Student Information Pack

Tactel®

Only by DuPont

DuPont Tactel® Student Information Pack

Contents:

Tactel®
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What is Tactel®?

Tactel® is the DuPont fibre brand-name for its hi-tech fibre which creates innovative textile effects across a range of end-uses through the application of science to excite the modern consumer

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How does Tactel® add value?

Tactel® supports a premium for everyone in the chain, from yarn, fabric and garment through to the consumer.

Tactel® is based on continuous innovation, to enable our customers to be on the leading edge, all the time.

Tactel® impresses buyers by its high visibility across ready to wear, active, hosiery and intimate apparel.

Tactel® supports customers wherever they are selling across all regions of the world.

Tactel® swing tickets and point of sale material help retail to add excitement.

Tactel® branding programme protects the Brand and reinforces buyer confidence throughout the chain.

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Tactel®

Fibre branding-why it's so important!

"a brand is a name or logo which enhances the value of a product beyond its functional purpose"

A brand:

- speeds up the market acceptance of fibre innovation all the way through the value chain.
- develops a reputation and image which increases its influence in the market.
- provides an easy way for retailers to communicate excitement about hi-tech fibres and modernity in clothes.
- is focus for lots of information about product offerings and technical data.
- is highly visible through promotion and advertising , point of sale material. and swing tickets, seen by trade and consumers.

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What is Tactel®?

The Tactel® yarn portfolio

Tactel®
aquator

Tactel® aquator is a unique fabric system giving added comfort through effective moisture management.

Tactel®
diabolo

Tactel® diabolo gives a unique drape and lustre.

Tactel®
HT

Tactel® HT offers more performance benefits, inspired by DuPont yarn technology.

Tactel®
micro touch

Tactel® micro touch has a luxurious, soft handle combined with excellent performance.

Tactel®
multisoft

Tactel® multisoft brings a range of lustres in soft, supple fabrics with excellent cover.

Tactel®
strata

Tactel® strata gives a robust and reproduceable two tone colour effect to fashion fabrics.

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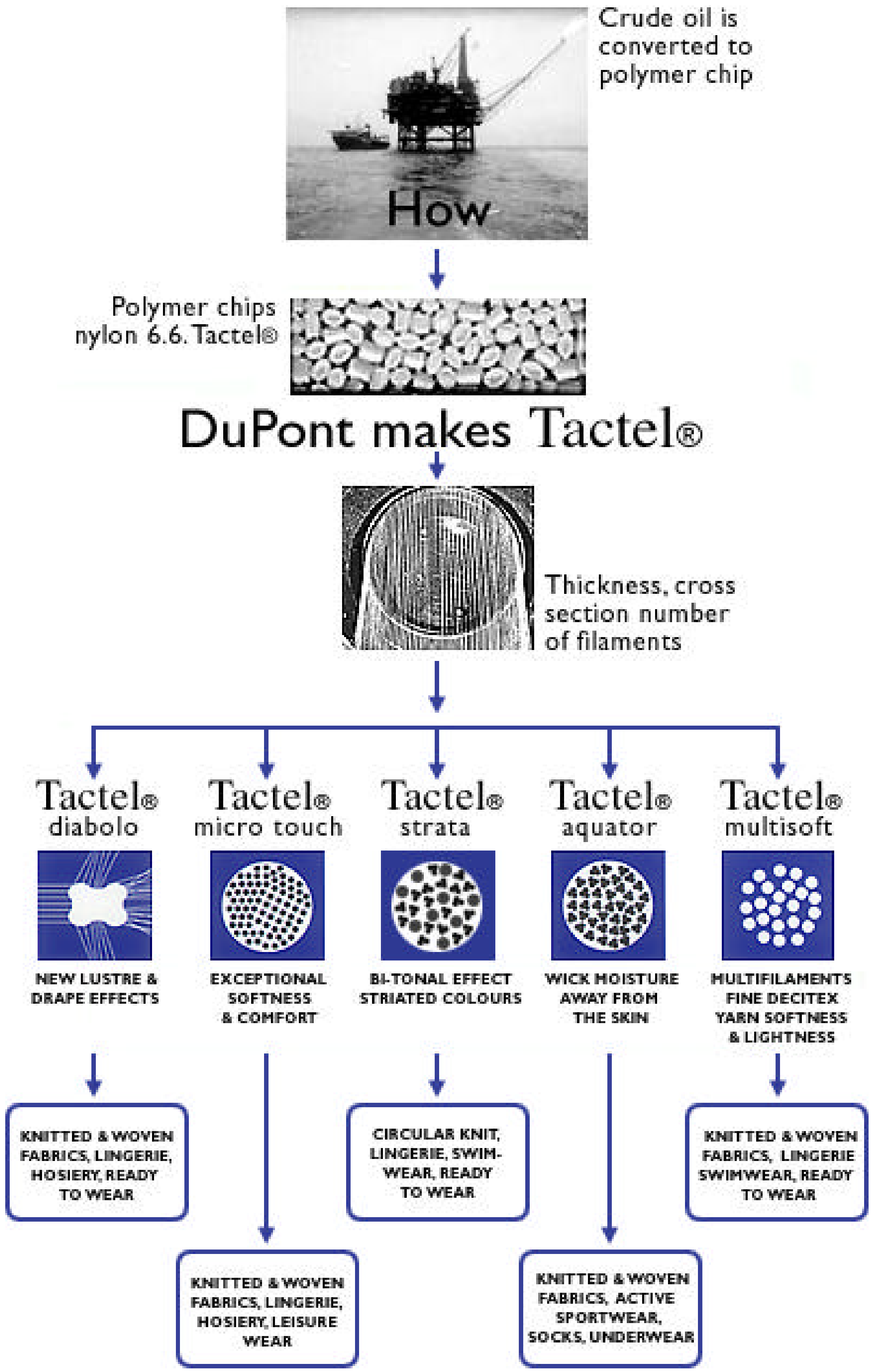

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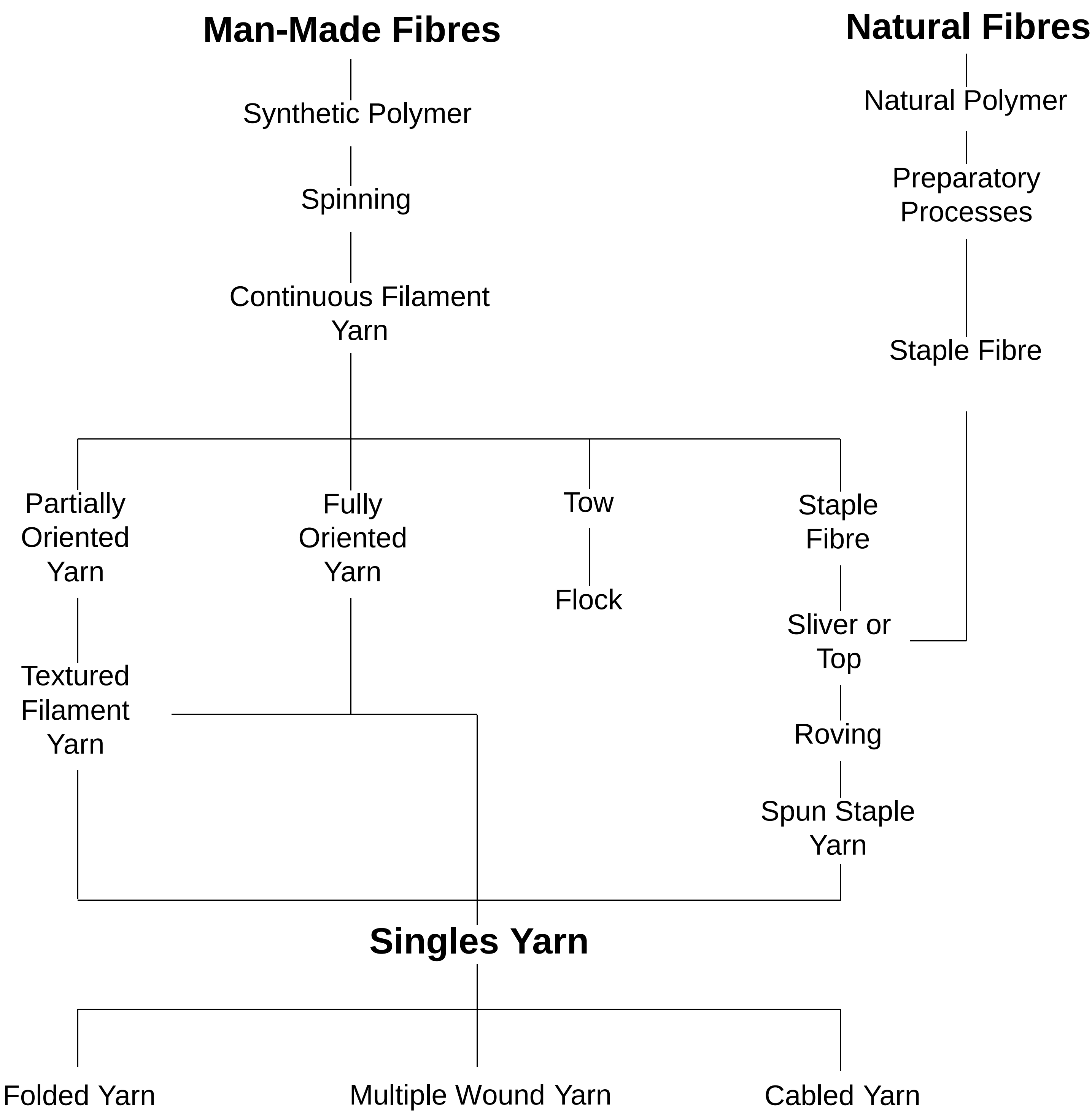
Yarn Production Sequence



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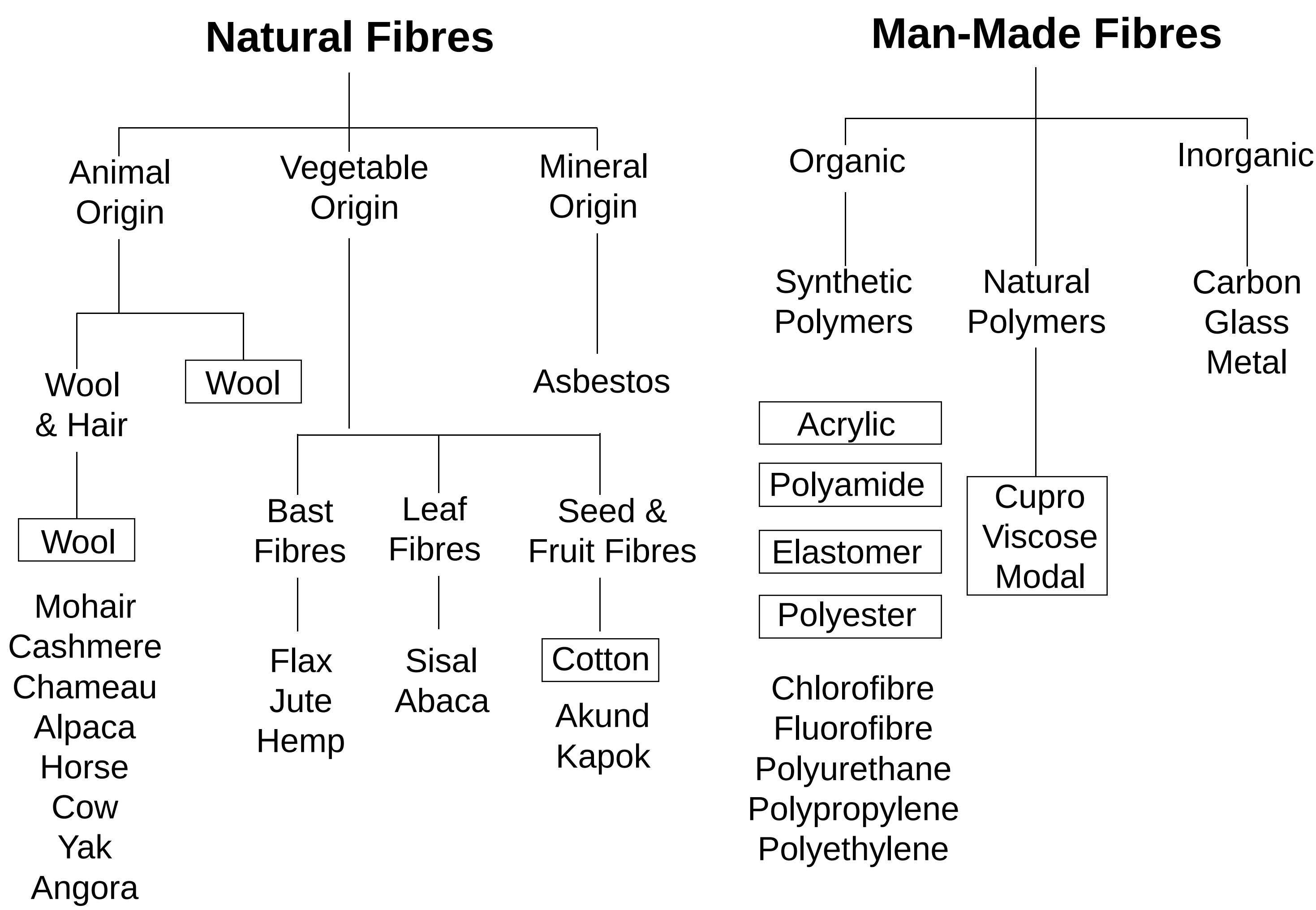
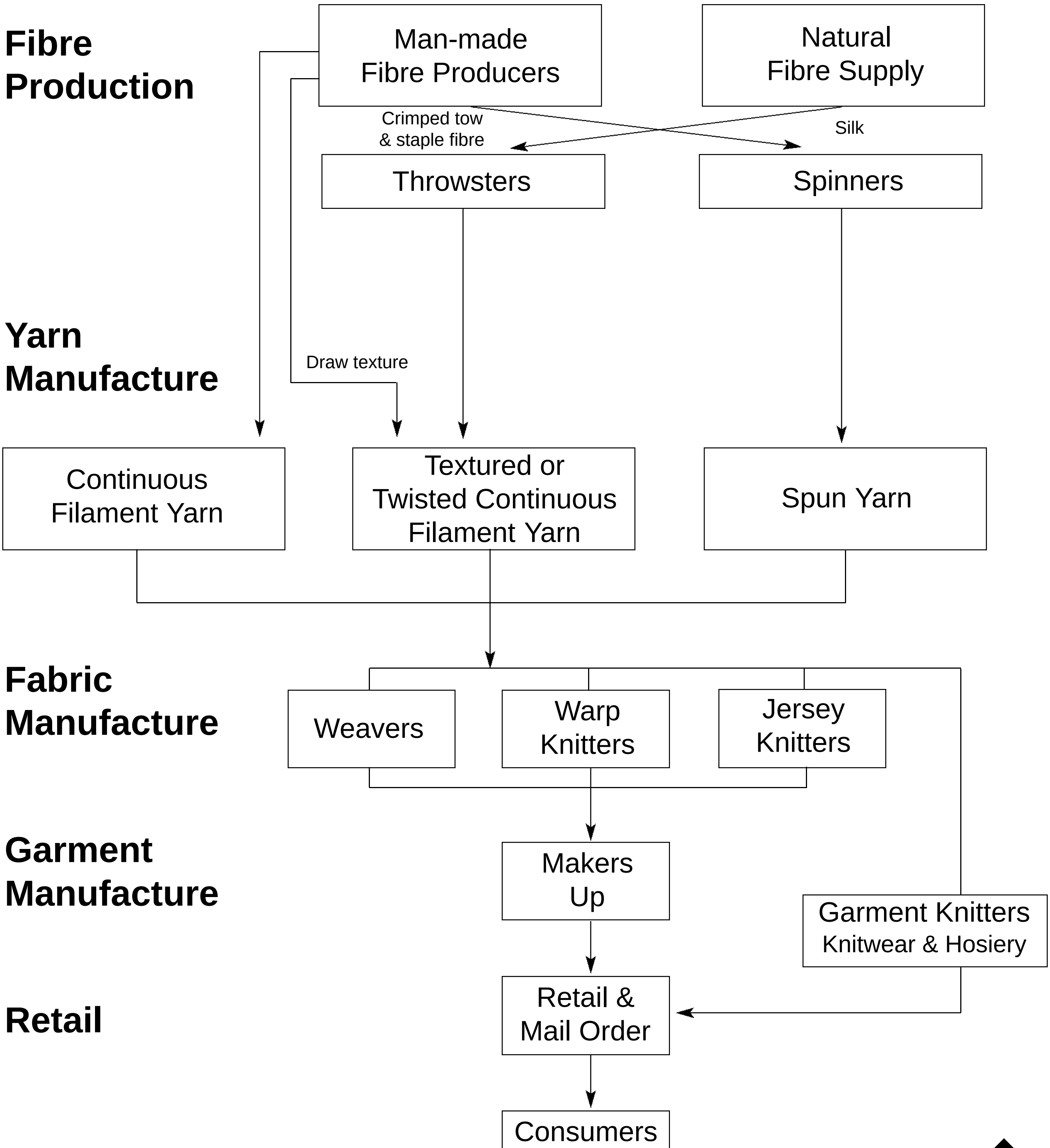
Textile Fibres



From Fibre to Consumer



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Texturising

DEFINITION

A technique by which closely packed parallel arrangements of continuous synthetic filaments are changed into more open voluminous structures to extend the use of manufactured fibres into varied fabric effects/uses. By texturing, the compact structure of continuous filament yarns is modified to give texture without cutting or breaking the filaments, by the introduction of durable crimps, coils, loops, or other fine distortions along the length of the filaments.

FALSE TWIST TEXTURISING

Partially orientated yarn (POY) is fed into a heating zone (200-230˚C), where inserted twist is set. The yarn then passes through a cooling zone to a twist unit, consisting of a series of revolving discs, which insert twist. When twisted yarn is relaxed, the yarn retains a thermal memory, which produces yarn with a high bulk/stretch potential. Bulk/stretch can be controlled by passing the yarn through a second heater.

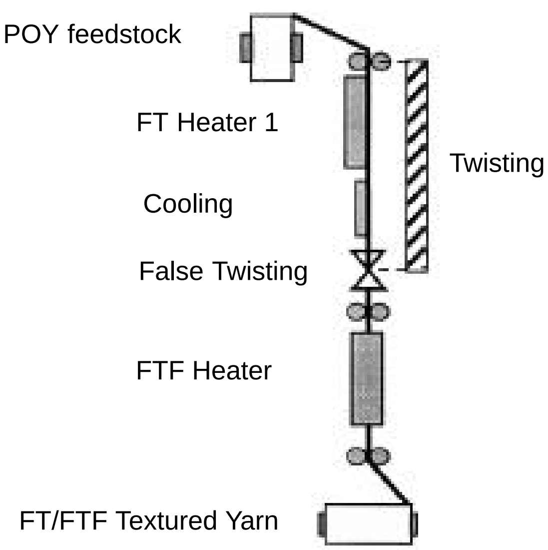

Diagram 1: Schematic of false twist texturising.

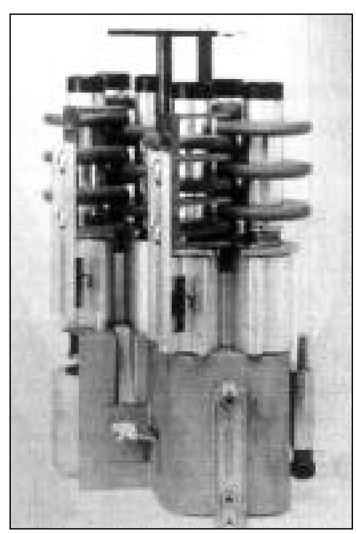

Diagram 2: A twist unit.

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Texturising

AIR-JET TEXTURISING

- Yarn is texturised by overfeeding into a high-pressure jet of air, to create a looped and more 'natural' appearance yarn.
- Bulk level controlled by input speed (overfeed) and jet take out speed.
- Can be used to combine two or more ends of different filaments or multiple ends of the same filaments (Core and Effect and Parallel) to make a single end of yarn.

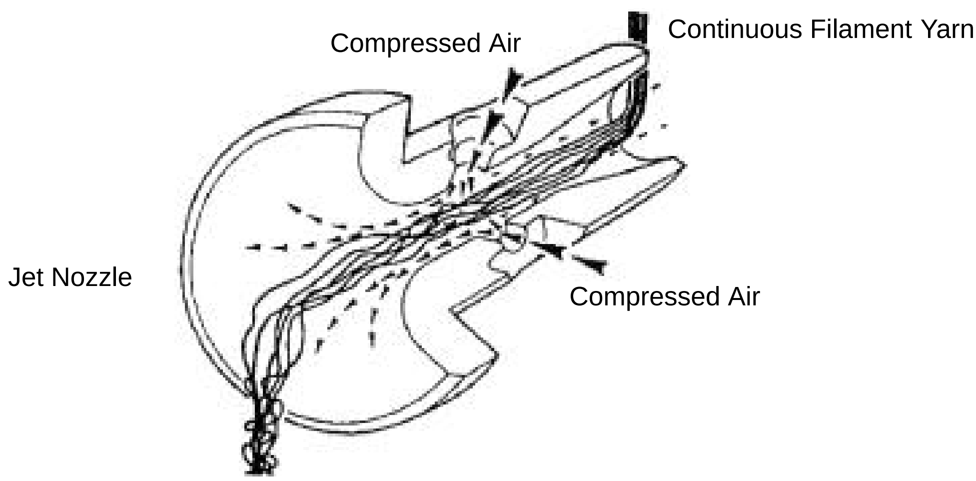

Diagram 3: Schematic of a continuous filament yarn being air jet textured.

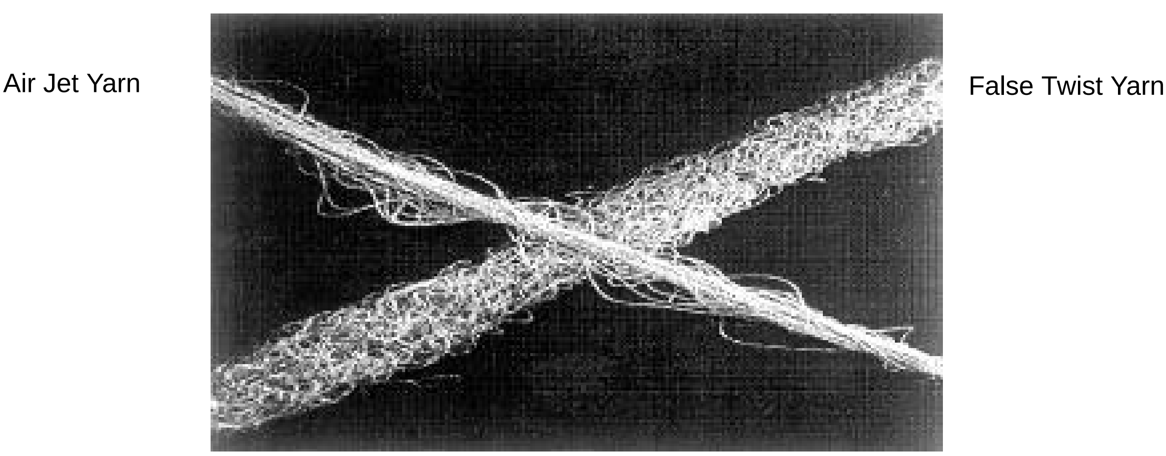

Diagram 4: Photograph showing the differences between Air Jet textured and False Twist textured yarns

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Texturising

Additional Texturising Methods

Knit de-knit.
Where the yarn is knitted, and heat set prior to being unraveled. The shape of the knitted stitch remains in the yarn.

Stuffer box or Compression crimping.
Texture, or crimp, is conferred to a yarn by overfeeding it into a heated tube.

Gear Crimping.
Yarn is run between a pair of intermeshing gear wheels. The resultant yarn is left with the impression of the gear wheel teeth.

Covering or Co-mingling

This method is employed to combine two or more similar or different yarns. Eg: Tactel® and Lycra®, polyamide and cotton, etc.

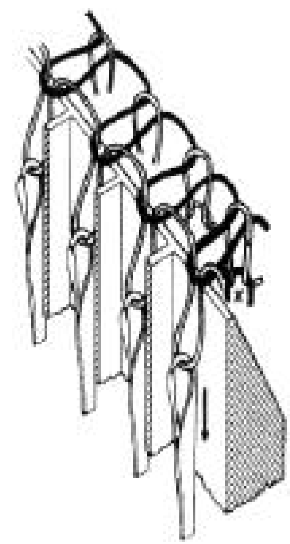
Conventional Covering
A central core of elastomeric yarn (eg. Lycra®) is wrapped with either flat or textured yarn. The resultant yarn has strength with stretch and recovery.

Air Covering/Co-mingling
Where two or more yarns of different properties are brought together in an air jet, which inserts entanglement points or 'nodes' which hold the yarn together.

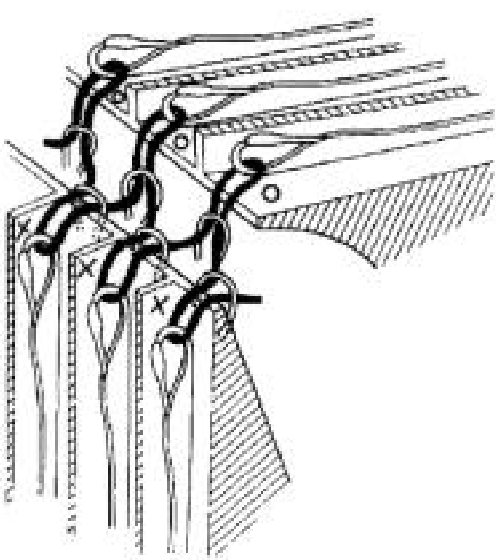
Weft Knits

Weft knitting, as its name implies, is a type of knitting in which yarns run horizontally, from side to side, across the width of the fabric. The fabric is actually formed by manipulating the knitting needles to make loops in horizontal courses built one on top of another. All stitches in a course are made by one yarn.

Weft knits are made either as flat or open width (like woven fabrics) on so-called flat knitting machines, or as tubular fabrics (like a seamless stocking) on circular knitting machines. There are two main types of circular knitting machine.



1. SINGLE JERSEY MACHINES
The knitting machines that produce single jersey fabrics have one set of needles in one needle bed. All needles in one needle bed can pull loops in one direction only, as a consequence single jersey materials are unbalanced and have a tendency to curl at the edges, although this can be corrected during fabric finishing.



2. DOUBLE JERSEY MACHINES
Double jersey fabrics are produced on mainly rib or interlock machines and simple types of fabric are nearly similar on both sides. Whereas complex fabrics have different appearances on the face and back, they are much more stable than single jersey fabrics because of their close knit construction and varying amounts of miss and tuck stitches used to create design and surface texture.

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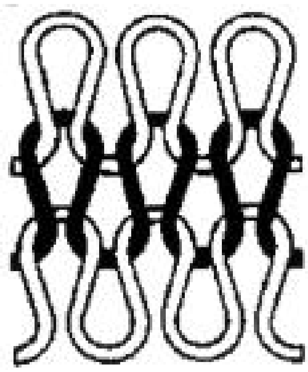
Weft Knits

Basic Stitch Information



A Typical Weft Knitting Machine

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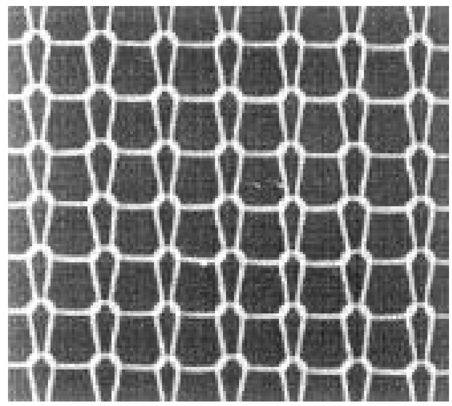
Legwear

Based on the principle of circular or weft knitting, legwear is the production of small diameter tube garments. Sock machinery ranges from 40-240 needles with varying diameters to accommodate children's, men's and ladies' sizes. Fine gauge ladies' hosiery machinery ranges from 240-430 needles usually with a diameter of 4 inches.

Diagram 1: Monofilament hosiery fabric, showing stitch formation.



The machine is prepared for the continuous knitting of socks or hose, completing one cycle either mechanically or electronically for each article produced. Subsequent toe closing and making up is required on all but the latest machinery prior to dyeing and packaging.

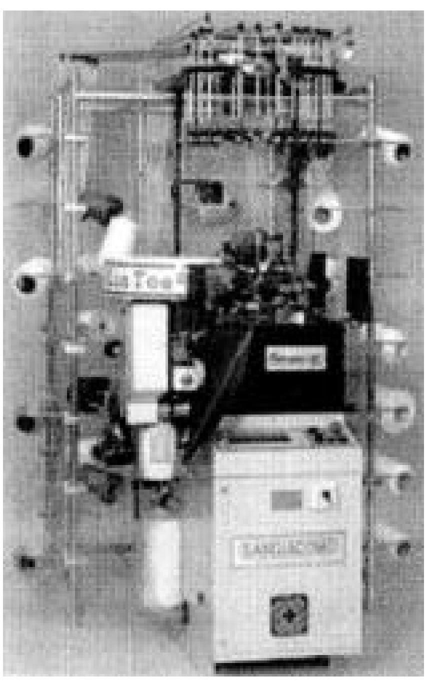


Diagram 2: New generation sock machine.

Warp Knits

Warp knitting is defined as a loop-forming process in which the yarn is fed into the knitting zone, parallel to the fabric selvedge. Diagram 1 illustrates the most basic warp knitted structure, made by a single set of ends, fed from a single warp. As can be observed, every needle is fed by a separate end, out of which a loop is formed. In order to connect the loops into a fabric, the ends shog between the needles. In this manner the needle draws the new loop through the loop formed by another end in the previous knitting cycle.

The small section of fabric in Diagram 1 is made by four needles, and as every needle must receive an end to form a loop, it must be made of four yarn ends.

From this basic section of fabric, it can now be deduced, that at least one set of ends, equaling the number of needles in the machine, is necessary to produce a fabric.

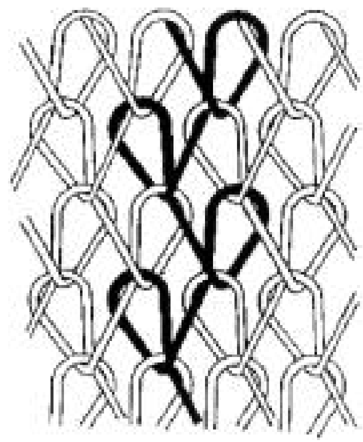


Diagram 1: Warp knitted loop structure

A Course
A course is a horizontal row of loops formed by the needles during one knitting cycle. In warp knitting, all the needles perform the knitting action simultaneously, so that one knitted course is formed across the whole width of the knitting machine for every turn of the main shaft.

A Wale
A wale can be defined as a vertical column of loops formed by a single needle. The number of wales in the fabric equals the number of needles across the width of the machine.

Loop Parts
The warp knitted loop structure is made of two parts. The first one is the loop itself, which is formed by the yarn being wrapped around the needle and drawn through the previous loop. This part of the structure is called an overlap. The second part is the length of yarn connecting the loops, which is called an underlap. It is formed by the shogging movements of the ends across the needles.
The length of the underlap is defined by needle spaces according to the shogging movement. The longer the underlap (in terms of needle spaces), the more it lies weftwise in the fabric and by doing so, increases its widthwise stability. In the same way, a shorter underlap will increase lengthwise stability.
The underlap length affects the fabric weight as well. While knitting with long underlaps, more yarn is fed into the fabric. The underlap crosses and covers more wales on its way, with the result that the fabric becomes heavier, thicker and denser.
Since the underlap is connected to the root of the loop, it causes, due to warp tension, an inclination to the loop structure. The reciprocating movements of the yarn, therefore, cause the loops of each knitted course to incline in the same direction, alternately to the left and to the right (see Diagram 1).

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Warp Knits

In order to control both the widthwise and lengthwise properties, as well as to achieve a better appearance of the fabric with erect loops, a second set of ends can be employed. This second set usually makes an opposite shogging movement to the first. The length of the underlaps need not necessarily be the same in the two sets.
Diagram 2 shows a fabric which is called locknit. In this fabric, one set of ends from one warp shogs between two adjacent needles, while the other set shogs a larger traverse of two needle spaces.

Technical Back
A plain warp knitted fabric is not symmetrical on both sides. The structure in Diagram 2 is drawn from the side facing the knitter while working on the machine. This side is called 'technical back' and can be recognized by the underlaps floating on the surface (Diagram 3).

In a fabric composed of several sets of ends, fed from different warps, there are several layers of underlaps. The ends fed from the warp closer to the front of the machine (facing the knitter), float on the surface of the technical back. The underlaps of the other warps are sandwiched under the underlaps of the former warp in their respective order.

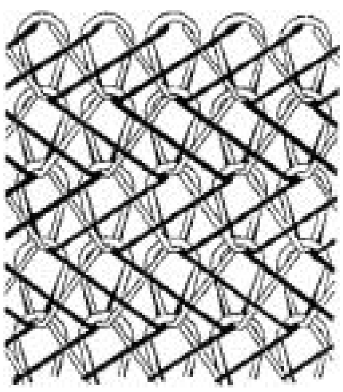

Diagram 2: Two-guide bar loop structure

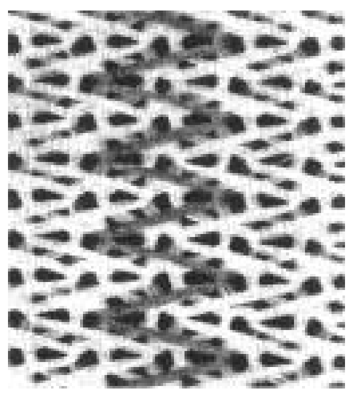

Diagram 3: Technical back

Technical Face
The other side of the fabric is called 'technical face'. On this side, the loop structure shows on the surface (Diagram 4). When the fabric is formed by more than one set of yarn ends, all the yarns which overlap the needle will appear in the loop. In most cases the yarns of the warp closest to the front of the machine cover the others, thus forming a plating effect on the technical face. The quality of the plating varies with the knitting conditions, the settings of the machine and the yarn used.

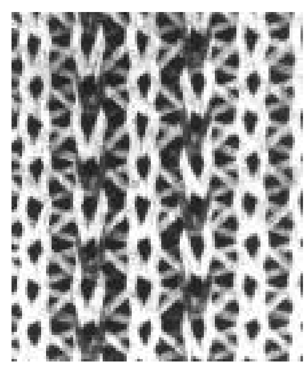

Diagram 4: Technical Face

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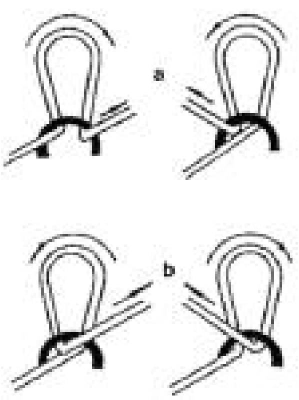
Warp Knits

Open and Closed Laps

Two different lap forms are used in warp knitting, depending on the way the yarns are wrapped around the needles to produce an overlap. When the overlap and the next underlap are made in the same direction, an open lap (Diagram 5 a) is formed. If, however, the overlap and the following underlap are in opposition to one another, a closed lap (Diagram 5 b) is formed.



The most common lap is the closed one, which is used in most warp knitted structures. The open lap is used when special needs arise or when technical limitations are imposed.

Special attention must be paid to the overlap direction, as it affects the fabric properties greatly.

Diagram 5: Open and closed lap configurations

Stitch Density

The density of loops in the fabric is defined as the total number of loops in a square area. The area is usually a square inch or centimetre and the density is obtained by multiplying the number of courses by the number of wales in that area. The number of wales per unit length is determined primarily by the number of needles per unit length in the knitting machine. This factor is called the machine gauge and is measured as the number of needles in one inch.

Today all warp knitting machine gauges are measured in the same manner. Previously, however, the Raschel part of the industry used a length measure-ment of 2 inches. It is, therefore, of the utmost importance to make sure, when discussing Raschel gauge, to which length measurement the gauge applies. Some warp knitted structures have the tendency to shrink widthwise when leaving the knitting zone, so that the wale count in 1 inch will be greater than the number of needles in the same length. A locknit structure, for example, knitted on 28 NPI (needles per inch), will measure in some cases 36 WPI (wales per inch), when taken off the knitting machine.

The count of fabric courses is determined by machine settings and knitting conditions. The loops can be knitted to be long - so that the fabric is slack, or small - so that the fabric is tight. If Diagram 2 is considered as a section of fabric with an area of 1 square inch, then the course density is 5 courses per inch, wale density is 5 wales per inch and the fabric stitch density is 25 loops per square inch. One has to remember that since the wale density is almost exclusively determined by machine gauge and fabric construction, the knitter can far more easily control the loop size, i.e. the course density. For this reason, in some parts of the industry, the main fabric parameter considered is the course count.

Woven Fabrics

Woven fabrics are made by interlacing two sets of yarns at right angles to each other. The lengthwise yarns are known as warp yarns or ends, while the widthwise yarns are known as weft yarns, filling yarns or picks. The lengthwise edges of the fabric are the selvedges. The selvedge is usually easily distinguishable from the rest of the material.

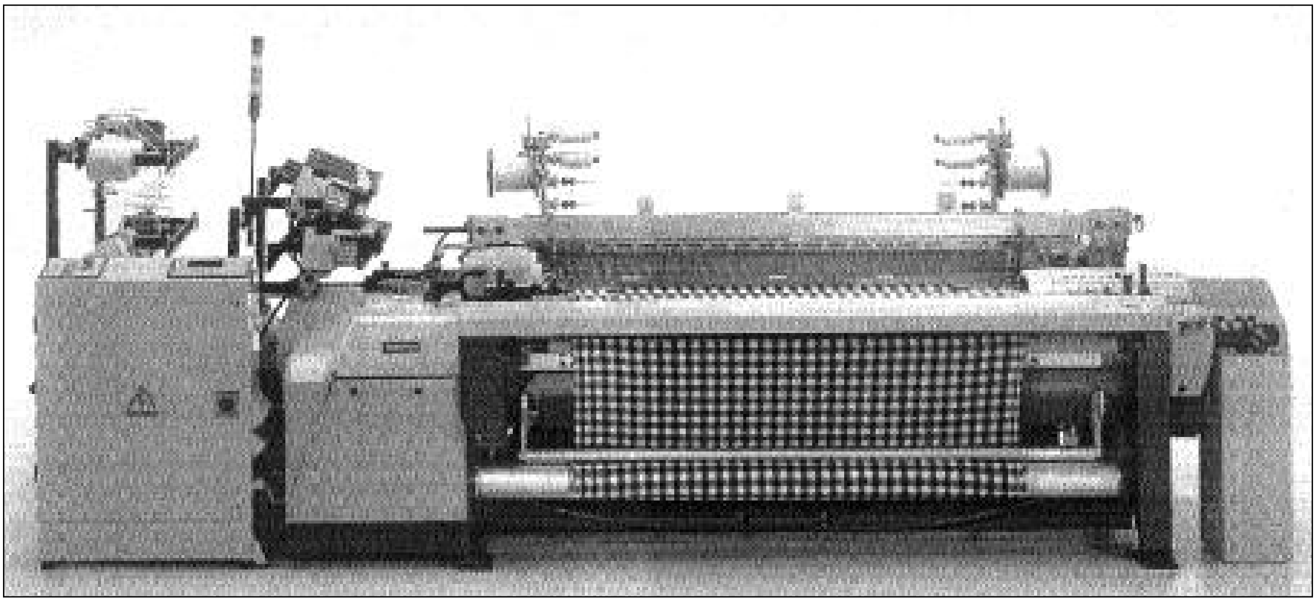


Diagram 1: State of the art loom

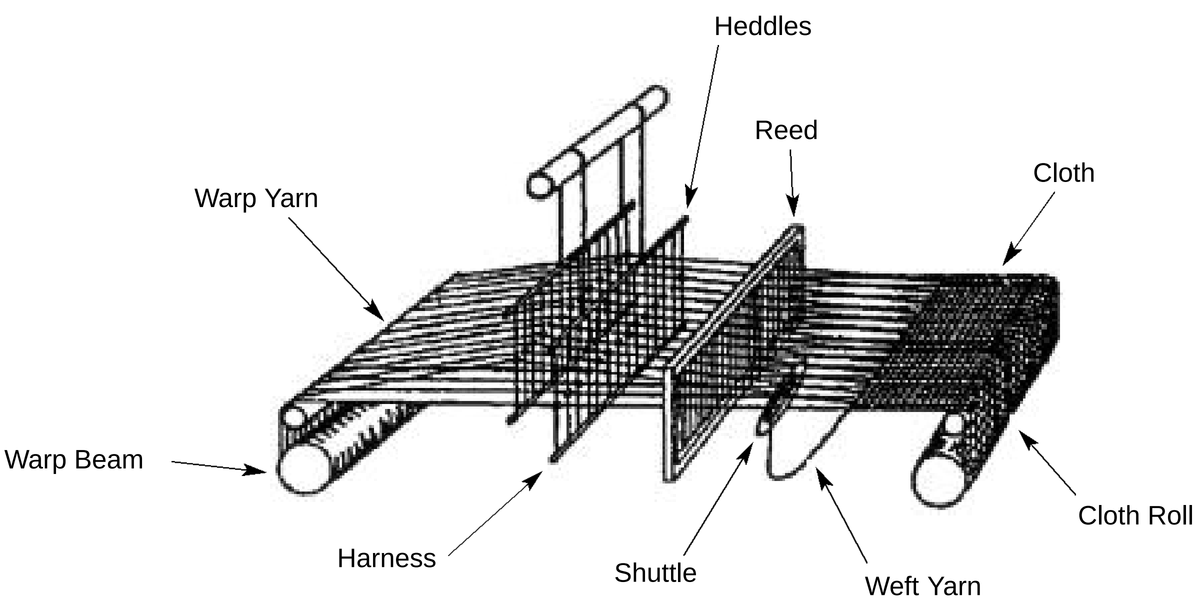


Diagram 2: Schematic loom representation

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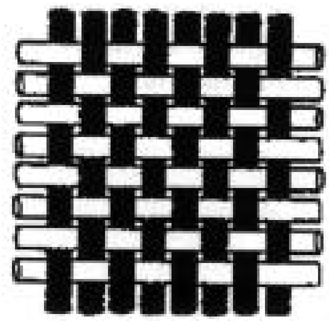
Woven Fabrics

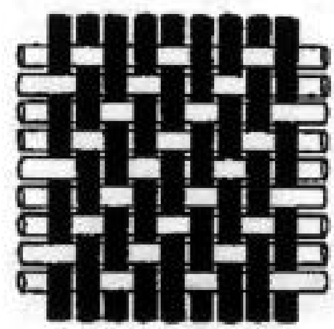
Weave Types

There are three basic weave types.

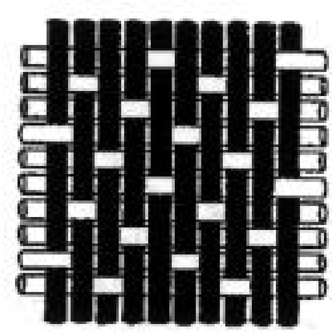
1.Plain weave. The simples and most used weave. Fabrics with a plain weave are reversible, unless one side is finished differently.



2. Twill weave. Twill weaves produce diagonal lines on the fabric. There are many types of twill, the simplest being the 2/1 twill.



3. Satin weave. Satin weaves produce a very even surface, and are smooth and lustrous. Satin is also the name of a fabric with a satin weave. Sateen is a cotton fabric with a satin weave.



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Basic Preparation, Dyeing & Finishing

SCOURING OF POLYAMIDE AND MICROFIBRES

It is essential, as with all fibres, to remove all impurities before dyeing to prevent spotting, stripes, and dye resistant marks.

The tendancy to reduce processing times in dyeing, and the ever increasing use of blend combinations, such as Lycra® and cotton, make it necessary for the dyer to have an efficient scouring system.

DYEING OF TACTEL®

Fabrics dyed with acid dyes exhibit good coverage, although with certain shades this may be difficult, and extra care must be taken.

Prepare the dye bath:
• pale to medium shades – pH7
• medium to heavy shades – pH6
• 1% levelling agent

Set the dye bath to 40°C. Raise the temperature at 1 to 1.5°C/minute. Boil for 45 to 60 minutes.

Higher temperatures and swing pH techniques will assist in level dyeing.

Cool and rinse until clear.

SETTING OPERATION

Setting is essential to processing, for aesthetics and full dimensional stability.

High temperatures are required, between 160 to 210°C. The fabric is padded with protecting agents at higher temperatures to protect the nylon.

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Man Made Fibres & The Environment

DuPont Gloucester. Textile Centre.
Environmental Excellence Team

INTRODUCTION

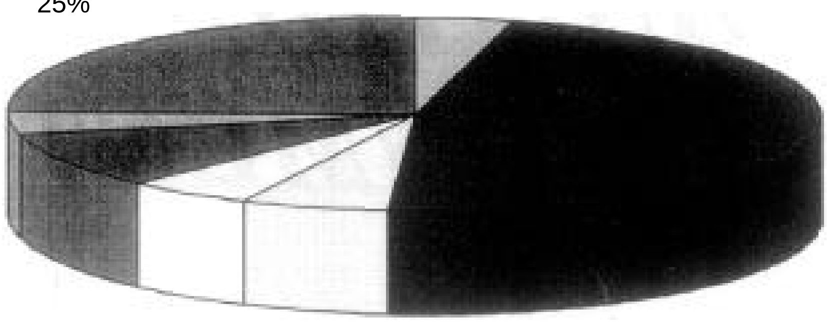
The environmental impact of the textile industry has become an important issue for consumers.When considering the environmental performance of fibres then the general consumer assumption is that 'natural' fibres are more environmentally friendly than manmade or 'synthetic' fibres.However this is a misleading and often inaccurate assumption. When handled responsibly then the processing and production of Man Made fibres compare favourably with 'natural' fibres in terms of environmental impact. All types of fibre have both upsides and downsides in terms of their environmental performance. Let us look at the entire lifecycle of the different types of fibre, discuss their environmental impacts and to highlight some interesting and often surprising comparisons between Man Made and natural fibres.
To simplify matters let us break the lifecycle down into three main areas;

Origin and Production. Where the fibres come from and how they are made.
Processing and Use. Converting fibres into garments and what happens to these garments during use.
Waste and Recycling. What happens to garments at the end of their 'useful' life?

Man Made Fibres & The Environment

ORIGIN AND PRODUCTION.

We will look here at how the different types of fibre are produced and what sort of environmental impact the different production methods make.
Just how much fibre is actually produced in the world each year?



WORLD FIBRE PRODUCTION (1994) 45 MILLION TONNES

We can look now at the environmental impact of some of the major fibres at the production stage.

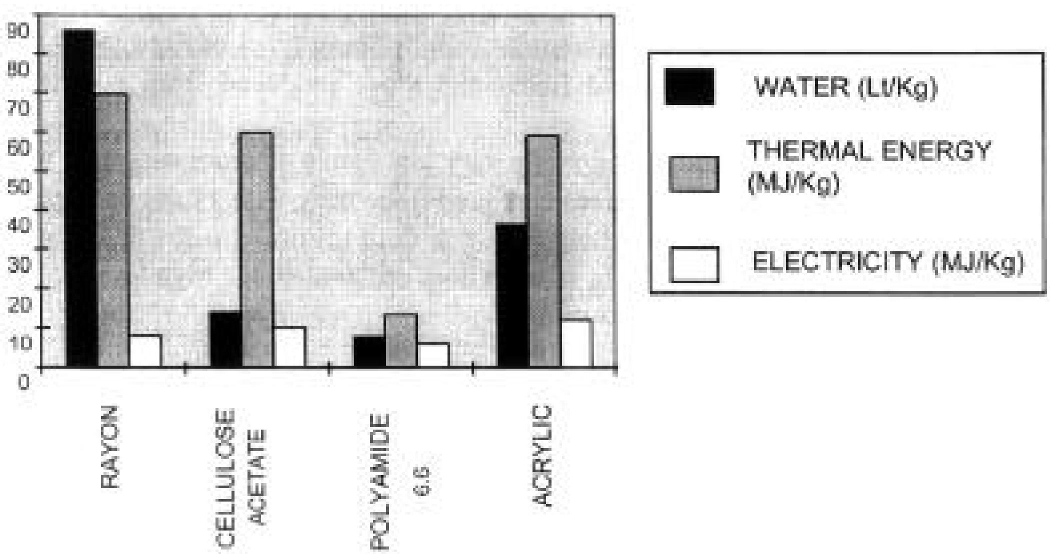
COTTON: Cotton growing takes up large amounts of high quality agricultural land in its cultivation. This land is often in developing nations where it is grown as an export crop at the expense of food production. Large amounts of water are also required for irrigation (this is one of the main causes of the near disappearance of the Aral Sea in Russia). There is a worldwide shortage of fresh water. Cotton plants are susceptible to pests and diseases, if a plant pest exists then the cotton crop probably suffers from it. This means that large amounts of pesticides and fungicides are required in cultivation. Fungicides and rot proofing agents such as PCBs are also sometimes needed to protect cotton and cotton goods if they are to be shipped or stored over a long period of time. If cotton crops are to be machine picked then the plants must be defoliated before harvesting can take place. All of this means that the cultivation requires large quantities of fertilisers, pesticides and defoliants.

WOOL: Wool production also takes up large amounts of land but this is usually of poor quality and unsuitable for food production. The main problem with wool production is the very dirty nature of the raw fibre. Large amounts of water and chemicals are required to remove the oil and grease from raw wool in order to prepare it for further processing.

Man Made Fibres & The Environment

REGENERATED CELLULOSE FIBRES: These fibres, the best known of which is Viscose, are produced from cellulose obtained from timber. Of the soft wood timber some 50% of the weight of timber is lost in the pulp manufacturing process. Pulp purification involves a great deal of washing and bleaching using chlorine, chlorine dioxide or hydrogen peroxide. The cellulose must be dissolved before it can be spun and this requires the use of carbon disulphide and caustic soda. This whole system has very high water and energy requirements and produces major amounts of noxious effluents. Tencel, the new cellulose fibre does not present this degree of environmental hazard, but being a cellulose fibre, it does have other problems, which will become clear later.

MAN MADE FIBRES: Nylon fibres (such as Tactel®), Polyester and other 'synthetic' fibres are produced from chemicals derived from oil. Oil is of course a non-renewable resource. However the entire production of chemicals required to make Nylon for example accounts for less than 1% of global oil production each year very small amount when put next to the amount we put in our cars each year. DuPont are also investing a large amount of money in changes to the types and sources of intermediates used in the manufacturing process. The production of man made fibres has its own environmental problems. The most notable of these in the case of Nylon is the generation of Nitrous Oxide during the manufacture of Nylon chemicals. This is the fourth most common 'greenhouse gas' after Carbon Dioxide, Methane and CFCs. The Nitrous oxide from Nylon production accounts for around 0.5% of all greenhouse gases. Du Pont has made a commitment to eliminate the release of Nitrous Oxide from its Nylon production by the year 2000. It is now essentially completed worldwide.



Source: UK Ecolabelling Board 1997

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Man Made Fibres & The Environment

Fibres Ecological Footprint

The Fibres Ecological Footprint helps to compare the 'load' impose by the different fibres groups (cotton, wool, and synthetics) on nature. It represents the land area necessary to sustain current levels of resource consumption and waste discharges by these fibres groups. Studies (Franklin Associates Ltd, 1993) compared the production data and useful land area for cotton, wool and synthetics. They found that the production of synthetics and cotton fibres, representing together 96% of the total fibre production world-wide, only need about 1% of the estimated useful surface of the earth necessary to produce wool fibres, which in turn are only 4% of the total fibre production world-wide. For these 4% about half of the useful surface of the earth is necessary. And the required useful surface for cotton fibres (estimated to about 334,000 km2) is heavily dependant of the climatic and high water consumption requirements too. Above means that with a growing world-wide population, land for cotton and wool will be more and more in direct competition with land for food, thus making synthetics a must to meet an expected increased population as well as pro capita consumption growth

PROCESSING AND USE.

In this section we will look at the conversion of fibres into fabrics and garments and also what happens to these during their useful life. In the fabric forming processes, weaving, knitting etc. there is little significant difference in the environmental impacts of the different types of fibres (although there are several health problems associated with the dust arising from the spinning and weaving of cotton). However the big difference arises in the dyeing and finishing of fabric and garments made from different types of fibre. Man Made fibres perform very well when compared to natural fibres and those produced from regenerated cellulose. There are several reasons for this. Man made fibres are usually visually white and contain only very low levels of processing oils which can be removed by low temperature (typically 50 degrees centigrade) scouring with a mild detergent. Their whiteness means that they do not require bleaching as cotton does resulting in savings in water, energy and chemical use. The man made fibre scouring effluent does not contain the high levels of oils, grease and scouring chemicals that arise from wool scouring.

B.O.D. LEVELS RESULTING FROM SCOURING.

WOOL	**45,000 MG/LT**
NYLON	**100 MG/LT**

B.O.D. or Biological Oxygen Demand is a measure of the amount of oxygen used in the breakdown of pollutants in an effluent and is a good indicator of the amount of pollutants present in a given effluent. The comparison between the B.O.D. levels resulting from wool scouring as compared to Nylon scouring gives a striking example of how a man made fibre can gain over a natural fibre during wet processing. A further indication of these advantages is indicated below. The comparison between water use levels in the wet processing stages indicates not just the reduced amounts of water needed in made manmade fibre processing but has a wider implication. Water that is not used is water that does not need to be heated which means savings in energy too.

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TYPICAL WATER USE DURING WET PROCESSING

NYLON	**50 LT/KG**
COTTON	**250 LT/KG**
WOOL	**400 LT/KG**

The other major aspect of the wet processing advantage enjoyed by man made fibres and by Nylon in particular is the relative simplicity and efficiency of the dyeing process.
Dyeing is perhaps the number one environmental issue in the textile industry. The size of the problem is clear from the figure below:

GLOBAL ANNUAL DYESTUFF CONSUMPTION:
467,000 TONNES OF DYES (1992)

The types of dye used depend on the type of fibre to be dyed and the methods of applying and fixing the dyes varies accordingly. The dye effluent colour issue is the most pressing problem in textile processing. However the efficiency of the methods used to dye different types of fibres varies enormously and this is the major factor governing the amount of colour left in the effluent, colour which must be removed before the effluent can be disposed of. Those dyes typically used for the dyeing of cellulose, which means not just cotton but also the regenerated cellulose fibres like viscose, are reactive and sulphur dyes. These can leave anything from 20-50% of the dye in the effluent at the end of the dyeing operation. The application method for these dyes also involves the use of other chemicals, typically salt (up to 90 g/Lt) and alkali or metal salts used to fix the dyes on the fabric. These effluents are very difficult to deal with and are potentially highly environmentally damaging.
The dyes used in the dyeing of Nylon are much more efficient in their application and typically 80-95% of the dye in the bath is taken up by the fibre thus leaving far less colour in the effluent. This combined with the absence of large quantities of bulk chemicals in the dye fixing process, results in a far cleaner effluent.
To sum up, man made fibres have a major advantage over the natural and cellulose fibres at the wet processing stage giving savings in water, energy, chemicals and colour.

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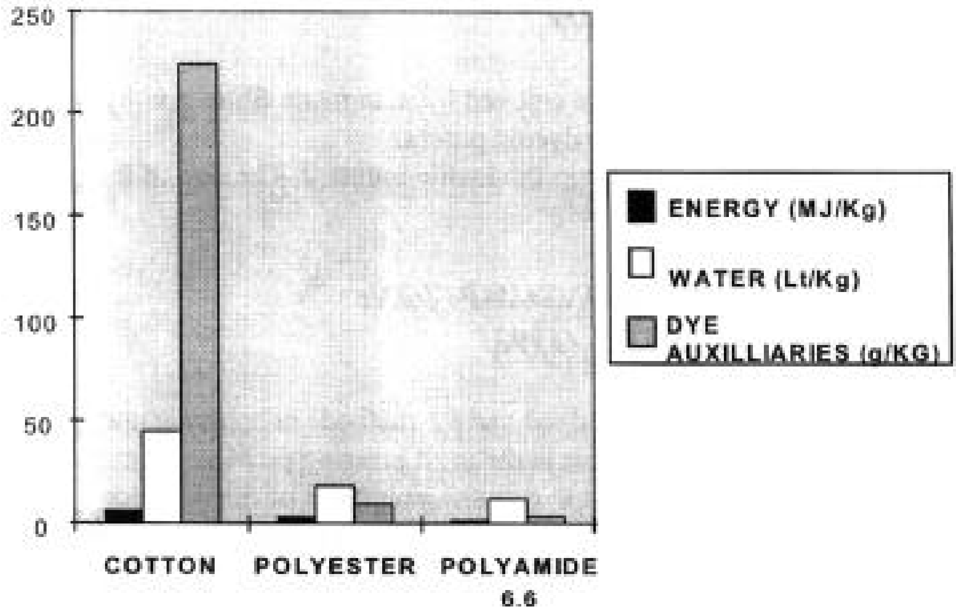
RESOURCE CONSUMPTION IN DYEING



Source: UK Ecolabelling Board.1997

Just because a garment reaches the consumer does not mean that its environmental impact is at an end. In fact the life of the item is just beginning. There are advantages to garments made of man made fibres during the useful life of the garment. There is an advantage in terms of a longer life in terms of the garment's resistance to rot and moths. But the major impact any garment make during its lifetime is in term of washing and laundering. Washing and laundering takes large amounts of energy, water and detergents and it is generally true to say that man made fibres require less severe, lower temperature, laundering than natural fibres. Man made fibres also retain less water and thus require the consumption of less energy if artificial drying is required. Man made fibres are also less likely to be dry cleaned. The solvents used in dry-cleaning are often CFCs or other organic solvents. The avoidance of the use of these chemicals is an obvious advantage. In terms of the useful life of the garment then man made fibres again score well when compared to natural fibres.

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WASTE AND RECYCLING

Eventually, of course, all garments reach the end of their useful life as far as the original purchaser is concerned. What happens then? The fate of such garments can lie in one of two directions.

Firstly the garments can go for reuse. This may be to jumble sales, charity shops or clothing banks. This is a much larger scale operation than most people realise involving many thousands of Tonnes of garments. They will be sorted, graded and the best will then be sold again. However the majority will be packed and exported most often to the developing world for resale there. Others will be broken down to yarns and fibres to re-enter the textile chain back at the start.

Still, however, the majority of unwanted garments enter the refuse system and end up as domestic waste. More often than not this means ending their life in a landfill tip. Clearly this is undesirable and highly wasteful. Space for landfills is rapidly running out. To add to this the UK Government is imposing a landfill tax likely to be in the region of £7.00 per Tonne.

At the waste stage a major difference arises between the natural/regenerated fibres and those made from petro-chemicals. The man made synthetic fibres do not readily biodegrade. What was an advantage in use, the resistance to rot and the actions of micro-organisms, becomes a landfill problem. The current best solution for these fibres is incineration. This serves to unlock the relatively high amount of energy in the large organic molecules from which the fibres are made. If the energy from the incineration can be harnessed by an efficient incinerator/generator then that energy can be recovered. However in the longer term the route forward for man made fibre must be real recycling, the turning of waste fibre back into fibre we can use again.

In theory the recycling of waste polymer and fabric is simple. You simply melt it down and spin it into new fibre. However, whilst this is very appealing, it is also in most cases impractical. In some cases it is possible to carry out this process. If you have a reliable stream of pure, clean, waste nylon then it can indeed be remitted. This is what happens to all Tactel® waste generated on the DuPont Gloucester site, be it waste yarn, polymer or hard waste generated at machine cleaning. This is sold to a local company for melting and turning back into nylon polymer chip. The quality of this is not, however, acceptable for textile use. Several considerations, primarily dyeability, preclude turning this back into garments. The nylon is instead used for moulding into a variety of objects; examples include car components, curtain fittings and garden furniture.

Recycling used garments is a much more complex and difficult problem. Clearly pure streams of Nylon, polyester or what ever are required. Therefore, sorting is required. However the majority of garments manufactured today are made of not one fibre but of a blend of many. DuPont are now looking to work with our customers to explore future routes for the recycling of Tactel®. For the future the DuPont vision for man made fibres recycling involves the reclaiming of fibre and polymer and its depolymerization to produce chemical building blocks which can be returned to the manufacturing process right at the start.

DuPont has developed and patented a chemical recycle technology that can process both N6 and N66 and generate monomers for the reproduction of nylon.A demonstration-sized facility is now operational in North America on route to a commercial size facility expected to be operational by 2003.

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CONCLUSION.

A closer look at fibre types based on a full range of environmental considerations and loadings, across the whole of the life cycle of a fibre taking into account pollution, water use, energy requirements etc does not show any superiority for ‘natural’ fibres.
Man made synthetic fibres, like Tactel® only by DuPont, can be just as friendly to the environment as natural fibres, when considered over their lifetimes.

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