2.3.3b Classification of fibres and yarns

Fibres are the raw materials of all textile fabrics.

Fibres have different properties and can be manipulated in many ways to produce different fabrics. An example of this is cotton, which can be manufactured into a number of different types of fabrics such as denim, seersucker or calico. Therefore, to state a fabric is 'cotton' shows little understanding.

Fibres are classified according to their source:

- Natural polymers: plant or cellulosic; animal protein.
- Manufactured polymers: synthetic; regenerated.

All textile fibres (or polymers) have an inherent set of properties, making each one suitable for specific purposes.

The structure or shape and length of a fibre plays an important role and is an indication of its properties and what it can be used for.

Stock forms for textile materials

Textile materials bought 'off the roll' are available in standard widths or stock forms.

The width of a textile material is governed by the size of the loom or knitting machine it was made on.

Standard widths are 90cm, 115cm, 150cm, 200cm and 240cm.

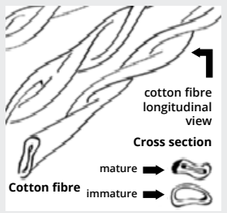
Stock forms of materials that have trade names are not known by the fibre content. These include jersey, drill, voile, cotton poplin, corduroy, gabardine and tweed.

Components also come in stock forms. Manufacturers rely on specialist component manufacturers for their supply as it is not commercially viable to make them 'in-house'.

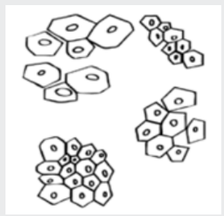
Natural polymers: plant based or cellulosic

These include cotton, linen, hemp, jute, bamboo, soya and banana.

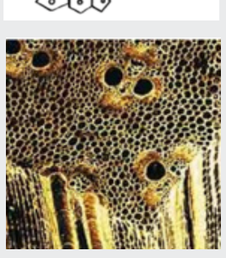
- Most cellulosic fibres have a hollow cavity which allows for moisture/water to be absorbed and stored. This makes them absorbent and is one of their most important properties.



The hollow cavity in the cotton fibre allows for absorption. The twist in the smooth fibre adds strength.



Linen's smooth surface gives it a slight lustre, whilst the hollow centre of the fibres allow for good absorption.

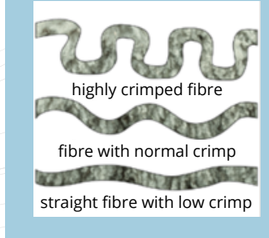


The micro-holes in bamboo fibres allow good absorption. It is anti-microbial and prevents the growth of bacteria.

Natural polymers: animal and insect protein

These include wool/fleece, mohair, cashmere, angora, alpaca, camel, llama and silk (insect).

The most common wool fibre comes from sheep, but all animal fibres have similar properties.



Wool fibres have a natural crimp which traps air, making wool a good insulator. The tighter the crimp, the warmer the wool. The scales on it also trap air.

Wool fibres can also repel water because of the natural grease on the surface.

The scales on wool fibres can hook together causing matting or shrinkage.

Manufactured polymers: synthetic

These include polyester, nylon (polyamide), polypropylene, elastane/Lycra, aramid fibres and microfibres.

- Manufactured polymers are derived from petrochemicals – a finite resource.
- The structure of manufactured fibres can be changed or engineered to have specific properties, for example microfibres and aramid fibres.
- Synthetic polymers are generally strong, resilient, crease resistant. However, they're not absorbent.
- They are either thermosetting or thermoforming and can be shaped to meet specific requirements.
- Elastane has high extensibility; up to 7 times its original length.
- Aramid fibres are engineered synthetic fibres that are 5 times stronger than nylon and are heat and tear resistant.

Manufactured polymers: regenerated

Regenerated polymers are cellulosic fibres that have been chemically changed. They include viscose, rayon, acetate and lyocell.

- Viscose comes from wood pulp from eucalyptus, pine or beech wood, but also from cotton linters.
- Regenerated fibres have many of the same properties as natural fibres since their source is part natural.
- These fibres offer good alternatives to cotton, linen and silk.

Further resources:

https://resources.wjec.co.uk/Pages/ResourceSingle.aspx?rlid=2627