

**YARNS**  
**&**  
**CLASSIFICATION**

# INTRODUCTION

**Yarn is “a generic term for a continuous strand of textile fibers, filaments, or material in a form suitable for knitting, weaving, or otherwise intertwining to form a textile fabric.**

Yarns play an important role in the fabric manufacturing process since a majority of the textile materials are constructed with yarns.

Yarns are also used for products such as sewing and embroidery thread, string, and rope. Yarns are produced in various sizes and textures, and also vary in other characteristics. Performance, end use, and fabric care are affected by these yarn characteristics.

Fibre length is used to broadly divide yarns into:

- **Spun yarns (made from short, staple fibres)**
- **Filament yarns (made from continuous filament fibres)**

Yarn processing methods for spun yarns are very different from those of filament yarns.

## Definition

## Explanation



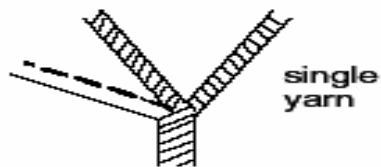
Single yarn

Spun yarn or  
Filament yarn



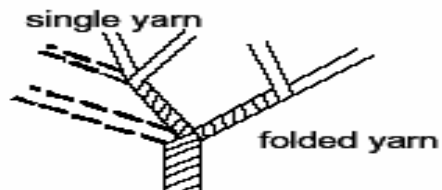
Multiple wound yarn

Two or more components  
no twisting operation  
similar or dissimilar components



Folded (plied yarn)

Two or more components  
one twisting operation  
similar or dissimilar components



Cabled yarn

Two or more components  
more than one twisting operation  
similar or dissimilar components

## Two important things in spinning of yarn that will later on affect the fineness and strength of the fabric woven.

- 1. Yarn twist** : Yarns (especially spun yarns) are twisted to hold the fibres together. The number of twists per unit length is used to measure twist. Yarn twist can be broadly divided by number of twists: none or very low, low, average, and high twist.

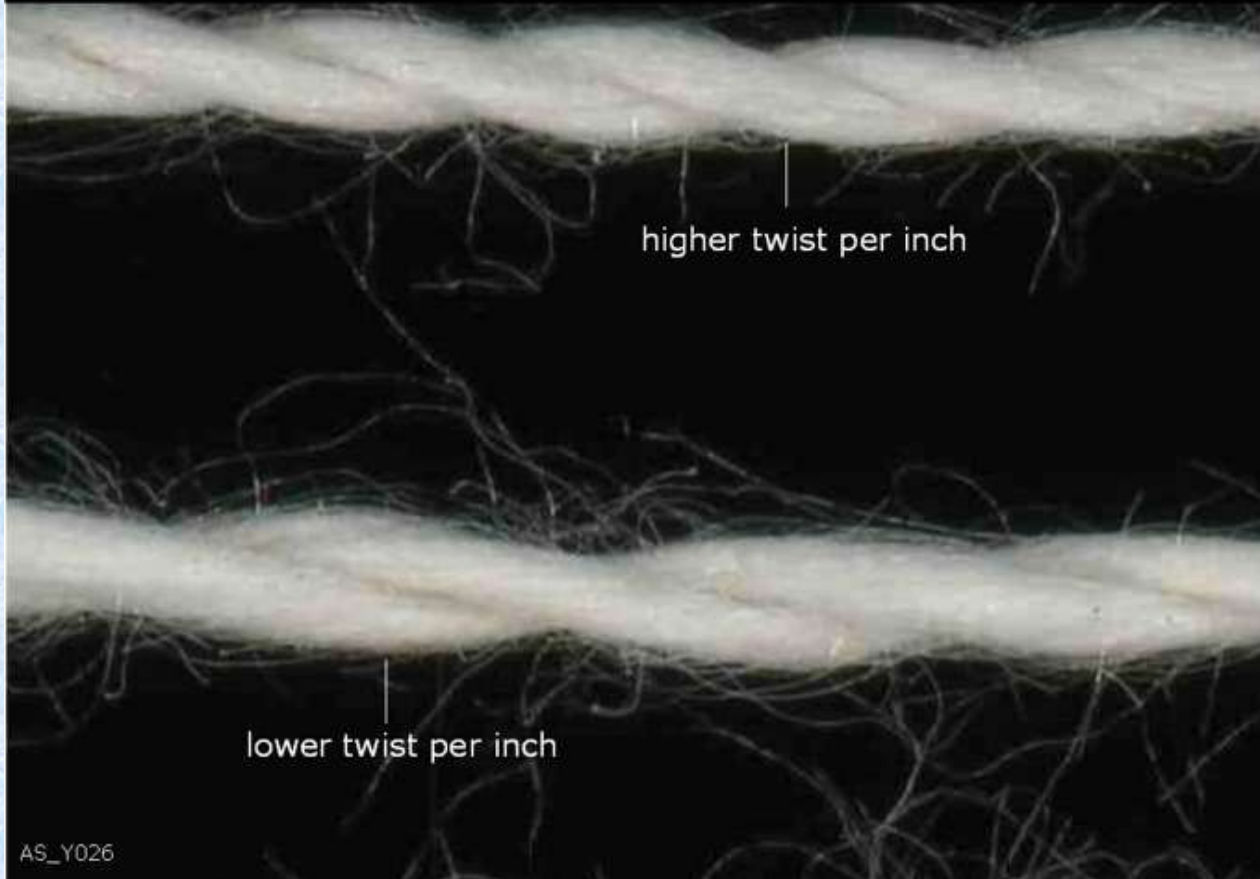
Some of the common uses for yarns with different twists are given below:

- Filament yarns used for smooth fabrics have no or very low twist.
- Yarns used for napping, bulky sweaters, and pile in towels have low twist.
- Most spun yarns used for woven fabrics have average twist.
- Crepe yarns used for plain and crepe weave fabrics have high twist.

**Yarn twist impacts the yarn's appearance, fineness, strength, and absorption.**

- To a point, the fineness and strength increase with an increase in twist, but excessive twist causes yarn strength to decrease.
- Absorption decreases with an increase in twist; however, in hydrophobic fibres even yarns with little or no twist may not have good absorption.
- In high twist yarns such as crepe, the twist increases the elasticity of the yarns, thus giving the fabric a lively suppleness.

## Two-ply Silk Yarns with Varying Twist Per Inch



## Ply Yarns

Z

← Z twist 3-ply  
silk yarn

S

S-twist 2-ply  
wool yarn

**DIRECTIONS OF TWIST :** Fibres can be twisted together in the clockwise or counter clockwise direction to form yarns. Yarns are twisted in the clockwise direction for "S" twist, and counter clockwise for "Z" twist. The "Z" twist is employed in a majority of the spun yarns used for fabric construction.

**2. YARN COUNT :** The yarn count, also called yarn number, of a yarn is the number of hanks of yarn needed to make up one pound of yarn. This is not to be confused with the number of yarns in an inch of fabric called thread count. In counting system, we count how many lengths, called a

hank, weigh one pound. Thus if there are 10 hanks of cotton yarn that weigh one pound, this is 10s yarn. Each of the hanks is 840 yards long, so the total length of the yarn is 8,400 yards. So, if its a coarser yarn it will take fewer hanks, and less length to make up a pound. On the other hand, the higher the number, the finer the yarn. It takes more of the finer yarns to make up one pound.

If the cotton count is 1, then  $840 \text{ yards} \times 1$  weighs one pound.

If the cotton count is 2, then  $840 \text{ yards} \times 2$  weighs one pound.

The length of a hank depends upon the spinning system:

**Cotton system: 1 hank = 840 yards**

Worsted system: 1 hank = 560 yards

Woolen cut system: 1 hank = 300 yards

Woolen run system: 1 hank = 1600 yards

# Types of Yarn

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graph TD; A[Types of Yarn] --> B[SPUN/STAPLE YARNS]; A --> C[FILAMENT YARNS];
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**SPUN/STAPLE YARNS**

**FILAMENT YARNS**



# SPUN OR STAPLE YARNS

Spun yarns are composed of short staple fibres, or long filament fibres that have been cut into short staple fibres. Spun yarns may contain fibres of the same type or a blend of different fibres. The spinning method used to manufacture the yarn affects properties such as uniformity and strength. Finer, smoother, better quality cotton yarns, known as combed cotton yarns, are produced by combing the fibres prior to spinning. A similar process is used to manufacture fine quality worsted wool yarns.

## Spun Yarn -

↳ Staple fibers twisted together to form a yarn



← This is one staple fiber

Note: Fiber ends protrude from spun yarns.

Inches

AS\_Y030

cm

# FILAMENT YARNS

Majority of the filament yarns are extruded yarns that are made of natural extruded fibres or manufactured fibres extruded through the spinneret. These yarns fibres can be broadly divided into:

1. Monofilament yarn is made from a single, relatively thicker filament fibre. Transparent sewing thread, metallic yarns, bare elastic, and fishing lines are examples of monofilament yarns. Silk is too fine to be used as a monofilament yarn.
2. Multifilament yarn is made from multiple filament fibres. Continuous filament fibre length requires little or no twisting to hold the multifilament yarn together.

Some filament yarns are produced by slitting or splitting yarns sheet or film of metallic-coated or polymer yarns. Some examples are:

Metallic-coated yarn is made by slitting a metallic foil laminated between plastic films.

Tape yarns is made by slitting or splitting polymer films. Olefin is the most commonly used fibre for tape yarns.

## Multifilament Yarn - Filament fibers held together with minimal twist

Note: Multifilament yarns are made of several **filament fibers** that are **many miles** in length. Thus, there are no fiber ends protruding from the multifilament yarn.

← This is one filament fiber

Inches

AS\_Y031

cm



## Filament and Spun Yarns with Different Characteristics

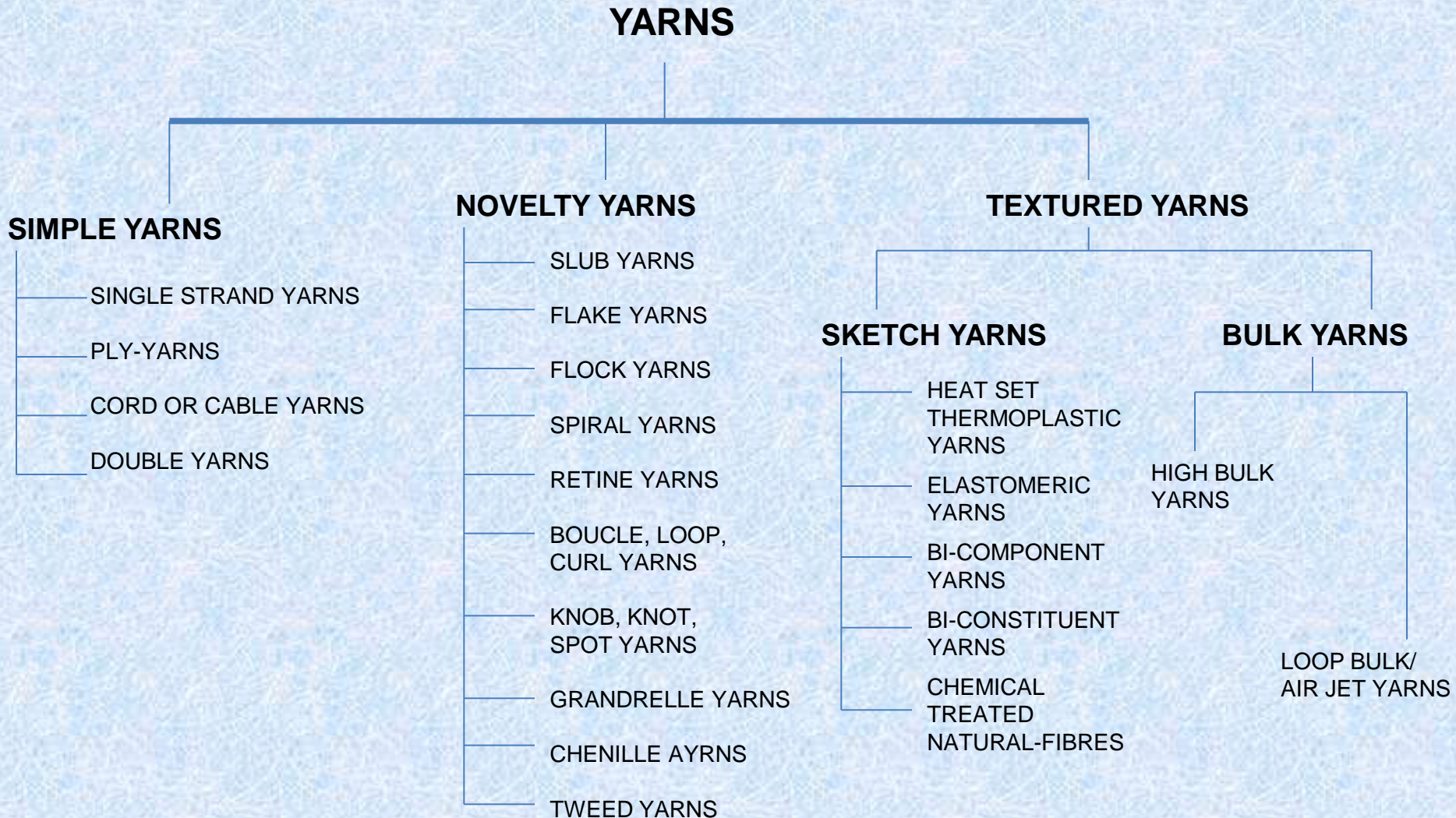
3-ply filament silk yarn  
no protruding fiber ends  
Z-twist

Z

2-ply spun wool yarn  
protruding fiber ends  
S-twist

S

# CLASSIFICATION OF YARNS



# SIMPLE YARNS

**Simple yarns** are characterized by uniform size and regular surface. They can be broadly divided into single, ply, cord, and rope yarns.

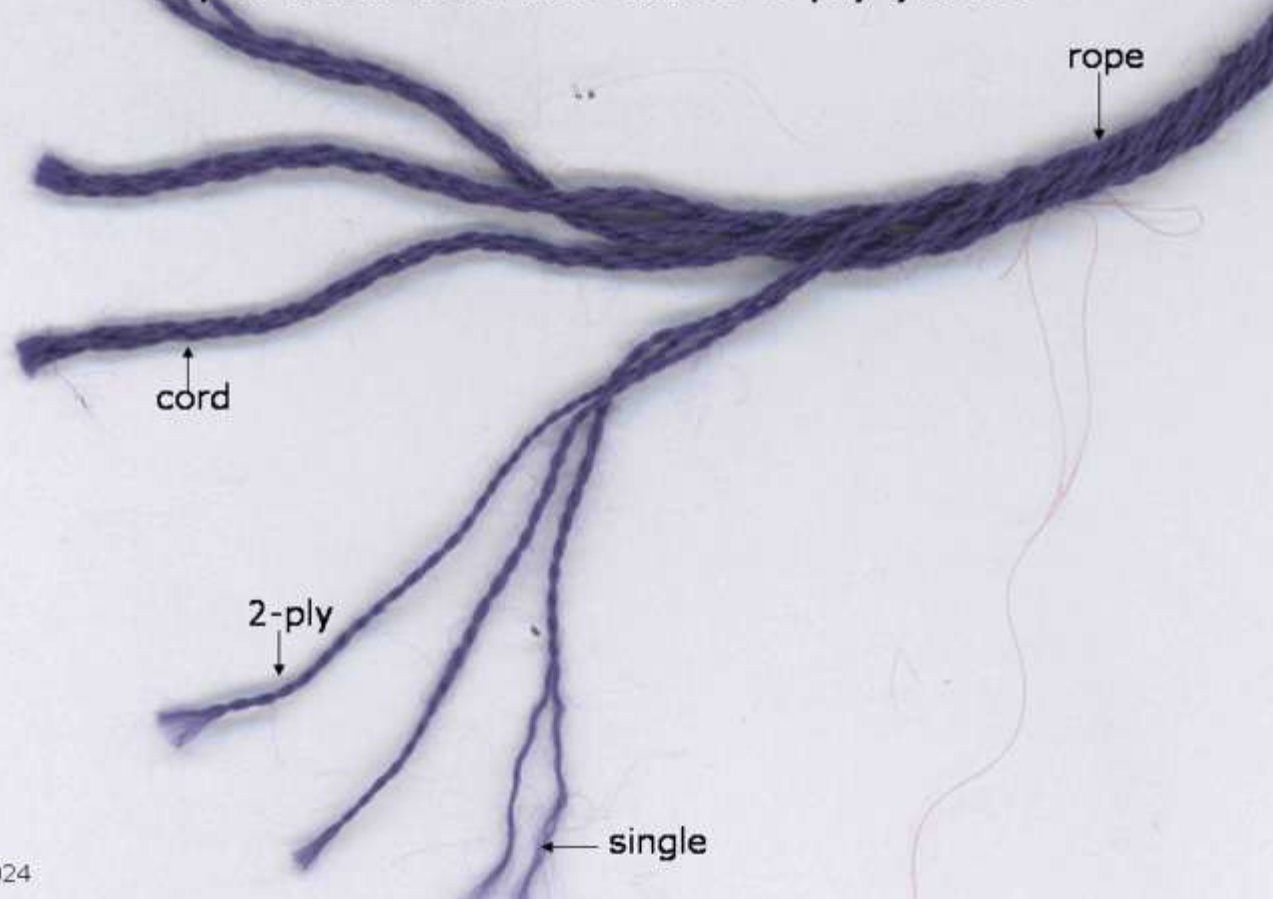
**1.Single yarn** is the simplest type of yarn. It is commonly produced by twisting together staple or filament fibres.

**2.Ply yarns** are produced by twisting two or more single yarns. Each strand of single yarn is referred to as a ply. Thus, four single yarns twisted together would form a four-ply yarn.

**3.Cord yarns** are produced by twisting two or more ply yarns.

**4.Rope yarns** are produced by twisting two or more cord yarns.

**Rope** - Four cord yarns are twisted together to form a rope. Each cord has three 2-ply yarns.



AS\_Y024



# NOVELTY YARNS

Novelty yarns, typically made of two or more strands, are produced to provide decorative surface effects.

Based on the purpose, each strand is referred to as base/core, effect, or binder.

- The base/core strand provides the structure and strength.
- The effect strand creates decorative detail such as knots and loops.
- The binder is used to tie the effect yarn to the base yarn if binding is necessary.

There is a wide variety of novelty yarns that are produced using different techniques and types of fibres and strands.

The terminology as well as the classification for novelty yarns varies considerably. Some of the commonly used novelty yarn categories are included in this section.

# TYPES OF NOVELTY YARNS

**Slub yarns** can be either single or ply yarns. These yarns are characterized by the soft bulky area that is spun at regular or irregular intervals.

**Flock/flake yarns** have small tufts of different colored fibres added at intervals. These tufts can be easily pulled out. Flock/flake yarns are generally single yarns.

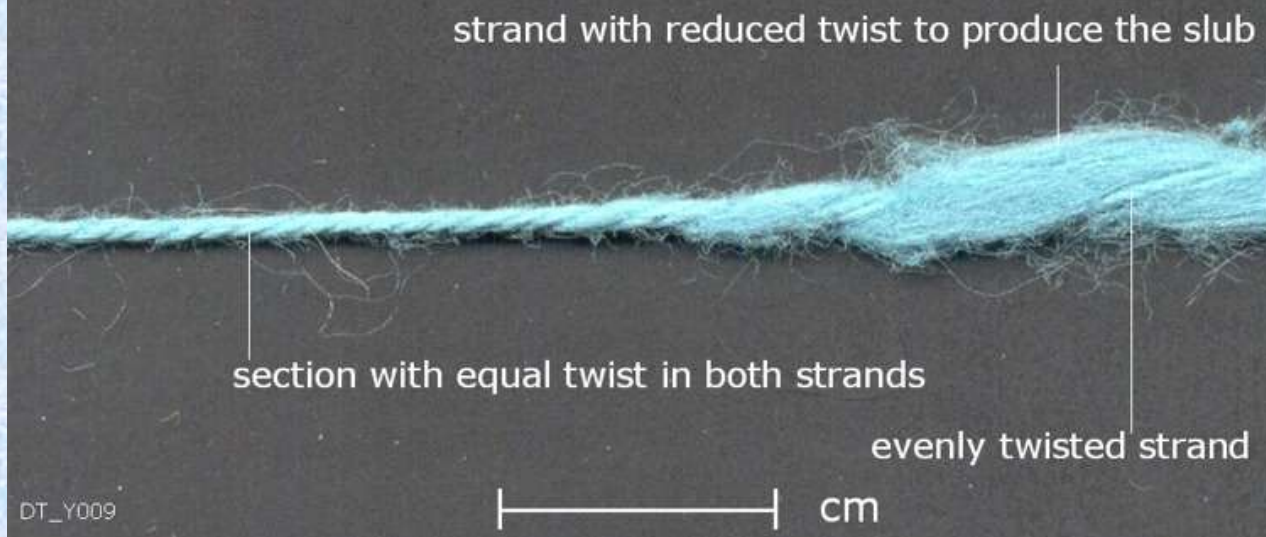
**Nub, knot, and spot yarns** are ply yarns in which the effect yarn is twisted around the base yarn to produce a thicker area or a bump.

**Bouclé and loop yarns** are ply yarns that use three sets of yarns – base or core yarn, effect yarn, and tie yarn. The effect yarn is looped around the base or core yarn and tied with a binder yarn.

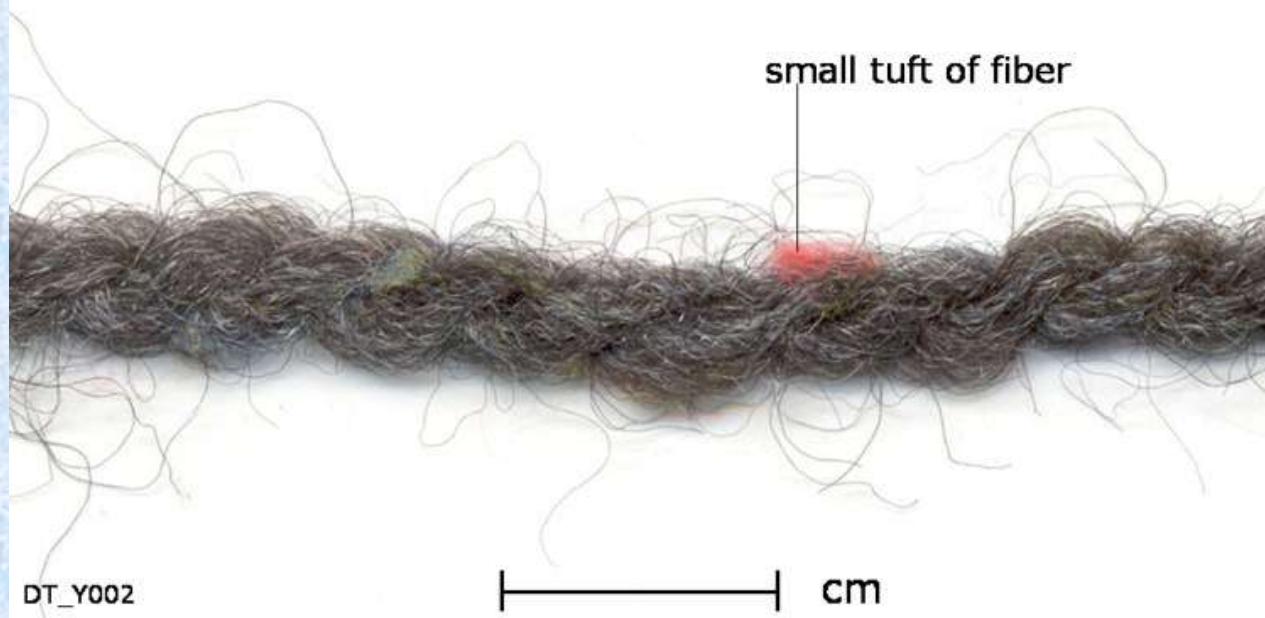
**Spiral and corkscrew yarns** are ply yarns in which one ply is soft and thick and the other is fine.

**Chenille yarns** are pile yarns that are often made by slitting leno weave fabrics into narrow strips in the warp direction.

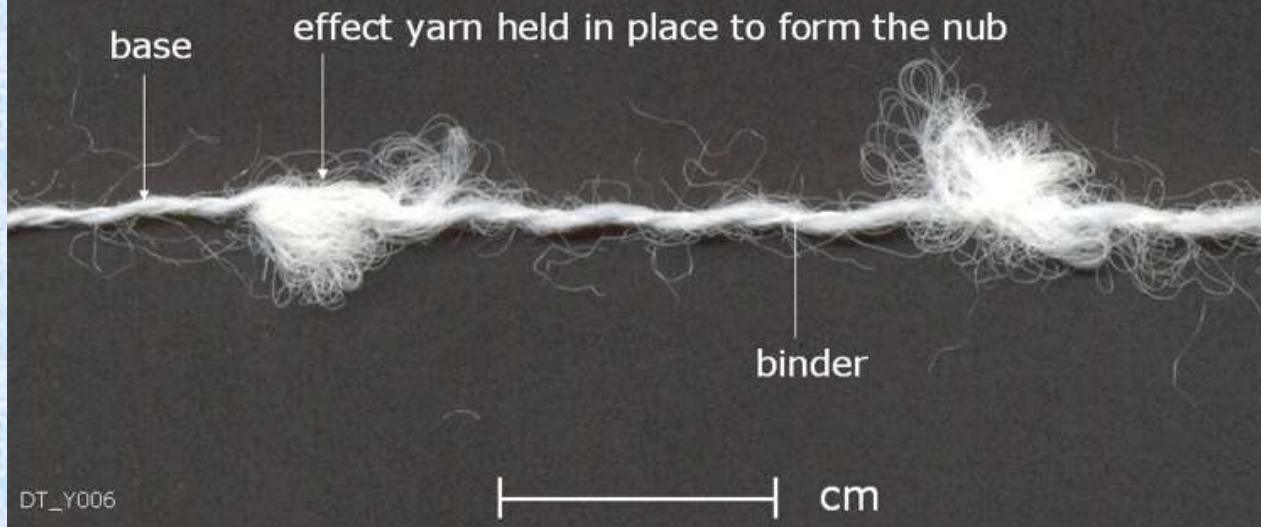
**Mercerized Cotton Two-Ply Slub Yarn –**  
Strand with sections of reduced twist forms the slub and  
the evenly twisted strand provides the strength.



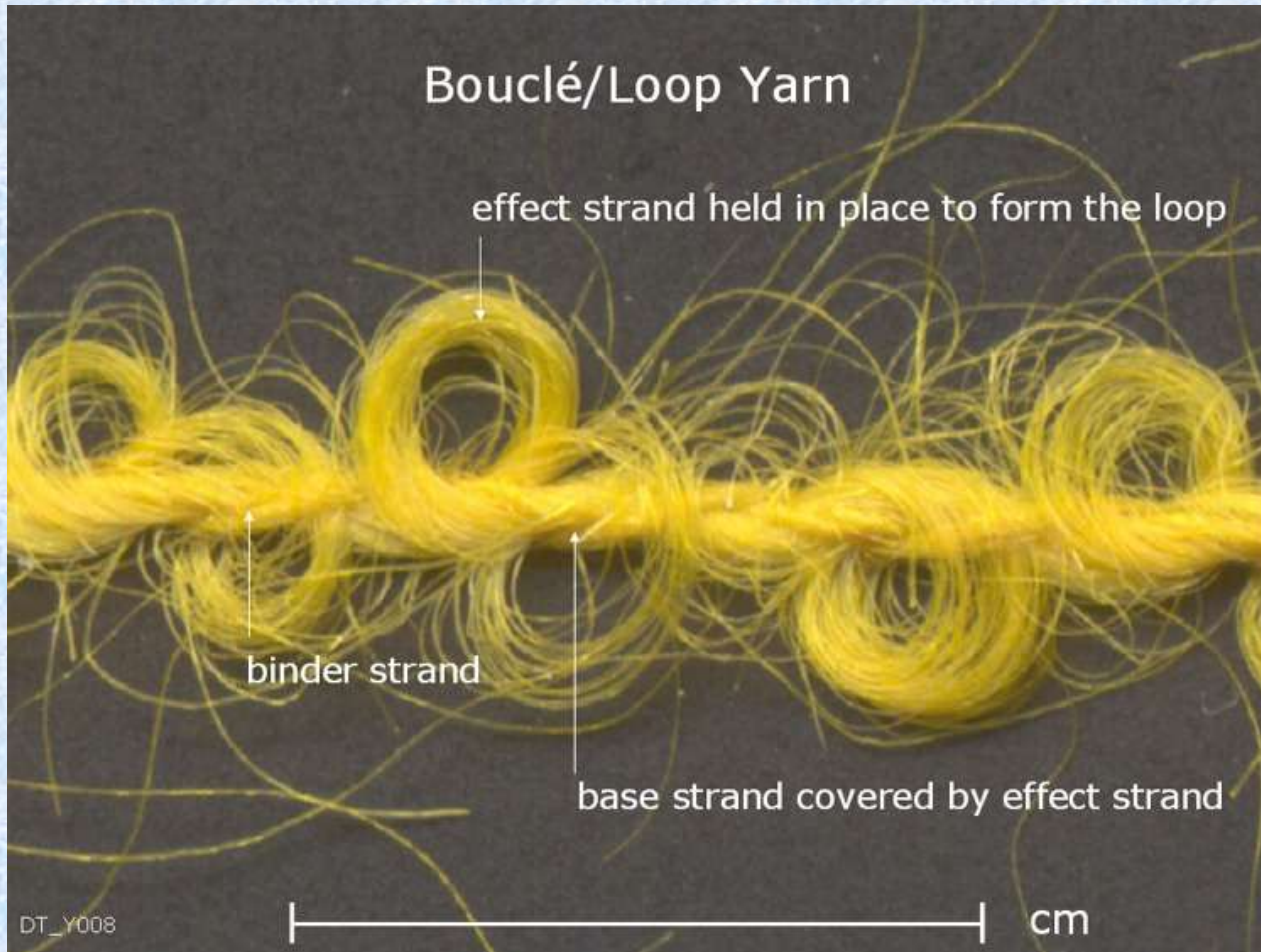
**Flock/Flake Yarn – Two-ply, tweed yarn with small tufts of fiber that are inserted when the yarn is twisted**



Nub/Knot/Spot Yarn – Binder yarn used to hold the effect yarn in place to form the raised segment



## Bouclé/Loop Yarn

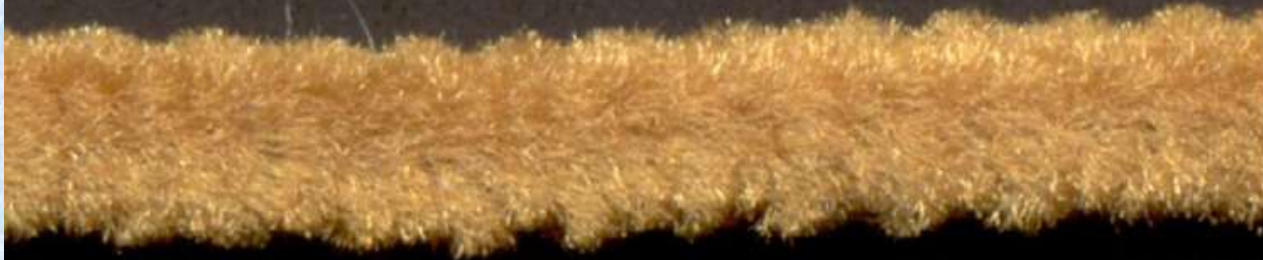


## Corkscrew Yarns



AS\_Y073

Chenille –  
Extra set of yarns form the pile



DT\_Y010





# TEXTURED YARNS AND TYPES

**Textured yarns** are made of fully drawn filament fibres with a changed surface, shape and texture developed by using the new spinning techniques. Nylon and polyester are two main fibres that are textured. Textured yarns provide many variations in fabric properties. There are two main types of textured yarns:

1. **Stretch yarns**
2. **Bulk yarns**

# STRETCH YARN & BULK YARN

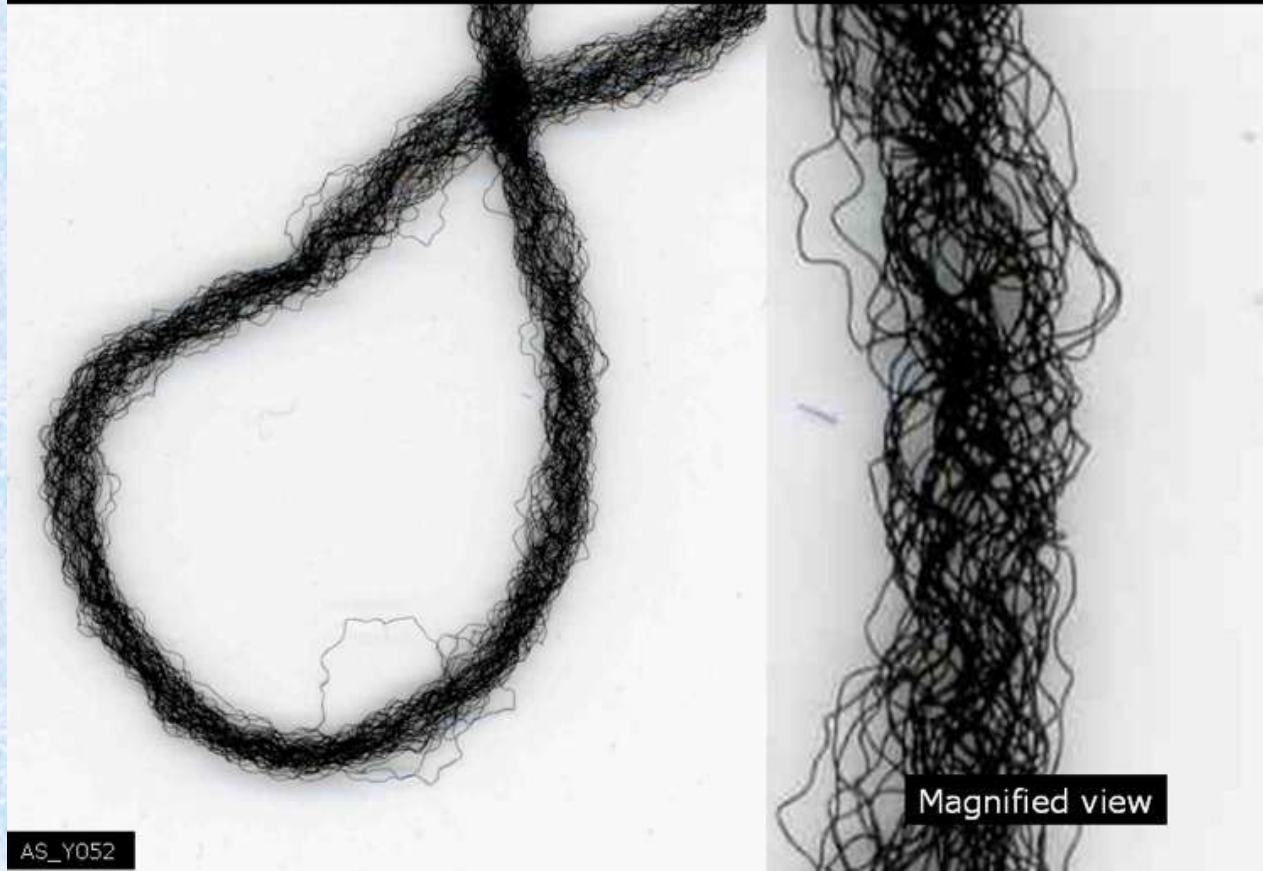
**Stretch yarn** can be made by using any of the following methods:

1. By using special heat setting treatment to thermoplastic filament fibres such as nylon and polyester.
2. From elastomeric fibres.
3. From bi-component fibres.
4. From bi-constituent fibres.
5. From chemically treated natural fibres.

**Bulk Yarns** are softer and much pliable than tightly constructed twisted yarns. Bulk yarns also have a better cover. They create a less transparent fabric and are of two types:

1. High bulk yarns
2. Loop-bulk or airjet yarns

## Nylon Multifilament Textured Yarn



## Bulked Multifilament Yarn

