrate (paper, cloth, cardboard, plastic etc). This is why it is sometimes called letterpress printing.

The earliest printing was done with wooden or clay blocks that had to be individually fashioned or carved.

There is some archaeological evidence that printing was done in Crete about 1500 BCE, but most early printing comes from China, Japan and Korea.

While letterpress printing is effectively obsolete (except for foil stamping and other finishing processes in bookbinding), some relief printing is still done, mainly on rotary presses to print labels and packaging.

Lithography

Lithography is the commonest form of printing these days. It works on the principle that oil and water do not mix. Originally the process involved drawing with a greasy crayon on a polished stone (a process still used by artists). The greasy image would accept the ink while the stone would reject it and a print could be taken.

The skill involved in creating the images on the stone was high and the lithographers were the princes of the industry. Offset plates are now made photographically or directly generated from computer images.

These days most lithography is offset lithography with the inked plate on the cylinder of the press transferring the image to an offset blanket on another cylinder and then onto the paper. This causes less wear on the plate and also means that the plate can be read the right way round.

Flexography

This is a form of relief printing that uses a flexible rubber or photopolymer plate attached to a cylinder. It uses a liquid ink and low pressure and is therefore suitable for printing on a wide variety of substrates including plastics, foils and pressure sensitive labels. Print quality is not as high as other processes but the technology is developing at a faster rate.

Gravure

In this process the image is etched into a copper coated cylinder which runs through a bath of ink. The surface non-image area is wiped clean by a flexible metal doctor blade and the ink is transferred by suction when the paper is pressed against it. Originally used for high quality photographic and magazine work gravure is now, due to cost of cylinders, used largely for long run packaging like cigarette and detergent packets.

Screen Printing

This is a comparatively slow ,but extremely versatile printing system that can print almost anything on anything (a commercial caterer has used a screen printing machine to spread margarine on sandwiches). It is also arguably the oldest printing process ,since stencils were used in the decoration of ancient Egyptian Tombs.

An image is created on a stencil attached to a fine mesh stretched on a frame with non-image areas blocked or masked. The mesh was originally silk, hence the old fashioned term silk screen printing, but is now almost invariably nylon.

Stencils can be created by hand or photographically. Ink is forced through mesh onto the substrate using a squeegee. This creates a thicker ink film than other processes and hence the drying is slower.

Much screen printing is done on substrates other than paper such as fabrics, plastics, CDs, ceramics etc. It is sometimes used for spot coating on already printed materials.

Pad Printing

Pad printing is the only contemporary form of printing that can be done inside a concave object. It is mostly used for printing on objects such as plastic bottles or inside electrical components.

It uses a gravure plate (usually photopolymer) and a pad or tampon that lifts the ink from the plate and onto the object that is being printed on. So it is essentially an offset gravure process.

Digital and Electronic Printing

A number of processes fall under this category. They include electrostatic printing using toner - the printing method used in photocopiers and laser printers.

Inkjet printing, essentially the same as used in an office is another common process. It is often used for short run colour posters.

Digital printing tends to be used for print jobs with very short print runs or that involve variable data (like those personalised letters from advertisers that you get). The advantages are that the set up costs are very low, however the unit costs in consumables (toner and ink) are much higher than other processes.

A number of printing presses are now driven by computers and generate their own plates on the machine. This is known as Computer to Press (CTP) technology. These use both lithography and gravure processes on plastic plates. Once the plates have been created, however, the printing process is exactly the same as for more conventional presses. They do not really qualify as digital printing since the essence of digital printing is the ability to cope with changing data.

Die Cutting

Relief presses can also be used for die cutting, creating different shapes such as blanks for boxes or windows in the substrate (usually cardboard of some sort).

For die cutting a cutting forme is made of thin blades set in wood just above type height. The cutting forme is locked in the chase and the press is operated in the normal way though without rollers and ink.

The unwanted cardboard is then stripped away by hand (though in newer, larger machines it can be done mechanically).

Some platen presses like these are still in use for small commercial die cutting jobs.

Embossing, in which the surface of the substrate is raised, is a similar process that uses a die slightly higher than type height with a “female” die on the other side of the substrate.

Die cutting and embossing have become the main 'letterpress' printing applications.