

Natural Fibres - Properties and Uses

Fibre	Properties	Uses
Cotton (cotton)	Absorbent, strong, cool, easy crease, easy wash, flammable	Clothing, threads, medical dressings, canvas, sheeting, furnishings
Linen (flax)	Strong, easy to wear, very easy crease, flammable, absorbent.	Summer clothing, table linen, furnishings.
Hemp	Absorbent, non-static, anti-bacterial, strong.	Clothing, carpets, ropes, mattress filling
Jute	Very Absorbent, high tensile strength, anti- static	Bags, sacking, carpets, geo textiles, yarn, twine, upholstery
Silk (cocoon)	Absorbent, cool/warm to wear, strong, creases, good feel, sheen, takes colour well	Luxury clothing and lingerie, knitwear, furnishings
Wool (fleece)	Warm, absorbent, low flammability, crease resistant, shrinks easily	Warm clothing, knitwear, furnishings, blankets.

Raw materials and processing

Natural Fibres

Plant (cellulosic)

- from the seed pod or stems
E.g. Cotton, linen (flax), hemp, jute
- regenerated fibres from the cellulose of wood pulp

E.g. Viscos, rayon

Animal (protein)

-Insects - from the cocoon

E.g. Silk

-Animals - from the fleece

E.g. Wool (sheep), Mohair / Cashmere (goat), Angora (rabbit), hair (Alpaca/camel)

Manufactured Fibres (Polymers)

Synthetic fibres derived from oil, coal or minerals.

The monomers are joined in long thin chains to form yarns. Non-biodegradable, produces microplastics and are less sustainable. Can be designed especially for the task, ie lycra for sports wear.



Fibre

Yarn

Donor yarn

Warp

Drape

Weft

Bias

Selvedge

Absorbency

Insulation

Flammability

Water-repellency

Anti-static

Comfort

Wearability

Crease-resistant

Synthetic Fibres - Properties and Uses

Fibre	Properties	Uses
Polyester	Strong, flame resistant (can melt) hard wearing poor absorbency, crease resistant	Used throughout textiles and furnishings.
Polyamide (Nylon)	Strong, hard wearing, melts, resistant to chemicals, and stains	Carpets, seat belts, tough clothing, rucksacks
Polypropylene	Hard wearing, durable, crease resistant, low melting point.	Carpet backing foam, hygiene products, geotextiles, ropes.
Acrylic	Strong (when dry) good insulator, burns slowly then melts poor absorbency.	Knitted fabrics, fake fur, upholstery.
Elastane (Lycra)	Very elastic and stretchy. Lightweight, strong and hard wearing.	Swimwear and sportswear, where stretch and fit are critical.
Aramid	Strong and heat resistant, does not melt, 5x stronger than Nylon, resists abrasion easy care	Flame- resistant, protective clothing, armour, cables, aerospace , geotextiles, ropes and cables.

Treatments and processes

Blending and Mixing Fibres - Way of getting better properties.

E.g. Quality/ Appearance/Functionality/Cost

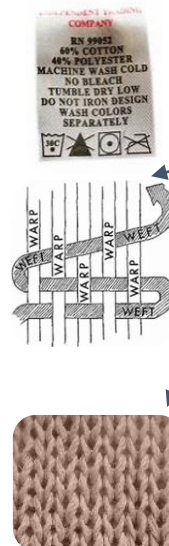
Blended fibres - 2 or more fibres spun together to make a single yarn. The resultant yarn should have the best properties of both donor yarns. For example a polyester cotton is both cool to wear and does not crease.

Mixed Fibres - Different fibres are used to make the fabric - ie one type for the warp and the other the weft.

Woven Textiles - created by weaving, warp and weft, pattern variations can be achieved by using varied under and over patterns (ie brocade) Diagonal threads can be used to create a twill weave for extra strength e.g. denim.

Knitted Textiles - Created using a series of loops in the yarn that interlocks with the next stitch and rows. This creates air pockets for a warm garment and stretch for wearer comfort. **Fleeces** are typically knitted textiles that have been brushed or carded out so that they have a single fluffy side.

Non-Woven Textiles - A web of fibres bonded together - mainly single use fabrics i.e. wipes, masks, geotextiles and garment linings.



Warp runs vertically through the weave
Weft runs horizontally and goes under and over.

Selvedge - the edge along the warp edge it will not fray.

Bias - the 45° diagonal across the weave

Natural fibres biodegrade

Synthetic fibres do not biodegrade

Materials core: Fibres and Fabrics

Design and Technology