2.3.3f Working properties of fibres and fabrics

All fibres have an inherent set of properties which determine what they can be used for.

The fibre property will always be reflected in the final fabric, regardless of the various construction processes it goes through during manufacture.

The working properties of fabrics are also determined by the construction method i.e. woven, knitted or non-woven.

However, applied finishes can impact and alter the effectiveness of the fibre's properties and the method of construction for the fabric.

Tensile strength

Tensile strength refers to the force needed to break a fibre. When fibres with a high tensile strength are used in a fabric, the resultant fabric will be more durable.

Fibres with a high tensile strength include cotton, linen, silk, polyester, nylon, acrylic and polypropylene.

Strength

Plain weave tends to be strong because of its structure of a maximum number of interlacing points. Twill is another strong weave.

Durability

Weak fibres such as wool, viscose and elastane will not withstand wear and tear when used in a fabric and break down easily when subjected to friction. Some knitted fabrics snag easily and are subject to pilling which spoils their appearance.

Elasticity

In fibres, this refers to the extent a fibre will stretch before it breaks and how well it will return to its original length after stretching. Fibres such as silk, polyester, nylon and acrylic have good elasticity.

Knitted fabric have good elasticity because of the looped nature of their construction.

Crease resistance

Fibres such as polyester and nylon that do not absorb water are more naturally resistant to creasing. Wool is naturally resistant to creasing. Non-elastic fibres are not crease resistant.

Water resistance

Most fabrics will allow water to pass through simply because of the structure of the fabric allowing water to pass through the gaps. Applied finishes are needed to make fabrics resistant to water but at some point, even these allow moisture though.

Water repellence

The surface of wool is hydrophobic and able to repel water. The natural grease on the surface of the wool fibre also repels water. Finishes are needed to make textile fabrics fully water repellent for example, Gore-Tex.

Absorbency

Natural fibres and fabrics, such as cotton or linen, are naturally absorbent. Texturing synthetic fibres will also allow synthetic fibres such as polyester to absorb some moisture.

Flammability

Fabrics that trap air or have an open structure will burn easily and are highly flammable, particularly if made from flammable fibres such as cotton. Synthetic fibres do not burn as easily.

Thermal

This refers to the ability of the fabric or fibre to trap air, allowing it to act as an insulator, for example knitted fabric.

Anti-static

An electrostatic charge builds up on some fabric through friction. Fibres that contain some moisture do not emit static electricity, for example natural fibres.

Resistance sunlight

Some fibres and fabric are effective at blocking out sunlight and resist UV rays for example, hemp, jute bamboo and soya. Some fabrics, such as cotton, are prone to damage by sunlight.

Weight

The fibre, thickness of the yarn and fabric structure all affect the weight of a fabric. A densely woven twill fabric such as denim will be heavier than a woven sheer fabric such as chiffon.

Density

Fabric density refers to the thickness of a textile fabric made from the fibre. It is a measurement of its base weight in grams per square inch. Low density fibres provide lighter fabrics.

Flexibility

This refers to the fibres ability to fold or be bent repeatedly without being ruptured. Fibres with low flexibility do not drape well.

Handle/drape

A fabric ability to drape depends on the fibre content, the yarn and the construction of the fabric. Smooth fibres such as silk or soya drape well, whereas wool fibre does not. The handle refers to how a fabric feels when handled.