

2.3.3a Construction and working properties of materials

The choice of material for a textile product depends on the following:

- fibre content – the sources of the fibre
- spinning method – fibres into yarn
- construction of fabric
- applied finishes.

All of these factors affect the fabric's end use and the impact it could have on the final product.

- **Weaving** and **knitting** are the two most popular construction methods for textile fabrics. Both have subtypes.
- Woven and knitted fabrics serve different purposes.
- The property of a knitted or woven fabric remains the same regardless of the fibre content.
- Woven fabrics have more structure and are considered more formal.
- Knitted fabrics are considered more casual as they have the ability to stretch.
- Fabric properties change depending on the tightness of the woven or knitted construction. For example, the resultant fabric in a loose weave will be less stable than in a tight weave.

Felted fabrics

Felted fabrics made from wool fibres rely on the natural ability of wool, in particular the scales, to matt together. This can be done using heat, mechanical action or moisture.

- Needle felts consist of synthetic fibres matted together mechanically using barbed needles.

Woven construction

Weaving is the interlacing of two sets of yarns at right angles.

Warp yarns travel the length of the fabric whilst **weft** yarns travel across the fabric interlinking with the warp yarns. Variations in weave patterns are created by different formations of yarns interlinking.

- *Plain*: the most common type and is considered strong and stable.
- *Twill*: identified by diagonal lines and is considered a stronger weave, making it ideal for workwear.
- *Satin*: has a characteristic shiny side caused by the warp yarns floating over the weft yarns. Satin weave drapes well, but snags easily.
- *Herringbone*: a variation on the twill weave, identified by a zigzag pattern.
- *Pile weave*: has a raised surface created by an additional weft thread which forms tufts or loops that stand up. The tufts can be cut to create plush fabrics such as velour. Pile fabrics have a 'nap' and need to be cut in one direction only.

Non-woven fabrics

Non-woven fabrics are made directly from fibres. They are:

- cheap to manufacture
- cheaper to use as there is no grain
- they do not fray when cut
- weaker than knitted or woven fabric.

Uses include disposable products, interfacings, filters, liners and insulation.

Non-woven carbon fibres are used to make fabrics for military use and in filtration systems.

Nonwoven fabrics can be impregnated with beneficial chemicals to use on products such as wound dressings.

Knitted construction

There are two types of knitted construction:

- **Weft** knitting is formed by continuous rows of loops interlocking **horizontally** across the fabric.
- **Warp** knitting is formed by yarns interlocking **vertically** along the length of fabric.

Characteristics of weft knitting:

- It unravels easily and ladders or runs if cut.
- It stretches easily but can also lose shape.
- It has an obvious right and wrong side.

Characteristics of warp knitting:

- Difficult to unravel and does not ladder if cut.
- Has stretch or elasticity but holds its shape well.
- Identical on both sides.
- Lies flat when it has been cut.
- Faster to manufacture than weft knitting and cheaper to produce.

Weft knitting can be achieved by hand or machine whereas warp knitting can only be done on an industrial machine.

Quilting

Quilting consists of 3 layers of fabric stitched through to hold them securely: an outer or facing layer, middle layer usually wadding or similar and an inner lining layer.

Quilting can be:

- decorative – intricate patterns in the stitching
- strong and protective – used in areas of wear e.g. reinforcing the knee/elbow area
- insulation – layers of fabric are warmer as air is trapped between the layers. Wadding has gaps in the fibres, which also increase insulation levels.