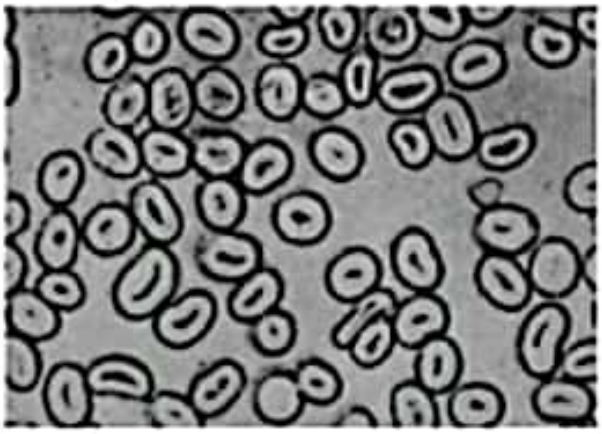
Mercerizing Definition :

It is a treatment for cotton articles and/or natural fibres composed by cellulose in a concentrated solution of caustic soda (300 g/l), under tension and ambient temperature.

Objective:

Fibre swelling and simultaneously there is a longitudinal shrinkage, modifying the morphological structure of the fibre and achieving a shinier surface, resistant to wear and washing.



Mercerised cotton

Not mercerised cotton

Mercerization are Two Types:

1) **Tension Mercerization**

- The purpose of mercerization is to increase luster of Cotton fibers
- The fiber untwists and swells, lumen becomes rounder in cross-section and it gains luster. Dye affinity and chemical reactivity increase. Fabric becomes stronger and smoother.

2) **Slack Mercerization**

- Not as lustrous as tension method
- Elongation and recovery properties improve and thus have been used to produce comfort stretch garments and fabric bandages, which need to conform to body shapes.

Mercerization is possible

- on greige goods
- after desizing
- after desizing and scouring
- after bleaching
- after dyeing.

1. Larger dyeing affinity
2. Larger dimensional stability of the articles
3. Increasing of the lustre
4. Increasing of the tensile strength
5. Better covering of dead and/or mossy cotton
6. Improving to the touch

Effects of the chain mercerization of cotton fabric

Property	Effect
Fabric lustre	Increased
Dye uptake	Increased
Dye consumption	Economy of 30–50%
Fibre strength	Increased
Standard regain	Increased from 6 to 10%
Fibre cross-section	Increased and rounder

1. Improve Luster.
2. Increase ability to absorb dye.
3. Improve reaction with a verity of chemicals.
4. Improve stability of form.
5. Improve strength/elongation.
6. Improve smoothness.
7. It has been shown that the increase in the luster occurs because of an effect.
8. The cotton fiber do convoluted.
9. The cross-sectional shape changes.

In mercerizing followings are important:

1. Twaddle
2. Temperature
3. Tension
4. Time

(1) Twaddle (Concentration of NaOH):

If the concentration of NaOH is increased above 56oTw improvement in luster will be attained but if it is decrease below 48o Tw. The quality of luster will begin to be adversely affected.

(2) Temperature:

High degree of luster is attained at temperature 18-20oC. As the temperature is increased the quality of luster is adversely affected but on lowering the temperature no improvement in the luster is obtained.

(3) Tension:

For acquiring better luster the material must be stretch to its original dimension (both in warp and weft direction during mercerization). If the material is allowed to shrink during mercerizing then quality of luster will be impaired on the other hand if the material is stretched more no improvement in luster is achieved.

(4) Time:

The optimum time for mercerizing is 30-60 seconds by increasing the duration of time no applicable improvement in the quality of mercerization can be achieved but if the time limit is less than 30 seconds in the quality of mercerization will be improved.

- To improve the lusture
- To improve the strength
- To improve the dye uptake and moisture regain.

The mercerizing involves these three subsequent steps,

1. Impregnation of the material in in relaxed state,cold caustic solution of required strength and wettability..

2. Stretching while the material is still impregnated in the caustic solution.

3. Washing off the caustic soda from the material while keeping the material still in the stretch state.

3. Caustic tray movement
4. Pre tensioning
5. Free shrinkage
6. Lye tensioning
7. Squeezing
8. Washing tray movement
9. First wash and tensioning
10. Second wash
11. Third wash
12. Final wash

In general following process control tests are carried out in yarn mercerizing ,

1. The circumference of the hank
2. The machines settings for shrinkage and stretching and actually achieved values
3. Concentration of the lye and level of contaminants such as carbonate content, bicarbonate content etc.
4. Temperature of caustic
5. Timings of different steps
6. Washing sequence, timings and temperature,
7. Shrinkage % or wetting power of caustic
8. Residual caustic content of the mercerized material.

1. Generally non crysilic type of wetting agents are used in mercerizing,
2. which Gives uniform wetting and better penetration of caustic liquor of mercerizing and causticising strength. ,
3. Improves luster and strength of mercerized cotton.
4. Does not interfere during caustic recovery.
5. Effective over a wide range of temperature.
6. Non-foaming.
7. And odor free