

PRINTING AND ASSOCIATED PROCESSES

This mobile revision pdf is based on detailed work found in the 'PRINTING PROCESSES' section.

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Tap the blue button to view Printing Processes covered by this Revision PDF



PRINTING AND ASSOCIATED PROCESSES

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2. THE ROTARY LETTERPRESS

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7. VARNISHING AND UV VARNISHING OF CARD

8. LAMINATING

9. EMBOSSING

10. THE DIE CUTTER

11. DIRECT PRINTING

12. SUBLIMATION PRINTING

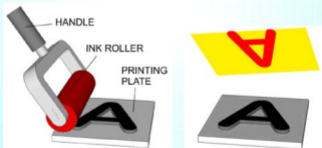
13. FLEXOGRAPHIC PRINTING

14. WEB-FED SYSTEMS

THE LETTERPRESS (1)

One of the most basic ways of printing with ink or paint is through the use of a 'letterpress'. Using a letterpress is sometimes called relief printing. In simple terms, the letter or shape to be printed stands above the surface. Ink or paint is then rolled across the shape/letter and paper is then pressed down onto it. When the paper is lifted up the ink/paint has been transferred to the paper. This process can be repeated any number of times.

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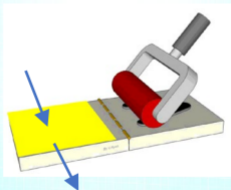
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THE LETTERPRESS (2)

With the addition of a handle and hinge mechanism, a letterpress capable of more accurate work can be made. These were seen in the early days of printing in medieval times. Early books were produced page by page using this technique.

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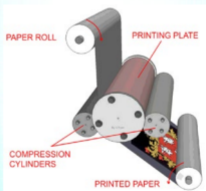
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THE ROTARY LETTERPRESS

A rotary letterpress is used for manufacturing paper products such as wallpaper. The printing plate is made from aluminium and has the pattern/shape/text to be printed - embedded in its surface. As the printing plate revolves ink is spread across it and the paper is pulled between the compression cylinders and the plate. The pattern or shape on the plate is printed onto the paper.

Tap the image for detailed information and exercises



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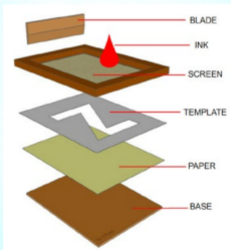
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SCREEN PRINTING

Screen printing is in common use today as it is relatively cheap and a variety of colours can be used. Good examples are seen on T-shirts and posters. In industry this technique is used to produce thousands of screen printed items, even on packaging. The equipment required for this technique are shown below.

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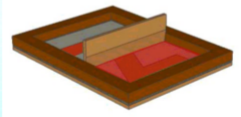


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1. The material is placed on top of the base. In the example, paper is being used.
2. A template made from card, with the required shape cut out of it, is placed on top of the paper.
3. A screen is placed on top of the template. The screen is made of stretched nylon fabric and has a wood frame to hold it in place.
4. Ink is then squeezed through the nylon fabric.
5. A blade is used to spread the ink out and push it through the fabric, through the template, and onto the paper.
6. The paper is taken out of the screen printing equipment and the printed pattern can clearly be seen.

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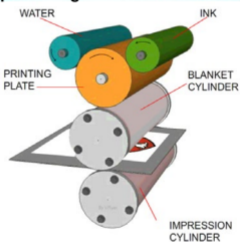
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LITHOGRAPHY

Lithography is used by commercial printers, printing companies that print thousands of copies of the same item, in one production run. Lithography machines can print on both sides of paper/card and they rely on four basic colours; yellow, cyan (type of blue), magenta (type of red) and black. This is also known as the CYMK process.

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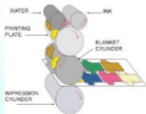
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LITHOGRAPHY – HOW IT WORKS

1. The printing plate has the image to be printed, on its surface (the image stands out slightly from the printing plate surface).
2. The printing plate is kept dampened. Ink is applied to the plate but it is repelled from the dampened surfaces which are the non-image areas.
3. As the printing cylinder rotates the ink is transferred to the rubber blanket cylinder.
4. The ink, now on the rubber blanket cylinder, is pressed onto the paper or card as it is pulled through the machine. (The paper is trapped between the blanket cylinder and the impression cylinder - these pull the paper through the machine)

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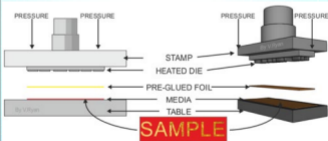


FOIL BLOCKING / FOIL STAMPING

Foil Block Printing (sometimes called Hot Foil Stamping) is where a pre-glued metallic foil, is pressed by a heated die, into the surface of a material. This is a permanent way of applying a quality finish to materials, such as card, for packaging. This process can also be used to apply a finish to other materials including leather.

The foil is metallic, but comes in a range of colours including gold, copper, red and purple. It is even possible to block print holographic foils, creating 3D effects. Foils are also available as satin, gloss and matt.

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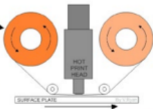
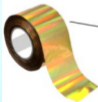


DIGITAL FOIL HOT STAMP MACHINE

The media to be printed on, is placed on the surface plate. The heated digital head (made up of minute individual pins) continually forms the desired shapes / letters / characters and they are pressed into the moving media, whilst the head is hot. The heat and pressure applies the foil permanently to the media, in the form of shapes / letters.

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SAMPLES OF AVAILABLE FOILS



FOIL BLOCKED PASSPORT COVER

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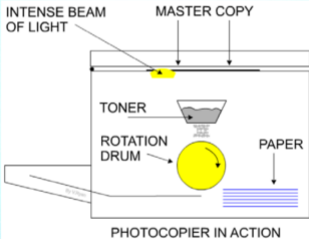
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HOW A PHOTOCOPIER WORKS

We have all used photocopiers and they are a modern way of printing copies of pages or entire documents. Companies, schools, businesses and individuals use them on a regular basis

Tap the image for detailed information AND how does it work?



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REGARDING THE
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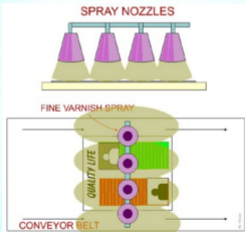


VARNISHING OF CARD

Fine varnish can be sprayed on to the surface of card. When dry this gives a gloss finish and helps protect the printing underneath. The printing and colour work must be completed before this process takes place.

The varnish takes at least two hours to dry.

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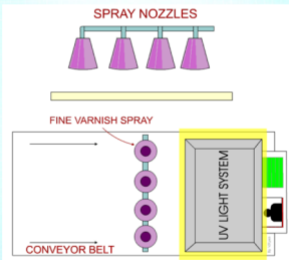


ULTRA VIOLET VARNISHES

Special varnishes dry almost straight away if they are exposed to ultra violet light. (UV light). The varnish is sprayed on to the paper / card in the same way as other varnishes.

However, after spraying the card passes underneath UV lights which dries the varnish almost instantaneously.

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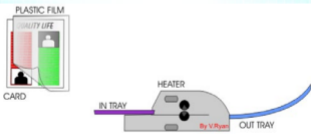


LAMINATING

This also produces a high gloss finish on card and provides good protection against damage as it is normally water proof.

The printed card is placed inside a plastic film/sleeve. It is then placed in the 'in tray' of a laminating machine which pulls the card and film through its heater and rollers. The heater warms up the film almost to melting point and the rollers press the film sleeve until it is sealed. When the card reappears in the 'out tray', the finished item looks glossy and professional. However, laminating is much more expensive than varnishing but gives more protection to the card.

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LINKS TO DETAILED PAGES REGARDING LAMINATING



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EMBOSSING

Embossing involves raising areas of a card surface above the level of the rest. The diagram below shows a coat of arms that has been embossed on green card. The image stands out from the card as it has been produced by a stamp which presses the card to the correct shape. This process adds cost to the printing process but gives the card a 3D effect.

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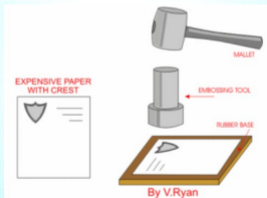
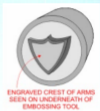
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EMBOSSING

A special embossing tool has been made with the shape of the coat of arms engraved on its base. The embossing tool is aligned with the printed coat of arms and the mallet is then used to strongly tap the embossing tool.

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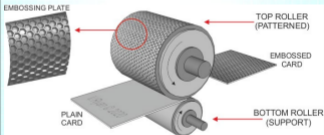
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COMMERCIAL EMBOSSING

Commercial embossing is usually, a batch or continuous production process. A simplified diagram of typical embossing machinery is shown below. Commercial machinery employs two roller cylinders. The top roller has the pattern, which will be pressed into the card. The bottom roller has a rubberised surface and supports the card, as it travels through the machinery.

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LINK TO DETAILED PAGES REGARDING EMBOSSING

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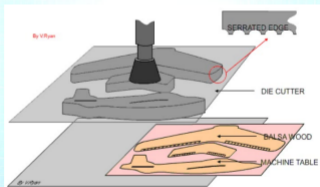
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THE DIE CUTTER

DIE CUTTERS are normally used to manufacture card packaging. They can also be used to manufacture shapes / nets / developments from stronger materials. The example below - model gliders / aeroplanes (balsa wood / polystyrene) are usually manufactured using a steel die cutting machine. A sheet of thin balsa wood or polystyrene is placed on the machine table and the die cutter 'stamps' out the shape and the material is then removed.

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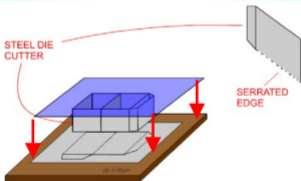
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MANUFACTURING NETS AND DEVELOPMENTS - DIE CUTTING

The die cutter (below), is pressed into the card by the force of the machine. The 'stamped out' net is then automatically placed on a folding table. Parts of the table move/fold, forming the basic package. People sometimes finish the more delicate folding operations. (This depends on the complexity of the package).

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DIRECT PRINTING

CD ROM packaging is printed through direct printing. The Direct Imaging Press is based on a typical 'offset press except that it is computer controlled. All the imaging plates are pressed onto the paper/card precisely through the control of a computer system. Usually an offset press operates using one imaging plate at a time. This means that the paper / card has to be sent through the offset press at least four times until the application of colour is complete. With the Direct Imaging Press the card / paper is sent through once.

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SUBLIMATION PRINTING

A sublimation printer and associated heat press, allows the user to 'sublimate' shapes, patterns and images, on to the surface of materials, such as polypropylene and textiles.

Tap the image for detailed information



A design is produced using CAD software. The design is printed using a sublimation printer. The printed image, is placed on the surface to be sublimated, between the top and bottom plate of a heat press, turning the printed image into a gas. The gas penetrates the surface of the material and solidifies, produces a permanent image. Once cool, the printed product can be removed.

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SUBLIMATION PRINTING

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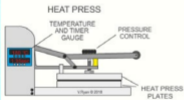
1 GRAPHICS SOFTWARE



2 SUBLIMATION PRINTER



3



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FLEXOGRAPHIC PRINTING

Flexographic printing (also known as Flexo), results in a clearly printed image, with sharp colour quality. This makes the flexo printing process popular with the packaging industry and many others

Tap the image for detailed information



The process is ideal for the printing of packaging, wallpaper, calendars, books, laminated tetra paks and food packaging. The material that receives the print, known as the substrate, can be paper, card, polymers, textiles and even metallised films (polymers coated with a thin layer of metal).

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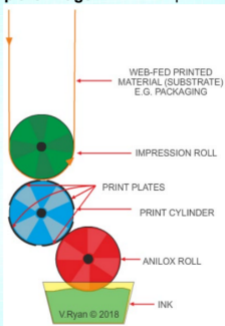
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HOW FLEXOGRAPHIC PRINTING WORKS

The ink reservoir is filled to a level, that allows the anilox roll to rotate through it. The print plates are re-inked by the anilox roll, which in turn rotates through the ink reservoir and the image is printed on the material.

Tap the image for a full explanation



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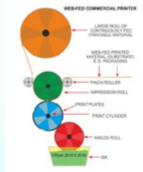
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ADVANTAGES AND DISADVANTAGES OF A WEB-FED SYSTEM

A web fed printing system, is supplied with printing material, from a large roll. The printing material, also called a substrate, can be paper, card, polymers, textiles and even metallised films (polymers coated with a thin layer of metal). Rotary letter presses, lithography printers, foil blocking machines, direct printers and even die cutting machines, are systems that can be web-fed.

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ADVANTAGES:

Because of the use of a large roll of print media, web-fed systems are faster than single sheet systems, as the roll continuously feeds the printer.

They are economic when printing large runs, as a large roll of print media is cheaper than the equivalent number of single sheets.

The printing process is a smooth operation, without the need to feed individual sheets of print media, into the printer.

DISADVANTAGES:

They require operation by at least one trained / semi-skilled operator.

If they break down, they can take longer to correct, due to their increased complexity, compared to other printing systems.

They are more expensive to install, than single sheet systems.

They require a greater number of maintenance sessions, to ensure prolonged, continuous running.

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