COATS

Bulletin Post
COATS SEWING SOLUTIONS

Know About Textile Fibres

Contents

Introduction

Textiles have such an important bearing on our daily lives that everyone should know something about the basics of fibres and their properties.

Textile fibres are used for a wide range of applications such as covering, warmth, personal adornment and even to display personal wealth.

Textile technology has come a long way in meeting these requirements. A basic knowledge of textile fibres will facilitate an intelligent appraisal of fibre brands and types and help in identifying the right quality for the application.

This bulletin covers various textile fibres and the properties that are important for a suitable textile application.

Fibre Classification

Textile fibres can be broadly classified into two categories:

- Natural fibres
- Man-made fibres

Natural Fibres

Natural fibres are subdivided further, as outlined below, by their origin.

Fibre Name	Source	Composition
Vegetable		
Cotton	Cotton boll	Cellulose
Kapok	Kapok tree	Cellulose
Linen	Flax stalk	Cellulose
Jute	Jute stalk	Cellulose
Hemp	Hemp or Abaca stalk	Cellulose
Ramie	Rhea and China grass	Cellulose
Sisal	Agave leaf	Cellulose
Coir	Coconut husk	Cellulose
Pina	Pineapple leaf	Cellulose
Animal		
Wool	Sheep	Protein
Silk	Silkworms	Protein
Hair	Hair bearing animals	Protein
Mineral		
Asbestos	Varieties of rock	Silicate of Magnesium and Calcium

Natural Fibres

Cotton

Cotton, the natural fibre most widely used in apparel, grows in a boll around the seeds of cotton plants. A single fibre is an elongated cell that is a flat, twisted, hollow, ribbon-like structure.

Characteristics

- Fair to good strength
- Very little elasticity
- Less resilient and prone to wrinkling
- Comfortable and soft feel
- Good absorbency
- Conducts heat well
- Damaged by insects, mildew, rot and moths
- Weakened by extended sunlight exposure

Applications

- Widely used in number of textile products
- Commonly used in woven and knitted apparel
- Home textile - bath towels, bath robes, bed covers etc.
- Used as a blend with other fibres as rayon, polyester, spandex etc.

Linen

Linen, one of the most expensive natural fibres, is made from the flax plant. It is labour-intensive to produce, hence produced in small quantities. However linen fabric is valued for its exceptional coolness and freshness in hot weather.

It is composed of 70% cellulose and 30% pectin, ash, woody tissue and moisture.

Characteristics

- Strongest vegetable fibre
- Poor elasticity, hence wrinkles easily
- Relatively smooth, becomes softer when washed
- Highly absorbent
- Good conductor of heat and feels cool
- Lustrous
- More brittle, constant creasing in the sharp folds, tends to break
- Damaged by mildew, perspiration and bleach
- Resistant to moths and carpet beetles

Applications

- Apparel - suits, dresses, skirts, shirts etc.
- Home and commercial furnishing items - table cloths, dish towels, bed sheets, wallpaper / wall coverings, window treatments etc.
- Industrial products - luggage, canvas etc.
- Used as blend with cotton

Wool

Wool fibre grows from the skin of sheep and is a relatively coarse and crimped fibre with scales on its surface. It is composed of protein. The fibre appearance varies depending on the breed of the sheep. Finer, softer and warmer fibres tend to be with more and smoother scales. Thicker, less warm fibres have fewer and rougher scales. Normally, the better wool fibres with finer scales are duller in appearance than the poorer quality fibres which have fewer scales.

Characteristics

- Crimped in appearance
- Elastic
- Hygroscopic, readily absorbs moisture
- Ignites at a higher temperature than cotton
- Lower rate of flame spread, heat release and combustion heat
- Resistant to static electricity

Applications

- Clothing - jackets, suits, trousers, sweaters, hats etc.
- Blankets, carpets, felt and upholstery
- Horse rugs, saddle cloths

Silk

Silk is a fine, continuous strand unwound from the cocoon of a moth caterpillar known as the silkworm. It is composed of protein. It is very shiny due to the triangular prism-like structure of the silk fibre, which allows silk cloth to refract incoming light at different angles.

Characteristics

- Lustrous, smooth and soft texture and not slippery
- Lightweight, strong, but can lose up to 20% of its strength when wet
- Elasticity is moderate to poor. If elongated, it remains stretched
- Can be weakened if exposed to too much sunlight
- May be affected by insects, especially if left dirty
- Can regain up to 11% of its moisture

Applications

- Shirts, ties, blouses, formal dresses, high-fashion clothes
- Lingerie, pyjamas, robes, dress suits and sun dresses
- Many furnishing applications
- Upholstery, wall coverings, and wall hangings

Other Natural Fibres

Jute

Jute is taken from a tall plant of the same name and it is easy to cultivate and harvest. It is the cheapest fibre and is used in great quantities.

Characteristics

- It is not durable as it deteriorates rapidly when exposed to moisture
- Less strength
- Cannot be bleached to make it pure white due to lack of strength

Applications

- Binding threads for carpets, coarse and cheap fabrics, heavy bagging etc.

Kapok

It is a white hair-like fibre obtained from the seed capsules of plants and trees called Ceiba Pentandra grown in Java and Sumatra (Indonesia), Mexico, Central America and the Caribbean, Northern South America and tropical West Africa.

It is called silk cotton due to its high lustre which is equal to that of silk.

Characteristics

- Smooth texture
- Very lustrous
- Weak
- Short fibre length
- Resistant to moisture, dries quickly when wet

Applications

- Mattresses, cushions, upholstered furniture

Ramie

A woody fibre resembling flax and it is also known as rhea and China grass. It is taken from a tall flowering plant.

Characteristics

- Stiff
- More brittle
- Lustrous

Applications

- Canvas, upholstery, clothing, etc.

Man-made Fibres

Man-made fibres are subdivided as shown below with their various compositions and origin.

Fibre Name	Source
Cellulosic	
Rayon	Cotton linters or wood
Acetate	Cotton linters or wood
Tri-acetate	Cotton linters or wood
Non-Cellulosic Polymers	
Nylon	Aliphatic polyamide
Aramid	Aromatic polyamid
Polyester	Dihydric alcohol and terephthalic acid
Acrylic	Acrylonitrile
Modacrylic	Acrylonitrile
Spandex	Polyurethene
Olefin	Ethylene or propylene
Vinyon	Vinyl chloride
Saran	Vinylidene chloride
Novoloid	Phenol based navolac
Polycarbonate	Carbonic acid (polyester derivative)
Fluorocarbon	Tetrafluoroethylene
Protein	
Azlon	Corn, soybean, etc.

Fibre Name	Source
Rubber	
Rubber	Natural or synthetic rubber
Metallic	
Metal	Aluminium, silver, gold, stainless steel
Mineral	
Glass	Silica sand, limestone, other minerals
Ceramic	Aluminium, silica
Graphite	Carbon

Man-made Fibres - Man-made (Regenerated)

Cellulosic

They are derived either from the cellulose of the cell walls of short cotton fibres that are called linters or, more frequently from pine wood. There are three types of man-made cellulosic fibres:

Rayon, acetate and tri-acetate

✦ *Rayon*

Rayon is made from naturally occurring polymers that simulate natural cellulosic fibres. It is neither a truly synthetic fibre nor a truly natural fibre.

There are two varieties of Rayon; viscose and high wet modulus (HWM). These in turn are produced in a number of types to provide certain specific properties.

Characteristics

- Soft, smooth and comfortable
- Naturally high in lustre
- Highly absorbent
- Durability and shape retention is low, especially when wet
- Low elastic recovery
- Normally weak, but HWM rayon is much stronger, durable and has good appearance retention

Applications

- Apparel - blouses, dresses, jackets, lingerie, linings, suits, neck ties etc.
- Furnishing items - bedspreads, bed sheets, blankets, window treatments, upholstery etc.
- Industrial uses e.g. medical surgery products, non-woven products, tyre cord etc.
- Other uses - feminine hygiene products, diapers, towels etc.

✦ *Acetate*

Acetate consists of a cellulose compound identified as acetylated cellulose - a cellulose salt. Hence it possesses different qualities compared to rayon.

Acetate is thermoplastic and can be formed into any shape by application of pressure combined with heat. Acetate fibres have good shape retention.

Characteristics

- Thermoplastic
- Good drapability
- Soft, smooth and resilient
- Wicks and dries quickly
- Lustrous appearance
- Weak, rapidly loses strength when wet, must be dry-cleaned
- Poor abrasion resistance

Applications

- Primarily in apparel - blouses, dresses, jackets, lingerie, linings, suits, neck ties, etc.
- Used in fabrics such as satins, brocades, taffetas, etc.

✦ *Tri-acetate*

Tri-acetate consists of acetylated cellulose that retains acetic groupings, when it is being produced as triacetate cellulose. It is a thermoplastic fibre and is more resilient than other cellulosic fibres.

Characteristics

- Thermoplastic
- Resilient
- Shape retentive and wrinkle resistant
- Shrink resistant
- Easily washable, even at higher temperatures
- Maintains creases and pleats well

Applications

- Primarily apparel
- Used in clothing where crease / pleat retention is important e.g. skirts and dresses
- Can be used with polyester to create shiny apparel

■ Man-made Fibres - Man-made (Non-cellulosic)

Polymer Fibres

This group of fibres is distinguished by being synthesised or created from various elements into larger molecules that are called linear polymers.

The molecules of each particular compound are arranged in parallel lines in the fibre. This arrangement of molecules is called molecular orientation.

The properties of such fibres are dependent on their chemical composition and kinds of molecular orientation.

✦ *Nylon*

In nylon, the fibre forming substance is a long-chain synthetic polyamide in which less than 85% of the amide linkages are attached directly to two aromatic rings. The elements carbon, oxygen, nitrogen and hydrogen are combined by chemical processes into compounds which react to form long-chain molecules, chemically known as polyamides and are then formed into fibres. There are several forms of nylon. Each depends upon the chemical synthesis.

They are: **Nylon 4; 6; 6.6; 6.10; 6.12; 8; 10; and 11**

Characteristics

- Highly resilient
- High elongation and elasticity
- Very strong and durable
- Excellent abrasion resistance
- Thermoplastic
- Has the ability to be very lustrous, semi-lustrous or dull
- Resistant to insects, fungi, mildew and rot

Applications

- Apparel - pantyhose, stockings, leggings, etc.
- Home furnishing
- Industrial applications - parachutes, tyre cords, ropes, airbags, hoses, etc.

✦ *Polyester*

In polyester, the fibre forming substance is any long-chain synthetic polymer composed of at least 85% by weight of an ester of a substituted aromatic carboxylic acid, but not restricted to substituted terapthalate units and para-substituted hydroxybenzoate units.

In producing such fibres, the basic elements of carbon, oxygen and hydrogen are polymerised. Variations are possible in the methods of production, in the combination of ingredients and in the ultimate molecular structures of the fibre forming substance.

Characteristics

- Thermoplastic
- Good strength
- Hydrophobic (non absorbent)

Applications

- Apparel - woven and knits, shirts, pants, jackets, hats etc.
- Home furnishing - bed sheets, blankets, upholstered furniture, cushioning material
- Industrial uses - conveyor belts, safety belts, tyre reinforcement

✦ *Spandex*

The fibre forming substance used to produce spandex is any long-chain synthetic polymer composed of at least 85% of segmented polyurethane. Variations are possible when producing this fibre.

The basic elements of nitrogen, hydrogen, carbon and oxygen are synthesised with other substances to ethyl ester compounds in polymer chains of soft segments or sections that provide stretch and harder segments that hold the chain together.

Trademarks of three spandex fibres are Cleer-span, Glospan and Lycra.

Characteristics

- Highly elastic
- Comfortable
- High shape retention
- Durable

Applications

- Never used alone, but always blended with other fibres
- Apparel and clothing items with stretch for comfort and fit
- Hosiery
- Foundation garments
- Swimwear, athletic, aerobic apparel
- Lingerie, leggings and socks
- Shaped garments e.g. bra cups
- Gloves

✦ *Acrylic*

In acrylics, the fibre forming substance is any long-chain polymer composed of at least 85% by weight of acrylonitrile units. Using complicated processes, carbon, hydrogen and nitrogen, the basic elements are synthesised with small amounts of other chemicals into larger polymer combinations. Variations are possible in the methods of production, in the combination of ingredients and in the ultimate molecular structures of the fibre forming substance.

Characteristics

- Soft, warm handling characteristics similar to wool
- Resilient
- Shape retentive

Applications

- Apparel
- Home furnishing

■ Man-made Fibres - Man-made (Protein Fibres)

The protein from such products as corn and milk has been processed chemically and converted into fibre. However, such fibres are not commercially successful.

■ Man-made Fibres - Man-made (Rubber Fibres)

The fibre forming substance is comprised of natural and synthetic rubber. The treated rubber is produced in strands, so that the cross-section is either round or square and the longitudinal surface is relatively smooth.

■ Man-made Fibres - Man-made (Metallic Fibres)

These fibres are composed of metal, plastic-coated metal, metal-coated plastic, or a core completely covered by metal. These fibres are usually produced in flat, narrow, smooth strips which possess high lustre.

Applications

- Decorative yarns in apparel and home furnishing items

■ Man-made Fibres - Man-made (Mineral Fibres)

Various minerals have been manufactured into glass, ceramic and graphite fibres having prescribed properties for specific uses.

✦ *Glass*

Although glass is a hard and inflexible material, it can be made into a fine, translucent textile fibre that has an appearance and feel of silk.

Natural minerals such as silica sand, limestone, soda ash, borax, boric acid, feldspar and fluorspar have been fused under very high temperatures into glass which is processed into a fibre.

Characteristics

- Inert
- Highly flame resistant

Applications

- Heat resistant industrial applications

Textile Fibre Parameters

Fibrous materials should possess certain properties to become a suitable textile raw material. Properties which are essential for acceptance as a suitable raw material may be classified as 'primary properties'. The other properties which add specific desirable character or aesthetics to the end product and its use may be classified as 'secondary properties'.

Primary Properties

- Length
- Tenacity (strength)
- Flexibility
- Cohesion
- Uniformity of properties

Secondary Properties

- Physical shape
- Specific gravity (influence weight, cover etc.)
- Moisture regain and absorption (comfort, static electricity etc.)
- Elastic character
- Thermo plasticity (softening point and heat - set character)
- Dyeability
- Resistance to solvents, corrosive chemicals, micro-organisms and environmental conditions
- Flammability
- Lustre

Physical Properties

Cotton

Property	Characteristics
Microscopic appearance	Flat, twisted and ribbon-like
Length	Staple fibre, length ranges from 1 to 5.5 cm
Colour	Creamy white in natural form, unless treated
Lustre	Medium, unless treated for lustre
Strength	Fair
Elasticity	Low
Resilience	Low
Moisture absorption	Excellent
Heat	Will withstand moderate heat / Decomposes after prolonged exposure to temperatures of 150°C / 320°F or over
Flammability	Burns readily

Silk

Property	Characteristics
Microscopic appearance	Triangular prism-like structure
Length	Continuous filament
Colour	Usually off white, and also shades of pale beige, brown, and grey
Lustre	Excellent
Strength	Good
Elasticity	High
Resilience	High
Moisture absorption	Good
Heat	Sensitive and gets decomposed
Flammability	Burns at 165°C / 330°F

Linen

Property	Characteristics
Microscopic appearance	Cross-section is made up of irregular polygonal shapes
Length	Long staple, 25 to 120 cms
Colour	Off white
Lustre	High
Strength	Good
Elasticity	Low
Resilience	Little
Moisture absorption	Good
Heat	Will withstand moderate heat
Flammability	Scorches and flames readily

Rayon

Property	Characteristics
Microscopic appearance	Striations seen in viscose and high strength rayon. If delustred, scattered specks of pigment can be seen.
Length	Filament and Staple
Colour	Transparent unless dyed
Lustre	High
Strength	Fair to excellent. Regular rayon has fair strength. High tenacity types have good strength.
Elasticity	Regular rayon: low High strength rayon: good
Resilience	High wet strength rayon is better
Moisture absorption	Higher than natural cellulose. Fibres swell in water. Weaker when wet.
Heat	Loses strength above 148°C / 300°F. Decomposes between 176°C / 350°F and 204°C / 400°F.
Flammability	Burns rapidly unless treated
Electrical conductivity	Fair - static charge can be reduced with special finishes

Wool

Property	Characteristics
Microscopic appearance	Crimped
Length	Staple fibre, up to 40 cms
Colour	Generally creamy white, some breeds of sheep produce natural colours such as black, brown, silver, and random mixes
Lustre	High
Strength	High
Elasticity	Good
Resilience	High
Moisture absorption	Tends to repel initially, but good absorption
Heat	Becomes harsh at 100°C / 212°F, decomposes at slightly higher temperatures
Flammability	Scorches at 204°C / 400°F, will char

Acetate

Property	Characteristics
Microscopic appearance	Striations farther apart than viscose rayon. Lobed cross-section.
Length	Filament and staple
Colour	Transparent unless dulled by pigments
Lustre	Bright, semi bright or dull
Strength	Moderate, less than rayon when it is wet
Elasticity	Not very high, similar to rayon
Resilience	Poor
Moisture absorption	6%, little strength loss when it is wet
Heat	Ironing temperatures of 135°C / 275°F are satisfactory
Flammability	Slowly combustible
Electrical conductivity	Good

Polyester

Property	Characteristics
Microscopic appearance	Smooth, even, rod like, different cross sectional shapes
Length	Filament and staple
Colour	White
Lustre	Bright or dull
Strength	Good to excellent
Elasticity	Fair to good
Resilience	Excellent
Moisture absorption	Less than 1%
Heat	Softening or sticking temperature is above 204°C / 400°F
Flammability	Burns slowly
Electrical conductivity	Accumulates static charges

Nylon

Property	Characteristics
Microscopic appearance	Very smooth and even
Length	Filament and staple
Colour	Off white
Lustre	High natural lustre that can be controlled
Strength	Exceptionally high
Elasticity	Exceptionally high
Resilience	Very good
Moisture absorption	3.8%
Heat	High resistance, melts at 250°C / 482°F
Flammability	Melts slowly. Does not support combustion.
Electrical conductivity	Low, generates static

Acrylic

Property	Characteristics
Microscopic appearance	Uniform and smooth surface. Irregular spaced striations.
Length	Mainly a staple fibre
Colour	White
Lustre	Bright or dull
Strength	Fair to good strength
Elasticity	Good
Resilience	Good
Moisture absorption	1 - 3%
Heat	Yellowing may occur above 148°C / 300°F. Softening or stocking about 232°C / 450°F.
Flammability	Burns with yellow flame
Electrical conductivity	Fair to good

Fibre Properties - Comparison

Absorbency

Fibre	Moisture Regain*
Cotton	7 - 11
Flax	12
Silk	11
Wool	13 - 18
Acetate	6.0
Acrylic	1.3 - 2.5
Aramid	4.5

Fibre	Moisture Regain*
Glass	0 - 0.3
Nylon	4.0 - 4.5
Polyester	0.4 - 0.8
Rayon	15
Rayon HWM	11.5 - 13
Spandex	0.75 - 1.3

* Moisture regain is expressed as a percentage of the moisture-free weight at 70° Fahrenheit and 65% relative humidity.

Thermal Properties

Fibre	Melting Point		Softening Sticking Point		Safe Ironing Temperature	
	°F	°C	°F	°C	°F	°C
Cotton	**Non melting**				**425**	**218**
Flax	**Non melting**				**450**	**232**
Silk	**Non melting**				**300**	**149**
Wool	**Non melting**				**300**	**149**
Acetate	446	230	364	184	350	177
Acrylic			400 - 490	204 - 254	300 - 350	149 - 176
Aramid	**Does not melt, carbonises above 426°C / 800°F**					
Glass			1400 - 3033			
Nylon 6	414	212	340	171	300	149
Nylon 66	482	250	445	229	350	177
Polyester PET	480	249	460	238	325	163
Polyester PCDT	550	311	490	254	350	177
Rayon	**Non melting**				**375**	**191**
Spandex	446	230	347	175	300	149

Effects of Acids

Fibre	Behaviour
Cotton	Disintegrates in hot dilute and cold concentrated mineral acids
Linen	Disintegrates in hot dilute and cold concentrated acids
Wool	Destroyed by hot sulphuric, otherwise unaffected by acids
Silk	Organic acids do not harm, concentrated mineral acids will dissolve
Rayon	Disintegrates in hot dilute and cold concentrated acids
Acetate	Soluble in acetic acid, decomposed by strong acids
Tri-acetate	Soluble in acetic acid, decomposed by strong acids
Nylon	Decomposed by strong mineral acids, resistant to weak acids
Polyester	Resistant to most mineral acids; disintegrated by 96% sulphuric acid
Spandex	Resistant to most mineral acids, some discolouration can happen
Acrylic	Resistant to most acids
Glass	Resistant to most acids

Effects of Alkalis

Fibre	Behaviour
Cotton	Not harmed by alkalis
Linen	Highly resistant
Wool	Attacked by weak alkalis, destroyed by strong alkalis
Silk	Damaged only under high temperature and concentration
Rayon	Disintegrates in concentrated solutions
Acetate	Not affected, unless high concentration and temperature is applied
Tri-acetate	Not affected, unless high concentration and temperature is applied
Nylon	Little or no effect
Polyester	Resistant to cold alkalis, slowly decomposed at a boil by strong alkalis
Spandex	Affected
Acrylic	Destroyed by strong alkalis at boil, resists weak alkalis
Glass	Attacked by hot weak alkalis and concentrated alkalis

Effects of Organic Solvents

Fibre	Behaviour
Cotton	Oxidises, turning yellow and losing strength on long exposure
Linen	Resistant than cotton, gradually deteriorate from prolonged exposure
Wool	Strength loss due to prolonged exposure
Silk	Continuous exposure weakens
Rayon	Generally resistant, loses strength after long exposure
Acetate	Approximately same as rayon
Tri-acetate	Resistant, loses strength after long exposure
Nylon	Good resistance
Polyester	Good resistance
Spandex	Generally not affected, prolonged exposure weakens
Acrylic	Little or no effect

Effects of Sunlight

Fibre	Behaviour
Cotton	Oxidises, turning yellow and losing strength on long exposure
Linen	Resistant than cotton, gradually deteriorate from prolonged exposure
Wool	Strength loss due to prolonged exposure
Silk	Continuous exposure weakens
Rayon	Generally resistant, loses strength after long exposure
Acetate	Approximately same as rayon
Tri-acetate	Resistant, loses strength after long exposure
Nylon	Good resistance
Polyester	Good resistance
Spandex	Generally not affected, prolonged exposure weakens
Acrylic	Little or no effect

Cleanliness and Washability

Fibre	Behaviour and Effect
Cotton	Launders well and gives up dirt easily
Linen	Launders well and gives up dirt easily
Wool	Attracts dirt, unless thoroughly cleaned it retains odors
Silk	Prevents dirt from settling. Smooth surface allows stains to be easily washed away
Rayon	Prevents dirt from settling. Smooth surface allows stains to be easily washed away
Acetate	Prevents dirt from settling. Smooth surface allows stains to be easily washed away
Tri-acetate	Prevents dirt from settling. Smooth surface allows stains to be easily washed away
Nylon 6.6	Prevents dirt from settling. Smooth surface allows stains to be easily washed away
Polyester	Prevents dirt from settling. Smooth surface allows stains to be easily washed away
Spandex	Launders well
Acrylic	Launders well

Effects of Perspiration

Fibre	Behaviour
Cotton	Resistant to alkali perspiration, slight deteriorating effect with acid perspiration
Linen	Resistant to alkali perspiration, slight deteriorating effect with acid perspiration
Wool	Weakened by alkali perspiration. Discolouration happens in general with perspiration.
Silk	Deteriorates and Colour is affected causing stains
Rayon	Fairly resistant to deterioration
Acetate	Good resistance
Tri-acetate	Good resistance
Nylon 6.6	Resistant. Colour may be affected
Polyester	Resistant
Spandex	Good resistance to degradation
Acrylic	No deterioration

* Perspiration can be acidic or alkaline, depending on the individual's metabolism.

Effects of Mildew

Fibre	Behaviour and Effect
Cotton	Affected in a damp condition
Linen	Affected in a damp condition
Wool	Not susceptible in ordinary condition, but in damp condition
Silk	Not susceptible in ordinary condition, but in damp condition
Rayon	Affected in a damp condition
Acetate	Highly resistant
Tri-acetate	Extremely high resistance
Nylon	No effect
Polyester	Absolutely resistant
Spandex	Good to excellent resistance
Acrylic	May form, but will have no effect. Can be easily wiped off.

Effects of Heat

Fibre	Behaviour and Effect
Cotton	Withstand moderate heat. Will scorch and burn with prolonged exposure to high heat.
Linen	Withstand moderate heat. Will scorch and burn with prolonged exposure to high heat.
Wool	Not easily combustible, becomes harsh at 100°C / 212°F and will scorch at 204°C / 400°F and eventually char
Silk	Sensitive to heat, decomposes at 165°C / 330°F
Rayon	Behaves similar to cotton as a cellulosic fibre
Acetate	Thermoplastic in nature, gets sticky at 176°C / 350°F and becomes stiff later
Tri-acetate	Thermoplastic in nature, gets sticky at 298°C / 570°F and becomes stiff later
Nylon	Will melt under high temperature, Nylon 6 melts at 215°C / 420°F and Nylon 6.6 248°C / 480°F
Polyester	Will melt under high temperature. Becomes sticky at 226°C / 440°F to 243°C / 470°F and melts and flames at 248°C / 480°F to 290°C / 554°F depending on its type.
Spandex	Yellows and loses elasticity and strength at over 148°C / 300°F, sticks at 175°C / 347°F and melts at 230°C / 446°F
Acrylic	Becomes sticky at 229°C / 455°F and melts at higher temperature

Effects of Insects

Fibre	Behaviour and Effect
Cotton	Not damaged
Linen	Not damaged
Wool	Vulnerable to moths and carpet beetles
Silk	May be attacked by larvae of cloth moths or carpet beetles
Rayon	Not attracted
Acetate	Not attracted
Tri-acetate	Not attracted
Nylon	Unaffected
Polyester	Unaffected
Spandex	Unaffected
Acrylic	Unaffected

Please **contact** your local Sales Office to find out more about Textile Fibres.