



Raw Cotton Testing

The word "cotton" as we know it today originates from the Arabic word "qutun". In Middle Dutch it was also known as "cotton" and with the development of Africans as a spoken language it became "catoen" and later "katoen".

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(We at "Ragini International" have tried our best to provide all the necessary information absolutely truth from the best of our knowledge. Even though if there is any mistake, we are keen to hear suggestions.)

For Ragini International

(Authorised Signatory)

1.0 Cotton Fibre

There are a number of fiber properties, which can influence the quality of the yarn. A textile fiber is a peculiar object. Fiber properties vary very much within the lot. Optimal conditions can be obtained only through the mastery of the raw material. Therefore fiber testing is very very important.

2.0 Cotton and Yarn Quality Co-Relation

Essential Characteristics of cotton quality and characteristics of Yarn quality of Yarn are given from detailed experimental investigations. Some of the important conclusions that help to find co-relation between Yarn quality and Cotton quality are given below

STAPLE LENGTH: If the length of fiber is longer, it can be spun into finer counts of Yarn, which can fetch higher prices. It also gives stronger Yarn.

STRENGTH: Stronger fibers give stronger Yarns. Further, processing speeds can be higher so that higher productivity can be achieved with less end-breakages.

FIBER FINENESS: Finer Fibers produce finer count of Yarn and it also helps to produce stronger Yarns.

FIBER MATURITY: Mature fibers give better evenness of Yarn. There will be less end - breakages. Better dyes' absorbency is additional benefit.

UNIFORMITY RATIO: If the ratio is higher. Yarn is more even and there is reduced end-breakages.

ELONGATION: A better value of elongation will help to reduce end-breakages in spinning and hence higher productivity with low wastage of raw material.

NON-LINT CONTENT: Low percentage of Trash will reduce the process waste in Blow Room and cards. There will be less chances of Yarn defects.

SUGAR CONTENT: Higher Sugar Content will create stickiness of fiber and create processing problem of licking in the machines.

MOISTURE CONTENT: If Moisture Content is more than standard value of 8.5%, there will be more invisible loss. If moisture is less than 8.5%, then there will be tendency for brittleness of fiber resulting in frequent Yarn breakages.

FEEL: If the feel of the Cotton is smooth, it will be producing more smooth yarn, which has potential for weaving better fabric.

CLASS: Cotton having better grade in classing will produce less process waste and Yarn will have better appearance.

GREY VALUE: Rd. of calorimeter is higher it means it can reflect light better and Yarn will give better appearance.

YELLOWNESS: When value of yellowness is more, the grade becomes lower and lower grades produce weaker & inferior yarns.

NEPPINESS: Neppiness may be due to entanglement of fibers in ginning process or immature fibers. Entangled fibers can be sorted out by careful processing But, Neps due to immature fiber will stay on in the end product and cause the level of Yarn defects to go higher.

An analysis can be made of Yarn properties that can be directly attributed to cotton quality.

YARN COUNT: Higher Count of Yarn can be produced by longer, finer and stronger fibers.

C.V. of COUNT: Higher Fiber Uniformity and lower level of short fiber percentage will be beneficial to keep C.V.(Co-efficient of Variation) at lowest.

TENSILE STRENGTH: This is directly related to fiber strength. Longer Length of fiber will also help to produce stronger yarns.

C.V. OF STRENGTH: is directly related CV of fiber strength.

ELONGATION: Yarn elongation will be beneficial for weaving efficiently. Fiber with better elongation has positive co-relation with Yarn elongation.

C.V. OF ELONGATION: C.V. of Yarn Elongation can be low when C.V. of fiber elongation is also low.

MARS VARIATION: This property directly related to fiber maturity and fiber uniformity.

HAIRINESS: is due to faster processing speeds and high level of very short fibers,

DYEING QUALITY: will depend on Evenness of Yarn and marketing of cotton fibers.

BRIGHTNESS: Yarn will give brighter appearance if cotton grade is higher.

3.0 Cotton Quality Specifications

3.1 Staple Length

The most important fiber quality is Fiber Length

Staple classification	Length mm	Length inches	Spinning Count
Short	Less than 24	15/16 –1	Coarse Below 20
Medium	24- 28	1.1/132-1.3/32	Medium Count 20s-34s
Long	28 –34	1.3/32 -1.3/8	Fine Count 34s - 60s
Extra Long	34- 40	1.3/8 -1.9/16	Superfine Count 80s - 140s

Notes

- Spinning Count does not depend on staple length only. It also depends on fineness and processing machinery.
- Length is measured by hand stapling or Fibro graph for 2.5% Span Length
- 2.5%SL (Spun Length) means at least 2.5% of total fibers have length exceeding this value.
- 50% SL means at least 50% of total fibers have length exceeding this value.

3.2 Uniformity Ratio

Length Uniformity is Calculated by $50SL \times 100 / 2.5 SL$

Significance of UR (Uniformity Ratio) is given below:

UR% Classification

50-55	Very Good	45-50	Good	40-45	Satisfactory
35-40	Poor Below	30	Unusable		

3.3 Fiber Strength

Fiber Strength, next important quality is tested using Pressley instrument and the value is given in Thousands of Pounds per Square inch. (1000 psi) For better accuracy, Stelometer is used and results are given in grams / Tex.

Lately, strength is measured in HVI (High Value Instrument) and result is given in terms of grams/Tex.

Interpretation of Strength value is given below

G/Tex	Classification
Below 23	Weak
24-25	Medium
26-28	Average
29-30	Strong
Above 31	Very Strong

Strength is essential for stronger yarns and higher processing speeds.

- Fiber Fineness Fiber Fineness and maturity are tested in a conjunction using Micronaire Instrument.
- Finer Fibers give stronger yarns but amenable for more Neppiness of Yarn due to lower maturity.
- Micronaire values vary from 2.6 to 7.5 in various varieties.

3.4 Micronaire for Fineness and Maturity

Usually Micronaire value is referred to evaluate fineness of Cotton and its suitability for spinning particular count of Yarn.

3.5 Cotton Grade

Evaluating colours, leaf and ginning preparation determine Cotton grade. Higher-grade cottons provide better yarn appearance and reduced process waste.

4.0 Influences

Quality Evaluation	Characteristics Co-Relation to Yarn
1. Staple Length	Spinning Potential
2. Fiber Strength	Yarn strength, less Breakages
3. Fineness	Finer Spinning Potential
4. Maturity	Yarn Strength and even ness, better dyeing
5. Non-Lint. content (Trash)	Reduced Waste
6, Uniformity Ratio	Better productivity and Evenness
7. Elongation	Less end Breakages
8. Friction	Cohesiveness
9. Class	Yarn Appearance
10. Stickiness	Spinning problem by lapping & Dyeing quality
11. Grey Value	Yarn luster
12. Yellowness	Yarn Appearance
13. Neppiness	Yarn Neppiness
14. Moisture Content	8.5% moisture content optimum for spinning at 65%

5.0 Fiber Quality Testing Equipments

Instrument	Measurements
Fibro graph	Length
Pressley Apertures	Fiber Bundle Strength
HV I Instrument	Length, Strength, Uniformity, Colour, Elongation, Micronaire & Trash
Stelometer Instrument	Strength, Elongation
Micronaire	Combined test of fineness & maturity
Shirley Trash Analyzer	Trash Content
Manual Test	Class & staple length
Moisture Meter	Moisture
Colorimeter	Grey value & yellow ness. Brightness
Polarized light Microscope or Casricaire test	Maturity
Photographic film	Neppiness