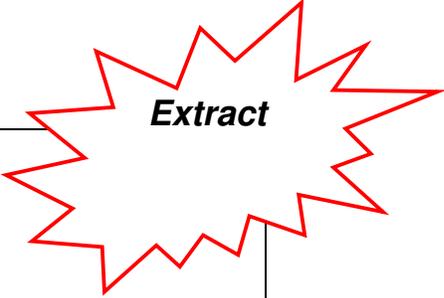


## 5. FABRICS AND RAW MATERIALS



**Extract**

### OVERVIEW

In this module, we will cover the following topics:

- Raw materials
- Natural fibres
- Chemical fibres
- Textile materials
- Woven Fabrics
- Knitting
- Finishing

### ABOUT FABRICS AND RAW MATERIALS

Before you start to construct your paper pattern, you have to consider what kind of fabric you want to use in your design. You'll have to ask questions like:

- Does it need to have special qualities like water-repellence, or windproof?
- Does it need to be an airy material that is comfortable to wear?

### THE RAW MATERIALS

When choosing your raw materials, you'll have to look to the two main groups:

1. **Natural fibres** - vegetable fibres are cotton and linen.
2. **Chemical fibres** - made from both natural and chemical substances.

Here we will go into more detail about the two types of raw material.

# 1. NATURAL FIBRES

## COTTON

Cotton is the oldest and most common natural fibre. The cotton plant is native to the tropical and subtropical regions of North America, central and South America, Egypt and India.

The cotton fibre grows around the seeds of the plant. The fibre consists mainly of cellulose. These cellulose fibres are spun into threads for the textile industry.

Cotton is a highly durable fibre with the ability to absorb moisture. Cotton threads or cotton fabrics can be brushed up to warm up the fabric. It's often used for underwear and summer clothes.

The disadvantages of cotton are:

- It tends to wrinkle
- It often shrinks
- It isn't dimensionally stable

Cotton is often blended with chemical fibres to reduce shrinkage and wrinkling.

The most common cotton cloths are:

- Grey cotton
- Linen
- Batiste
- Damask
- Molleton
- Flannel
- Poplin

## LINEN

Linen is more expensive than cotton and is used for finer textiles. The linen fibres are made from the flax plant. The plant is native to Europe. The usable flax fibres are extracted from the bast or skin of the stem of the flax plant.

Flax fibre is soft, lustrous and flexible. It's stronger than cotton fibre but less elastic.

Linen is a highly durable cloth. It has a natural shine. Linen doesn't shrink, and it absorbs moisture as well as cotton. Linen wrinkles but the clothes remain dimensionally stable. Linen is often used for summer clothes because of the cooling effect on the skin.

Its heat resistance makes it possible to wash the cloth at 95°. This makes linen useful for sheets, pillowcases, napkins and tablecloths.

You can purchase blends of linen with other fibres, or half linen, where the warp is from linen and the weft from cotton.

## ANIMAL FIBRES

Animal fibres are wool and silk.

## WOOL

Wool is a fibre that comes from the hair of animals, usually sheep. There are different types of sheep that provide different wool quality.

The most common types of wool are Merino and Cheviot.

- Merino wool is short, fine and crimped.
- Cheviot wool is long, strong and plain.

After shearing, the wool is separated. The most important part is the fleece. The fleeces will be classified, because the quality of the wool is different depending on the part of the body. For example the best wool comes from the shoulder parts.

To produce a thread out of the pure wool, the wool fibres have to be combed or carded.

- Combed yarn is a strong twisted flat yarn. It's used for light plain woollen cloth.
- Carded wool yarn is an uncombed yarn made from strong crimped fibres. The yarn is soft and fluffy.

Pure wool is often blended with chemical fibres to get a more hard-wearing material.

Wool fibres are stretchable and crease-resistant.

Due to its crimped fibres, wool is able to enclose air and keep it warm. Consequently, warm winter clothes are made from wool, like coats, suits, dresses, knitwear and socks.

Other than sheep wool, you can also use:

- Angora wool from the angora rabbit
- Mohair from the angora goat
- Cashmere from the cashmere goat

These are wool fibres of a very high quality and price and are only used for high class fashion.

## SILK

Silk is a very expensive fibre, due to the complex production process.

The fibre is obtained from the cocoon of the silkworm. The silkworm produces two fibres formed from two adenoids that build the silk yarn.

Silk is a soft, fine, airy and shiny cloth. The fibre has a high breaking and abrasion resistance.

Silk is usually chosen for eveningwear or expensive daywear and underwear.

The most common silk cloth is crepe de chine, crepe georgette and crepe satin.

Silk can also be blended with other fibres.

## 2. CHEMICAL FIBRES

Chemical fibres are chemically produced fibres. They can be made from **natural** substances or from **synthetic** substances.

To produce a chemical fibre, a spinning dope is needed. The spinning dope is pressed through fine nozzles called 'spinning nozzles'. The fibres from these spinning nozzles are spun to one thread and processed to either filament yarn or staple fibre.

## **CHEMICAL FIBRES FROM NATURAL SUBSTANCES**

### **CELLULOSE FIBRES**

The source material for chemical fibres made from natural substances is cellulose. From this substance, fibres like viscose, modal, acetate and triacetate are made.

The basic material for cellulose is timber, like spruce, fir and beech. The crushed timber is treated with chemicals to separate the cellulose from the other substances. Through further treatments the spinning dope is produced.

The most common method in producing cellulose fibres is the “viscose spinning method”. The source material is timber. The chemicals used to separate are sodium hydroxide and carbon disulphide.

### **VISCOSE FIBRES**

Viscose and cotton have similar qualities. The product is cheap in production, it's printable and durable and it can be coloured and is washable up to 60°.

Viscose is normally used for dresses, lining, underwear and also furnishing fabric.

Viscose is also blended with chemical or natural fibres.

### **MODAL FIBRES**

Compared to viscose fibres, modal fibres are crease resistant, and they are washable up to 95°.

Modal fibres are mainly used for tablecloth, bed linen, shirts and blouses. The fibres are usually blended with cotton fibres.

### **ACETATE FIBRES**

This fibre has a similar look and quality to silk and is crease resistant.

Acetate is good for eveningwear, summer dresses and lining.

Acetate is also blended with synthetic chemical or natural fibres.

## **CHEMICAL FIBRES FROM SYNTHETICALLY SUBSTANCES**

The source material for chemical fibres from synthetic substances are:

- Coal
- Crude oil
- Natural gas

These source materials have to be transformed into a compound, like the spinning dope, to press it through the nozzles.

From these substances fibres like polyamide, polyacrylic, polyester, polyvinyl and polyurethane are made.

These fibres are often blended with other fibres.

### **POLYAMIDE**

The polyamide fibre is the strongest fibre with high stretch and elastic ability.

Polyamide is mainly used for socks, underwear, shirts, raincoats and sportswear.

### **POLYACRYLIC**

These fibres are soft, fine and warm and similar to the wool fibres.

Their main use is for knitwear, sweaters and jackets, and also furnishing fabrics.

Polyacrylic fibres are often blended with wool fibres.

### **POLYESTER**

These fibres have a high elasticity and crease resistance. They are also insensitive to light and often used for curtains, as well as for dresses, blouses, and shirts.

They are often blended with other fibres.

## POLYVINYL

Polyvinyl fibres have an electrostatic charge and are therefore used for thermal underwear.

## POLYURETHANE

These fibres have a high elasticity and are used for underwear, medical stockings, swimwear and sportswear.

## BLENDED FIBRES

Most fabrics in fashion industry are blended.

The most common blends are:

- Cotton - linen
- Cotton - viscose
- Cotton - modal
- Cotton - polyamid
- Cotton - polyester
- Wool - silk
- Wool - polyamid
- Wool - polyacryl
- Wool - polyester
- Viscose - polyamid
- Polyester - polyacryl
- Polyamid - elasthan

Blended fibre means that the substances were blended before they were spun. The warp and the weft are from different material.

The blending is necessary to provide a durable and easy to clean garment

It's possible to combine qualities like crease resistance or absorbance with eudermic features.

## **EXERCISE 5.1**

What kind of fibre would you choose for a:

- T-shirt?
- Winter- coat?
- Summer dress?

And why did you choose the material?

## **TEXTILE MATERIAL**

### **SPINNING AND TWISTING**

To obtain a thread that can be processed to create a fabric, the fibres have to go through the spinning process.

Short fibres need to be spun to obtain a thread that can be used for weaving or knitting. The spinning process is usually done by spinning machines.

To obtain a stronger and harder thread, two or more spinning threads are twisted.

Depending on the use of the fabric, simple yarns or twisted threads can be chosen.

### **PRODUCING FABRICS**

The fabrics are divided into three main groups:

#### **1. Woven fabrics**

Woven fabrics with two threads

- Flat weaves
- Basic weaves
- Basic weave variations

Woven fabrics with more than two threads

- Nap weaves

- Two ply fabric

## **2. Knitted fabric**

Thread system:

- Basic knits
- Basic knit variations

Chain fabrics:

- Basic chain knits
- Basic chain knits combination

## **3. Compound material**

- Fibre compounds
- Thread compounds
- Multilayered fabrics

Raw materials for these textile faces can be natural fibres or chemical fibres

## **WOVEN FABRICS WITH TWO THREADS**

Weaving is the oldest method of bringing 2 threads together to build a cloth.

Weaving means threads or strands of material are passed under and over each other.

The first woven cloths were made from flax, wool or tree bast.

Today weaving is a major industry in many countries. It's often completed on high speed looms.

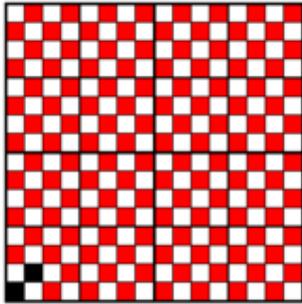
The basic of weaving means to bring two sets of threads, the warp and the weft, at right angles to each other. The warp threads are parallel to each other and pass through the harness, which by moving up or down builds a space for the weft to pass the thread trough the warp.

The weaving patterns are divided into three main groups.

## 1. TABBY WEAVE

This is the simplest basic weaving technique.

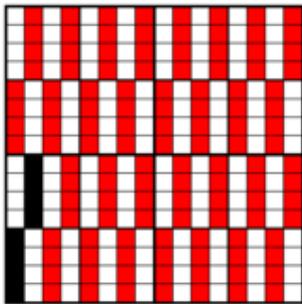
The warp and the weft are weaved one over another so that the upside and underside are similar. This high amount of cross points on a small area makes the fabric durable.



*Figure 1 Basic tabby weave*

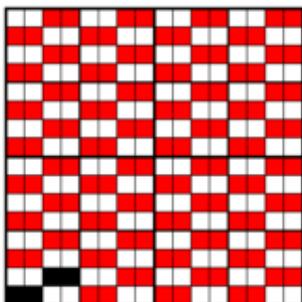
There are 3 main variations on the tabby weave.

The **warp rep** shows more warp threads than weft threads on the surface.



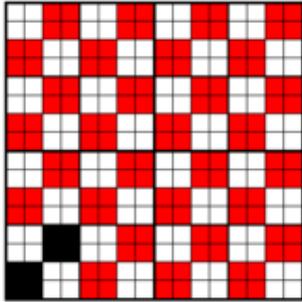
*Figure 2 Warp rep*

The **weft rep** shows more weft threads than warp threads on the surface.



*Figure 5.3 Weft rep*

Another variation is the **panama-weave**. Here the warp and the weft have the same amount of threads on the up side and underside.



*Figure 4 Panama weave*

## **REMINDER**

Have you completed the following exercises?

Exercise 5.1

Exercise 5.2

When you have completed the exercises you can move on to the next module.

## **SUMMARY**

1. You are aware of different types of raw materials.
2. You understand the difference between natural and chemical fibres.
3. You know about a variety of textile materials.
4. You are aware of different woven materials.
5. You have thought about different knitting methods.
6. You are aware of a variety of different finishes for garments.

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Well, that's the end of the extract. If you want to know more, you'll have to register!

We look forward to welcoming you on to the course, and helping you become a fashion designer.