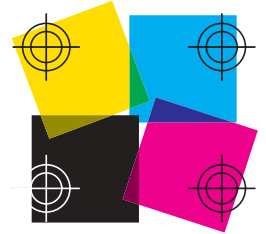


The **P&D** Print School

An information guide
to the printing of
large format posters





Introduction

Since 1996, Print & Display (Polska) have been running 'Print Schools' at their Warsaw plant. These seminars have been designed to provide an understanding of the complete print process, and of Outdoor printing in particular, for agency and client personnel involved in the creation, buying and approval of posters.

As a result of the popularity of these sessions, it was decided to present the essence of the Print School information in a series of articles in Impakt Extra - the company's quarterly newsletter - during 2002.

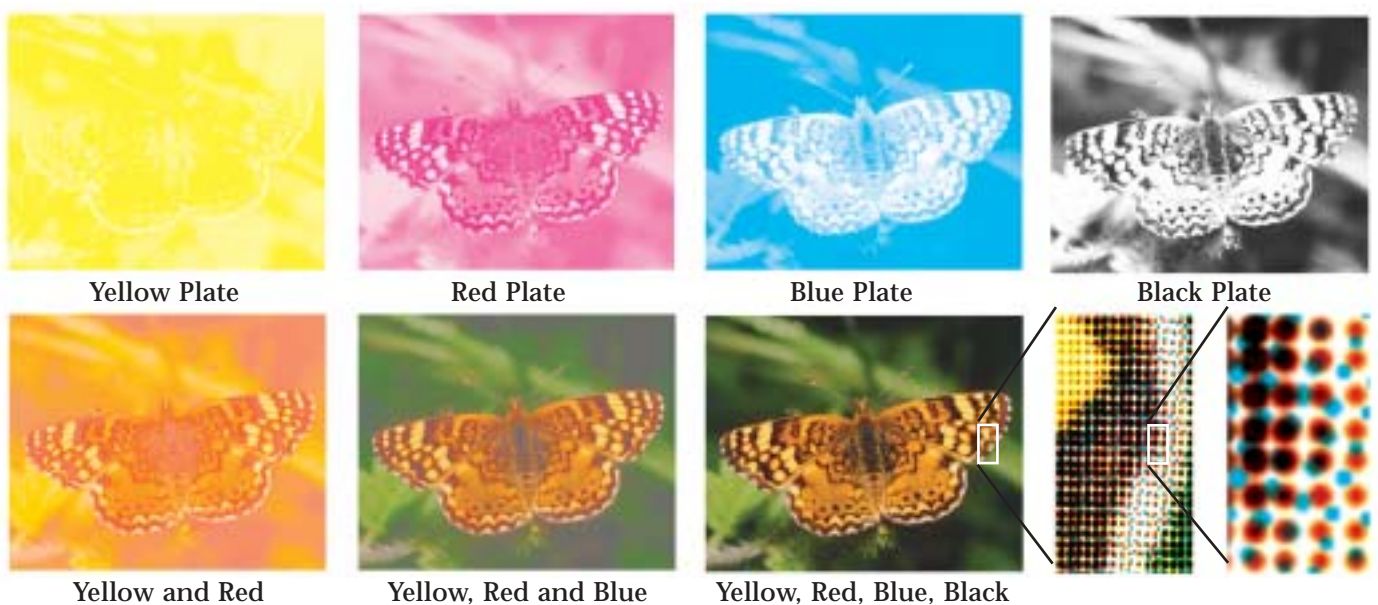
The series covered Process Colour and the Pantone System; the key characteristics of Screen and Offset printing; the various stages in the printing process; factors influencing colour reproduction and, finally, a glossary of technical terms.

This booklet now brings together those four articles as a cohesive guide for all concerned in the creating and buying of large format posters.



Process Colour

There are two kinds of colour printing – flat colour printing and process colour. Whilst the former merely transfers solid colour exactly as the inks used, process colour has the capacity to reproduce any colour with varying shades and tones. This is achieved by printing tiny dots of transparent inks in blue (cyan), yellow, red (magenta) and finally black (for sharpness and contrast). These four colours are referred to internationally as CMYK. In printing, these dots can fall close together, some are directly superimposed and some partially overlap. When the resulting image is viewed, the eye assimilates the colours of the dots into the colours and shades of the original image. For example, when the eye ‘sees green’ this is in fact a combination of blue and yellow dots. The intensity of the colour in a particular case depends on the density and size of such dots. In general, the bigger the dot, the darker the colour. Critical, of course, to achieving the varying tones is the fact that all the inks, including the black, are transparent, thus producing different combinations when overlaid. (The separation of images into component colours and dots will be covered later.)



The Pantone System

Everyone has a different perception of colour intensity and shading and it is impossible to describe this in objective terms. Each person’s view of what constitutes a particular colour is quite individual. In order to address this problem, not least as between printers and customers, the Pantone Book - a comprehensive colour palette - was created and this is now accepted as the printer’s basic reference world-wide. The Pantone Book provides the vital common colour reference system for creatives, buyers, ink manufacturers and printers.

It has to be noted, however, that the tone and shade of a given colour is affected by the particular material on which it is reproduced. The same Pantone colour can look different when printed on paper, foil, metal or on plastic. To help deal with this, the Pantone Book – which contains over 1,000 individually coded colours – is divided into two main sections – the ‘C section’ for coated paper and the ‘U section’ for uncoated or more absorbent paper. Each colour in the book has its own name and number together with details of its components.

In the case of process colour, a separate Pantone Book has been developed. This shows the range of colours that can be achieved using CMYK and, by implication, whether specific additional inks or specially mixed inks will be necessary to achieve the desired effect.

Even with the comprehensive nature of the Pantone System, there are some pitfalls. Some variations can occur in the manufacture of the inks and the Pantone references themselves may deteriorate. The durability of the book itself is approximately one year, depending on the pattern of usage. The condition of printing machines can affect colour reproduction and, finally, lighting conditions under which colours are viewed can obviously affect comparisons.

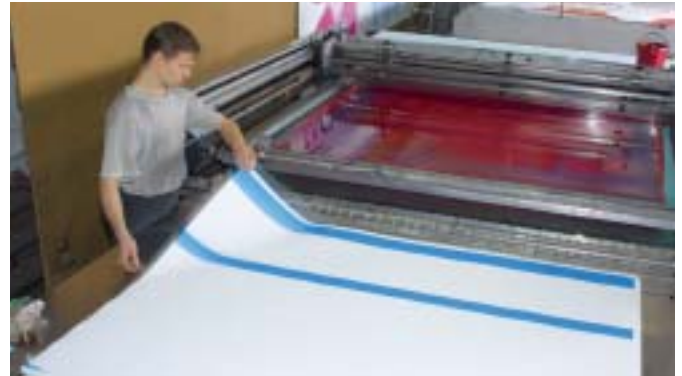
Screen Printing

Normal runs of large format posters are produced using either Screen Printing or Offset Printing technology, with each process having its own advantages and disadvantages.

Screen Printing, originally known as silk screen printing, is in fact the oldest of all printing techniques - originating in China over one thousand years ago. The fundamental process is essentially a simple one with ink being forced through a fine screen where the area, other than the chosen image, has been blocked out - thus transferring only this image to the material. Whilst originally stencils or a glue-like substance were used as barriers on the literally silk screen, the process to-day is photographic and chemically based and the screens are made of a durable photo-sensitive synthetic material. After printing, individual screens are cleaned for re-use and, at regular intervals, replacement fabric is stretched on the frames.

The nature of the screen printing process requires that one colour be printed at a time and that this go through a drying process prior to applying the next. This has obvious implications for production times even on the latest four-colour machines.

Present day screen printing technology allows for extremely high quality process colour printing with perfect register of colours. Indeed, the nature of the process allows for a high degree of control of poster reproduction. Specific areas of the sheets can be printed with special inks or extra colours where particular impact - such as for a logo or pack shot - might be relevant.



Screen printing



Checking litho plates

Offset Printing

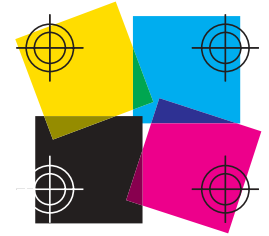
Offset or litho printing was discovered in the late 1700's in Germany and is based on the principle that grease and water do not mix. The term 'litho' comes from the Greek word for 'stone' and derives from the origins of the process. The discoverer, Alois Senefelder, drew a design on stone with a greasy crayon, then wet the stone with the result that the water adhered only to this and not to the grease. When ink was applied to the stone, it stuck only to the greasy image and when paper was in turn applied to this, only the image was transferred. To-day, photo-sensitive metal plates have replaced the stone to which images are transferred. Paper is not applied directly to these plates, rather the image is 'offset' on to rubber covered cylinders which in turn transfer it to the paper. To-day's litho printing presses incorporate the four CYMK colours in line and the sheet picks up these in sequence in a continuous pass. The inherent printing speed of the offset process as compared with screen printing obviously makes it more suitable for longer runs.



Offset printing

Combining Systems

On occasion, it can be advantageous to actually combine offset and screen printing whereby, for example, an offset poster can be overprinted by screen to apply phosphorescent or metallic inks.



Pros and Cons

Although, in the case of large format posters, there is virtually no difference in the quality or precision of the finished job, each process has advantages and disadvantages.

Screen Printing

Advantages

- Economical for short runs – typically 10-150/200.
- Can be used to print on a wide range of materials, including wood, acrylics, textiles and glass.
- Excellent resistance to fading.

Disadvantages

- Not precise enough for small sizes below B1/B2
- Uneconomical for runs in excess of 250. (The high ink usage is an important factor here.)

Offset Printing

Advantages

- Economical for longer runs over 150/200.
- Capable of precision printing on small sizes
- High speed production
- High flexibility in control of colour balance.

Disadvantages

- Uneconomical for short runs.

Digital Printing

The arrival of computer-driven digital printing in recent years has opened up new possibilities for short run jobs – including large format sizes. With the high quality digital option, it is now economically practicable to produce even one-off jobs direct from disk.



Colour Reproduction

This section concentrates on the production stages between the arrival of the basic artwork and its transfer (as plates or screens) to the actual printing machines – in essence, the mechanics of colour reproduction.

Original artwork for poster printing can be in the form of flat artwork, a transparency or, most commonly, a disk. The key requirement is, of course, to translate this from a single image to a series of plates or screens for printing.

The first stage in the process involves the scanning of the single image and its separation into the four CMYK colours. This is the first critical stage in colour reproduction and the most important aspect here is the quality of the resolution. The best reproduction is achieved with a resolution of 300 d.p.i.

Once the original image has been satisfactorily translated into the four part CMYK combination of images we can then move to the proofing stage. Whilst the most reliable proofing operation understandably involves an actual ink or ‘wet test’ of the plates or screens, the cost is prohibitive and, in practice, is replaced by a computer based proof, taken from the CMYK separations, on thermo-active material or colour foils such as cromalins or matchprints.

There are, however, important pitfalls here as the difference between the proofing material and the actual poster paper can result in colour variation . Experience in evaluating computer based proofs is a major factor in ensuring a satisfactory end result.

Another important factor in the journey from original image to printed reproduction relates to laminating, lacquering and coating as all these finishing techniques can, of themselves, modify the printed colour tones.

Once proofs have been signed off, the final stage between image and machine involves the production of film and the subsequent making of litho plates or screens.

For large format posters, the basic image is sectioned into film panels and these are in turn projected on to photo-sensitive litho plates or screens for transfer to the printing machines. A standard billboard incorporates six such individual panels.



Miniature film is projected on to a photo-sensitive screen

Glossary of Printing Terms

Absorption In paper, the property which causes it to take up liquids or vapours in contact with it.

Bleed That part of the image which extends beyond the trim-line of the page (i.e. the printed matter designed to run off the edge of the paper). Illustrations which spread to the edge of the page and allow no margins are described as 'bled-off'.

Colour Cast An overall colour imbalance in an image, as if viewed through a coloured filter.

Colour Separation The division of colours of a multicoloured original into basic portions, each of which is to be reproduced by a separate printing plate.

Colour Separations Colour process printing uses four colours: (1) cyan; (2) yellow; (3) magenta; and (4) black – also known as CYMK. These print as tiny dots of solid colour, which combine to give the full colour range of the original. The copy is broken down into the process colours by photographic or electronic colour separation. In separation, the original copy is photographed four times using coloured filters, to produce a different separation negative for each colour.

Cropping Trimming or masking sections of the artwork that are not required to be printed.

CYMK The process colours Cyan, Yellow, Magenta and Black which are combined in varying amounts to represent colours in an original image. K is used for Black to avoid confusion with Blue.

Greyscale An image comprising black, white and grey data only.

Halftone Artwork reproduced by breaking down the original tone image into a pattern of dots of varying size. Small dots produce light areas and larger dots produce darker areas.

Keyline An outline showing the shape of a die-cut, crease or perforation.

Line Colour Where a colour is printed using a specific colour of ink rather than creating it from the process colours.

Machine Proof A proof made on a machine similar to the one on which it will be printed.

Metallic Inks Inks in which the normal pigments are replaced by very fine metallic particles, typically gold or silver in colour.

Opaque Ink An ink which conceals all colour beneath it.

Ozasol, Matchprint, Cromalin 'Proof' made by means of a thermal base and colour foils.

Out of Register When inks printed over one another are not in alignment, resulting in 'out of focus' images.

Process Colour CYMK/ Four-Colour Process. The term used to describe colour printing by means of the three primary colours (cyan, yellow and magenta) and black.

Progressive Proof A series of colour proofs showing the individual, variously combined and collectively combined colours used in four colour process printing.


Register Marks Target marks or 'bull's eyes' placed on camera copy to assist in registration.

Serif Typeface Individual letters and characters with the small terminating strokes which are absent in sans serif faces. Most text is set in serif typefaces (fonts) because it is easier to read.

Spot Colour Also referred to as line colour – where a colour is printed using a specific colour of ink rather than creating it from the process colours.

Tints Various even tone areas (strengths) of a solid colour.

UV Varnish Varnish employed after printing through ultra-violet radiation



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