

Denim Dyeing



Denim garments were first to become very popular during the **18th century** due to its **durability and the resistance to tearing**. Denim is a **rough, sturdy fabric** in which the **warp yarn is dyed**, and the **weft yarn remains undyed**. It is **generally 3/1 warp-faced twill fabric**. Denim is different from other cotton fabric due to having a **diagonal ribbing on its face side**.

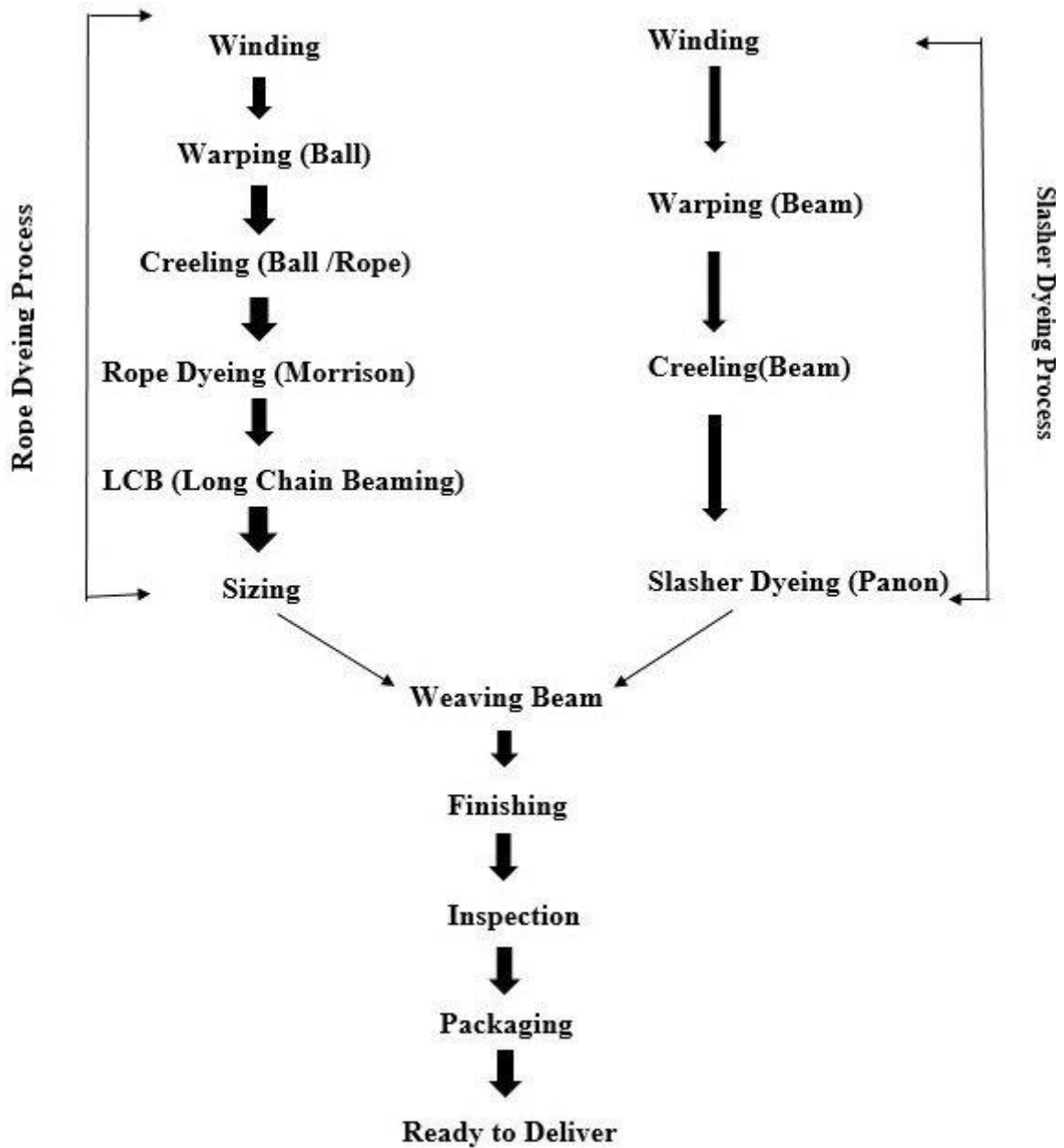
‘**Serge de Nimes**’ is a French word from which ‘**Denim**’ is **derived**. It refers to the **city of Nimes**.

Denim Dyeing Methods

Four denim dyeing methods with Indigo are available.

- ✓ **Rope/Ball warp/ Chain dyeing**
- ✓ **Slasher/ Open warp/ Sheet dyeing**
- ✓ **Loop dyeing**
- ✓ **Beam dyeing**

At least **95%** of world denim production is done by **rope and slasher dyeing**.



Flowchart of denim manufacturing process

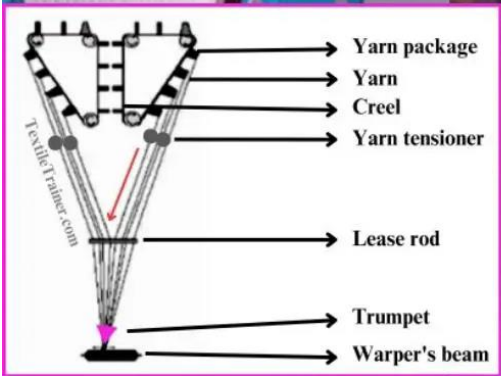
Rope Dyeing

It was first started **in USA at 1915**. It is a **superior dyeing** technology in which the warp yarns are **pre-treated and dyed** in rope form.

Rope Dyeing Process

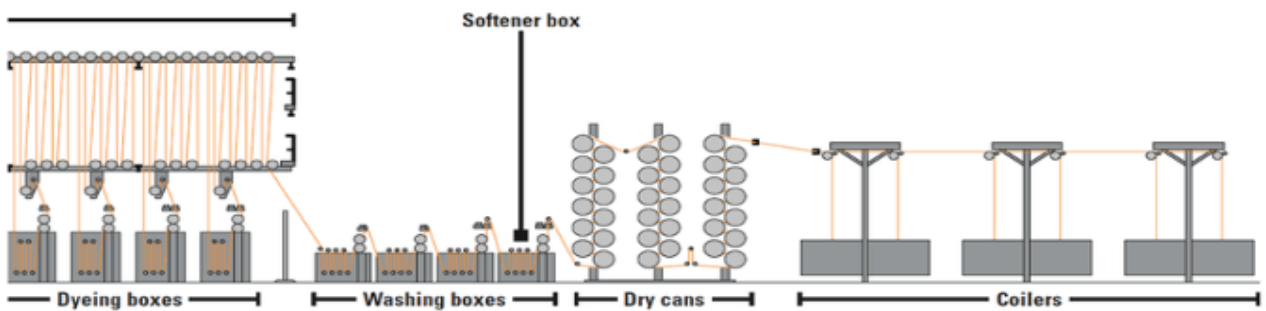
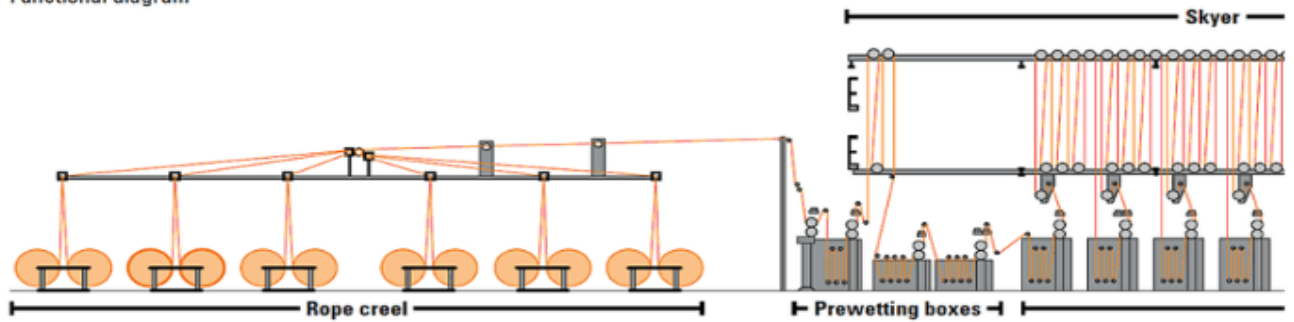
Rope dyeing/ Ball warping is a **rope-based process** that involves **winding yarn** into a **ball shape** to prepare it for **weaving and dyeing in denim production**.

Ball warping M/C



Rope range

Functional diagram



Schematic diagrams of rope dyeing

Advantages of Rope Dyeing

- ✓ No cross-shade variation
- ✓ Wastage of thread is low
- ✓ Productivity is high and flexible production
- ✓ Less reducing agent consumption
- ✓ No time loss during lot change
- ✓ Versatility in denim production

Disadvantages of Rope Dyeing

- ✓ A lot of space is required
- ✓ Immersion time and oxidation time is comparatively higher
- ✓ An additional step of opening ropes after dyeing is necessary
- ✓ Less flexibility in changing color
- ✓ The production cost is high

Slasher Dyeing

This **continuous process** was first introduced in **1970**. The warp yarns are **pre-treated and dyed** in the form of a **yarn sheet**. This is **multi-dip, multi-nip, and multi-airing indigo dyeing**.

Advantages of Slasher Dyeing

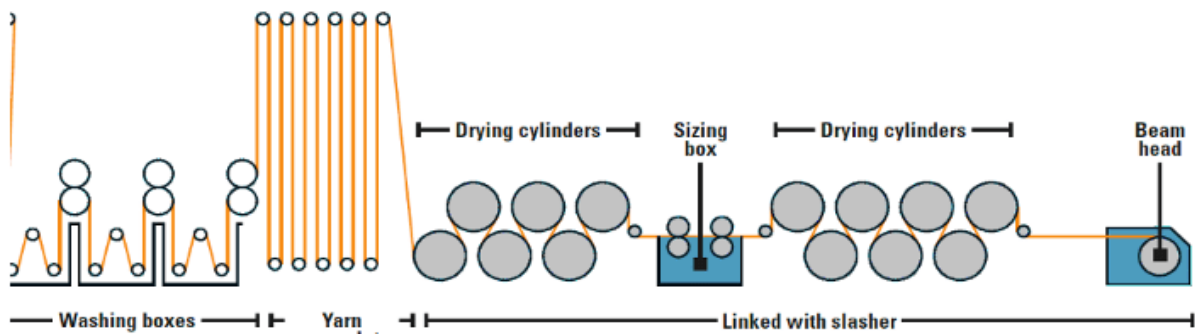
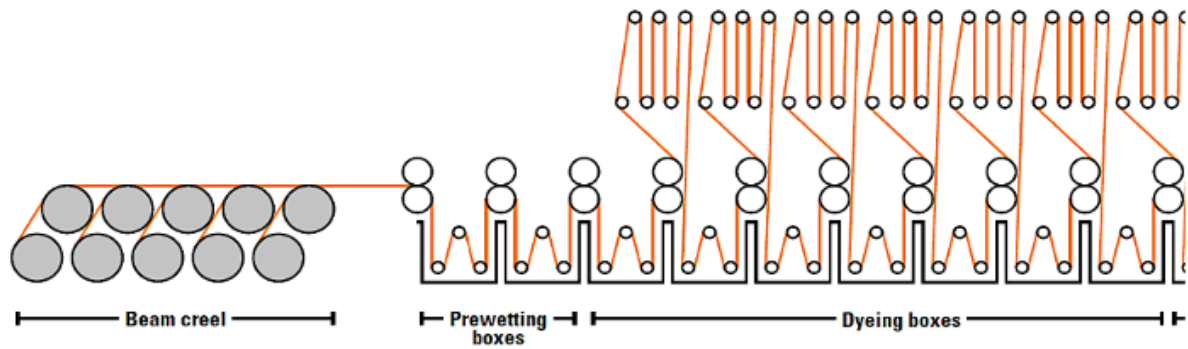
- ✓ Less space is required due to compact design
- ✓ Oxidation and immersion times are less
- ✓ Continuous process
- ✓ Flexibility in changing color
- ✓ Production cost is low

Disadvantages of Slasher Dyeing

- ✓ Possibility of cross-shade variation
- ✓ Possibility of yarn rupture
- ✓ Productivity and flexibility in production are low
- ✓ Extra time needed for lot change
- ✓ No versatility in denim production
- ✓ Reducing agent consumption is high

Sheetdyeing, slasher-dyeing

Functional diagram



Is denim a jean?

Denim is made of **100% cotton** and **twill structure**, whereas jeans are **one type of garment** which is made of denim fabric. Denim can be defined as **either pants, jackets, skirts, or shorts**. On the other hand, jeans are specially **defined as pants**.