# Wool

Sheep grow wool called "fleece". A sheep's fleece is made up of millions of individual fibres. The fibres are like tiny hairs, but many times thinner than human hair.

Not all wool is the same. It varies in colour, quality (fibre diameter(thickness)) and length. Two important measurements that affect the use of wool are *fibre diameter* and *fibre length*. Fibre diameter is measured in microns, and fibre length is measured in millimetres.

Wool can be divided into three main groups based on micron: fine, medium and broad.

* **Fine**: Merino sheep produce the finest wool, which is used for high-quality, soft fabrics and yarns by leading fashion designers.
* **Medium**: Medium wools are used in a variety of woven apparel fabrics, knitting yarns and furnishings. Medium wools are often produced by crossbred sheep.
* **Coarse:** Many different sheep breeds produce coarser wools and often they are dual-purpose breeds used to produce both meat and wool.

**The wool staple**

Wool fibres grow out of the skin follicles in tufts (staples) on the sheep’s back. As wool grows in the follicle it is covered with natural grease, which are removed during processing. The natural grease can be recovered to produce lanolin (a type of oil).

The wool fibres grow in a wave pattern called *crimp*. The finer the wool, the more noticeable the crimp. When these crimped fibres are spun into yarn, air gets trapped between them, which provides a natural insulating layer.



**The wool fibre**

Each wool fibre is made up of protein with a small amount of fat, calcium and sodium. The surface of each fibre is covered in scales, which are important in making felts and traditional woollen cloths.

**Fun Facts**

* Human hair has an average diameter of about 65 microns, more than four times as thick as ultrafine wool.
* Human hair grows about 10mm per month and wool grows about 6mm per month.
* Wool can absorb up to 35% of its own weight in water, more than cotton (24%), nylon (7%) and polyester (1%).

Some wool fibres are treated to reduce these scales, making them less likely to felt. This process also makes the wool machine-washable and shrink-resistant.



**Special qualities of wool**

Wool has several special qualities that make it unique:

* **Wool Bounces Back**: Wool fibres can stretch and bend thousands of times without breaking. When stretched, wool will return to its original shape.
* **Water-Repellent**: The natural grease in wool, called lanolin, helps keep water away.
* **Easy to Clean**: Wool doesn’t attract dirt easily. The natural grease helps protect it from stains, so wool stays clean longer than many other fabrics.
* **Naturally Safe**: Wool is harder to burn because it contains moisture, which makes it flame-resistant.
* **Keeps You Comfortable**: Wool helps keep you warm in winter by trapping air between its wavy fibres. It also keeps you cool in summer by letting air pass through. Wool can even protect your skin from sunburn better than most synthetic fabrics and cotton. Additionally, wool has anti-static and anti-odour properties.

**Disadvantages of wool**

Despite its many benefits, wool has some drawbacks:

* Wool fibres can sometimes mat together.
* Wool can be discoloured and must be cleaned (scoured).
* Wool can shrink or lose its shape if washed in very hot water.
* Some people find wool itchy or prickly on their skin.
* Some people are allergic to wool.

***Exercise: - Understanding Wool and Its Characteristics***

1. *What is wool made from, and how is it different from human hair?*
2. *How does the thickness of wool fibres affect how the wool is used?*
3. *What are the three main types of wool based on fibre thickness, and how are they different from each other?*
4. *What is the "staple" of wool, and how does it grow on the sheep's back?*
5. *What is lanolin, and why is it important in wool processing?*
6. *What does it mean when wool fibres have a "crimp," and how does it help wool work as an insulator?*
7. *What are some of the special qualities of wool that make it different from other fabrics?*
8. *Why is wool considered a natural and environmentally friendly material?*
9. *How does wool help keep you warm in cold weather and cool in hot weather?*
10. *Why is wool resistant to dirt and stains, and how does this benefit wool fabrics?*
11. *What makes wool naturally flame-resistant?*
12. *What are some of the advantages of wool for clothing and home furnishings?*
13. *What are some disadvantages of wool, and why might it not be suitable for everyone?*
14. *What is the role of wool’s scales, and how does removing them affect wool?*
15. *Why might wool shrink or lose its shape if washed in very hot water?*
16. *How can the crimp in wool fibres help make fabrics more comfortable and functional?*

**Answers**

**Understanding Wool and Its Characteristics**

1. **What is wool made from, and how is it different from human hair?**
Wool is made from the fibres that grow on sheep. These fibres are much thinner than human hair, and they grow in tufts (staples) on the sheep's skin. Unlike human hair, wool is covered with natural grease (lanolin), which helps protect it from water and dirt.
2. **How does the thickness of wool fibres affect how the wool is used?**
The thickness of wool fibres, measured in microns, determines what the wool is used for. Fine wool is used for soft, high-quality fabrics like those in fashion, while medium wool is used for everyday clothes and home furnishings. Coarse wool is used in products like carpets or for dual-purpose sheep (those raised for both meat and wool).
3. **What are the three main types of wool based on fibre thickness, and how are they different from each other?**
* **Fine wool**: Produced by Merino sheep, this wool is very soft and used for high-end fashion fabrics and yarns.
* **Medium wool**: Comes from crossbred sheep and is used for a variety of fabrics, including clothing and furnishings.
* **Coarse wool**: Produced by many breeds of sheep, this wool is thicker and is often used for products like carpets and blankets.
1. **What is the "staple" of wool, and how does it grow on the sheep's back?**
A staple is a tuft or cluster of wool fibres that grow from the sheep’s skin. These fibres grow from follicles and are naturally covered with grease to protect them as they develop.
2. **What is lanolin, and why is it important in wool processing?**
Lanolin is the natural grease found on wool fibres. It helps keep the wool water-resistant and also acts as a moisturizer for skin. During processing, lanolin can be removed or recovered and used in products like lotions.
3. **What does it mean when wool fibres have a "crimp," and how does it help wool work as an insulator?**
The "crimp" in wool refers to the natural wave or curl of the fibres. This crimp helps wool trap air between the fibres, which provides insulation, keeping the wearer warm in cold weather and cool in hot weather.
4. **What are some of the special qualities of wool that make it different from other fabrics?**
Wool is unique because it:
* Bounces back after being stretched or bent.
* Is water-repellent due to lanolin.
* Is easy to clean and resists dirt and stains.
* Is naturally flame-resistant because of its moisture content.
* Helps keep the body warm in cold weather and cool in hot weather.
1. **Why is wool considered a natural and environmentally friendly material?**
Wool is biodegradable, renewable, and natural. It comes from sheep, which can grow new wool every year, making it a sustainable resource. Wool also decomposes naturally in the environment without harming it.
2. **How does wool help keep you warm in cold weather and cool in hot weather?**
Wool's crimped fibres trap air, which insulates the body in cold weather. In hot weather, wool allows air to pass through, helping to keep you cool. It also wicks away moisture, keeping the body dry.
3. **Why is wool resistant to dirt and stains and how does this benefit wool fabrics?**
Wool contains natural grease called lanolin, which helps protect the fibres from dirt and stains. This means wool fabrics stay cleaner for longer, reducing the need for frequent washing.
4. **What makes wool naturally flame-resistant?**
Wool is naturally flame-resistant because of the moisture content in the fibres. The moisture makes it harder for wool to catch fire, and even if it does, it tends to smoulder rather than burn.
5. **What are some of the advantages of wool for clothing and home furnishings?**
Wool is durable, comfortable, and versatile. It is great for regulating body temperature, is resistant to wrinkles, and has natural anti-odour properties. It’s also long-lasting and can be used for various products like clothing, blankets, carpets, and upholstery.
6. **What are some disadvantages of wool, and why might it not be suitable for everyone?**
Some disadvantages of wool include:
* It can sometimes mat together.
* It may need to be cleaned carefully (scoured) if discoloured.
* It can shrink or lose shape if washed in very hot water.
* Some people find it itchy or prickly on their skin.
* Some individuals are allergic to wool.
1. **What is the role of wool’s scales and how does removing them affect wool?**
The scales on wool fibres help it felt (stick together), which is important for making felt and traditional wool fabrics. Removing or reducing these scales makes wool less likely to felt, which also makes it machine-washable and shrink-resistant.
2. **Why might wool shrink or lose its shape if washed in very hot water?**
Wool can shrink or lose its shape if washed in hot water because the heat causes the scales on the fibres to lock together, causing the wool to felt. This tightens the fibres and causes the fabric to shrink.
3. **How can the crimp in wool fibres help make fabrics more comfortable and functional?**
The crimp in wool fibres creates tiny pockets of air, which help insulate the body by trapping heat in cold weather. This same structure also allows the fabric to breathe and wick away moisture, making wool comfortable to wear in both hot and cold conditions.