Modern Fabrics

Modern (and smart) fabrics are designed to maximise characteristics such as lightness, breathability, waterproofing or to react to heat or light.
They are manufactured using microfibres.

Properties

	Technology	Properties	End use
Microfibre	Woven polyester	Lightweight Soft Good drape Breathable Shower-proof	Raincoats Active Sportswear Fashion Clothing
Polar fleece	Brushed Polyester Warp knit	Lightweight Soft Breathable Warm	Fleece jumper/jackets Blankets
Gore-Tex	Laminated membrane	Breathable Lightweight Waterproof	All-weather jackets and shoes
Micro-encapsulated	Different micro-capsules embedded in the fibre or fabric	Gives off an aromatic scent Can reduce body odour Can provide vitamins or reduce skin irritation	Underwear Anti-bacterial socks Medical textiles
Heat sensitive	Thermochromic	Micro-encapsulated dye can change colour in response to heat (lasts for 5-10 washes)	Children's clothes Sports clothing Fire fighters' clothing Wound dressings
Light sensitive	Photochromic dyes	Smart pigments change colour in response to sunlight	T-shirts military clothing

Combination fabrics

Fabrics can be layered and combined to improve their handle, appearance or performance. For example:

An **interfacing** fabric such as Vilene can be stitched or laminated to other fabrics. This reinforces, stiffens and gives strength to collars and cuffs to prevent the fabric from stretching or sagging.
A **quilted** fabric has two or more layers sewn together to give an attractive appearance and added warmth.
Gore-Tex can be laminated to another fabric using adhesive or heat. Gore-Tex is used for all-weather clothing and shoes because it is breathable and waterproof.
Kevlar is a high-strength, lightweight and flexible fibre. It is used in bicycle tyres, racing sails and police bullet-proof vests because of its high strength-to-weight ratio.
Thinsulate is a highly insulating but thin fabric. The microfibres in Thinsulate are fine and capture more air in less space, making it a better insulator. It traps air between the wearer and the outside. It can be machine washed and dry cleaned, and is breathable as well as moisture resistant. Scuba divers wear a Thinsulate suit under a dry suit when diving in cold water.

Technology in textiles

Textiles manufacturers use new technological developments to improve fabrics by giving them new properties. These might be developed for a special reason, but then adapted to be used in everyday products. For example:

Memory foam moulds to the user's shape and can return to its original state. It was originally developed for NASA astronauts and is now used in memory-foam mattresses and seats.
Smart-shape-memory alloy returns to its original shape when heated. Smart memory fibres are woven with nylon to make smart-memory shirts that don't need ironing.
Fastskin is used in swimsuits to simulate the texture of sharkskin. It increases a swimmer's speed by reducing drag through water.

Choosing materials

It is important to choose materials that are fit for purpose. Choosing a fabric with the appropriate quality and cost will ensure that a product will suit the target market. When making fabric choices, ask yourself the following questions:

Fibre content: should you use natural or synthetic fibres?
Fabric construction: should you use woven, knitted or non-woven?
Manufacturing processes: should you use dyeing, printing, mechanical finishing or chemical finishing?
End use of the fabric: what are you making, e.g. jeans, sportswear or a seatbelt?
Maintenance: what are the aftercare requirements of the product?

The fibre content, fabric construction and finishing processes determine the fabric's aesthetic, functional and comfort properties.

Properties of fabric

Aesthetic properties	Functional properties	Comfort properties
Handle Drape Colour Appearance	Strength Durability Crease resistance Flame resistance Stain resistance Water resistance Aftercare Cost	Absorbency Breathability Elasticity Softness Stretch Warmth

It is important to match fabric properties to the requirements of the product. For example:

Cycling jerseys need to be breathable
Cycling jackets need to be made from fabric that is warm, breathable, elastic, windproof and water resistant.
Children's jumpers need to be made from fabric that is soft, colourful, stretchy, warm and easy care.
Seat belts need to be made from strong, durable, flame-resistant materials.
Fire-protective clothing needs to be strong, durable, flame resistant and water resistant. It may also need to be breathable and elastic.
Geotextiles need to be strong and durable so they stop embankments from slipping.