

Textiles: Surface Treatments & Finishes

Fabric surfaces can be treated and finished to enhance their functional and aesthetic properties. This can be done by hand or with specialist equipment and machines.

Dyeing

Dyes can be used to change the colour of fabrics. There are two main types of dye:



Natural dyes are derived from natural sources such as plants, insects, minerals and molluscs. They were the only dyes available before the invention of synthetic dyes.

Beetroot is used to dye and colour food, clothing and hair.

Synthetic dyes are man-made chemical compounds that have been manufactured from organic molecules. They are widely used to produce bright and consistent colours.

The first synthetic dye was mauveine, a purple dye discovered in 1856.



Dyes can be applied at various stages of the manufacturing process. Fibres and yarns can be dyed before they are spun or woven, or dyes can be applied directly to finished fabrics or garments.

When dyeing fabrics, it is important to consider the following factors:

Absorbency

Highly absorbent fabrics such as cotton absorb dye easily, whereas some fabrics that are non-absorbent have to be chemically treated before being dyed to 'fix', or set, the dye.

Colour

If a dye is applied to a white fabric, it will take on the same colour as the dye. However, for a non-white fabric, the finished colour will be a mix of the dye and the natural fabric colour.

Commercial Dyeing

Commercial dyeing is used in industry to dye large volumes of fabric the same colour. This allows manufacturers to work more efficiently in terms of time and cost.



Continuous Dyeing

In continuous dyeing, yarn or fabric is fed continuously into a dye tank or bath.

After application, the dye is typically fixed with heat or chemicals and then washed.

Long rolls of fabric with a uniform colour are produced in one continuous process.

Batch Dyeing

In batch dyeing, yarn or fabric is loaded into a dyeing machine with a solution containing the dye. Because the dyes in the solution have an attraction to the fibres, the dye leaves the dye solution and enters the fibres.

The dye is fixed with heat and/or chemicals and then washed.

Resist Dyeing

Resist dyeing is usually performed by hand and involves using a resist, which acts as a barrier between the fabric and the dye. It is used to create patterns during the dyeing process.

Batik

Batik is a method of resist dyeing that originates from Indonesia. It uses a hot wax resist.



1 A paintbrush or tjanting tool is used to hand apply a design in hot wax. A stamp can be used for larger designs.



2 Once the wax has hardened and dried, the fabric is immersed in dye, or the dye is applied with a paintbrush.



3 The wax and dye may be applied several more times depending on the final desired effect. The fabric is left to dry each time.



4 Once the design is finished, the wax is removed by applying heat to it. This can be done by ironing or boiling it.

Batik produces unique and complex designs. Sometimes wax is also cracked for effect.

Tie-Dye

Tie-dye is a simple method of resist dyeing that uses string or elastic bands to create a barrier between the dye and the fabric. The way in which the fabric is folded and twisted can also act as a barrier.

1



The fabric is tied with string or elastic bands. Tying the fabric in different ways will produce different effects.

2



The fabric is immersed in a dye bath and then left to dry. The process can also be repeated to produce multicoloured fabric.

3



Once the tying-and-dyeing process is complete, the fabric is untied and left to dry to reveal the finished result.

Different tie-dye effects can be created by manipulating the fabric in the following ways:

Knotting

Folding

Twisting

Tying in buttons/pebbles

Printing

Printing is used to apply coloured patterns to fabrics. This can be done either by hand or with the aid of a machine.

Screen
Printing

Screen printing uses stencils (designed and cut by hand or by using CAD/CAM) and a mesh screen to transfer a design onto fabric.

Screen Printing by Hand

Flatbed screen printing is a simple process that can be carried out by hand. It uses a stencil and a mesh screen to print designs on fabric.

- 1 The stencil is placed between the mesh screen and the fabric.
- 2 Ink is spread over the mesh screen using a squeegee.
- 3 The ink is pressed through the mesh and the holes in the stencil onto the fabric, resulting in a printed design.

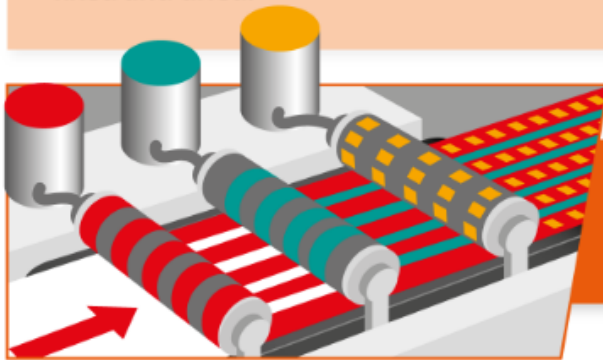
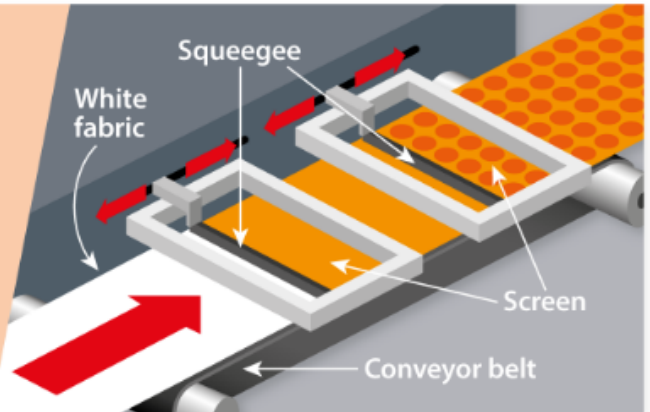


Screen printing is a low-cost option for printing small runs of intricate designs, such as bespoke t-shirts or individual craft projects. However, stencils can take a long time to create, and colours have to be applied separately.

Industrial Flatbed Screen Printing

In cases where large runs of printed fabric are needed, such as in retail, machines can be used for screen printing. Although efficient, the screens can be expensive.

- 1 The conveyor moves the fabric under the screens.
- 2 The colours are applied to the fabric by automated squeegees. Each screen applies a different colour and/or pattern.
- 3 The printed fabric is removed ready to be fixed and dried.



This process can also be carried out using cylinders instead of screens in a process known as rotary screen printing.

Like screen printing by hand, industrial flatbed screen printing is capable of printing intricate designs. However, it is much faster and can produce multiple designs very quickly. Unfortunately, the presses are also expensive, so it is only suitable for long runs.

Block Printing and Roller Printing

In block printing, a raised design is created on a block, which is then placed in dye and pressed against fabric to transfer the design to the fabric.

For large-scale printing, roller printers can be used. These are usually engraved or embossed copper rollers that are inked and continuously run over the fabric.



Digital Printing

Digital printing uses CAD/CAM to create complex designs that are then printed directly onto fabric using inkjet technology, which can use a wide range of colours.

Digital printing is best suited to items requiring a high level of detail that are produced in small quantities.

After printing, the fabric is treated with steam or heat to fix the dye to the fabric.



Advantages

Complex designs can be produced with a high level of detail and a wide range of colours.

The process is fast compared to other methods, from design through to the finished product. Designs can therefore quickly be adapted to suit changing trends.

Disadvantages

Digital printing is a relatively new technology and is therefore costly to set up.

Ink cartridges and regular machine maintenance are also costly.

Surface Treatment

Surface treatments can be added to textiles to improve their functionality or their aesthetics. For example, they can be made crease-resistant, flame-retardant, shiny or waterproof.



After a textile-based product is made, stain resistance can be added to keep it in good condition and protect it from spillages.

This is important for use in furnishings where people often spill food or drink onto the fabric.

Stain resistance is applied to prevent water- or oil-based stains from absorbing into the fabric.

