



Fabric Inspection Using Four-Point System



How to draw the samples?

If there are 10 rolls and each one is a different type of fabric or a different design, all the rolls have to be checked. However, in most cases there are several identical rolls, and statistical sampling helps us reduce the amount of work.

But most of the times clients impose their own methods: for example “take 10% of the rolls at random”, or “check the square root of the total number of rolls”. All are usually workable.

Selection of Rolls:

At least one roll of each color / quality is selected. If more than one roll per color / quality must be inspected, then the number of additional rolls in proportion to the total rolls per color / quality is inspected.

What can be checked?

The number of presented rolls, and the length & width of each inspected roll, is verified. Some tolerance is necessary because the factory’s machine (see above image) is often imprecise.

Usually the client sends some fabric swatches for reference. It is great to check the conformity of production. Lastly, packing and labeling.



Inspection:

Using 4-Point System or any other agreed upon system as defined by the customer, inspection is carried out on a fabric inspection machine.

Defect Classification Using Four-Point System:

Size of Defect	Penalty
3 inches or less	1 Point
Over 3, but not over 6 inches	2 Points
Over 6, but not over 9 inches	3 Points
Over 9 inches	4 Points

- A maximum of four points is charged to one linear yard
- The length of the defect is used to determine the penalty point.
- No more than four penalty points may be given for any single defect.

General Inspection Procedures

- 1. Fabric inspection is done in suitable and safe environment with enough ventilation and proper lighting.
- 2. Fabric passing through the frame must be between 45-60 degree angles to inspector and must be done on appropriate Cool White light 2 F96 fluorescent bulbs above viewing area. Back light can be used as and when needed.
- 3. Fabric speed on inspection machine must not be more than 15 yards per minute.
- 5. Standard approved bulk dye lot standards for all approved lots must be available prior to inspection (if possible)
- 6. Approved standard of bulk dye lot must be available before starting inspection for assessing color, construction, finish and visual appearance.



- 7. Shade continuity within a roll by checking shade variation between centre and selvage and the beginning, middle and end of each roll must be evaluated and documented.
-
- 8. Textiles like knits must be evaluated for weight against standard approved weight.
-
- 9. Fabric width must be checked from selvage to selvage against standard.
-
- 10. All defects must be flagged during inspection
-
- 11. The length of each roll inspected must be compared to length as mentioned on supplier ticketed tag and any deviation must be documented and reported to mill for additional replacement to avoid shortage.
-
- 12. If yarn dyed or printed fabrics are being inspected the repeat measurement must be done from beginning, middle and end of selected rolls.

No penalty points are recorded or assigned for minor defects. Only major defects are considered.

A major defect is any defect that, if found in a finished fabric /garment, would classify that fabric / garment as a second- rated.

- Major woven fabric defects are
 - slubs, hole, missing yarn, conspicuous yarn variation, end out, soiled yarn, wrong yarn.
- Major knitted fabric defects are
 - mixed yarn, yarn variation, runner, needle line, barre, slub, hole, and press off.
- Major dye or printing defects are
 - out of register, dye spots, machine stop, color out, color smear, or shading.
- The Quality Inspector may include any other defect which he feels are of a major category and may forward such defect details to the customer for feed back as and when required.



Minimum acceptable width

This width is excluding selvedge. Fabric width will be checked minimum of three times during the inspection of a piece (beginning, middle and end of a piece). Pieces having a width of measurement of less than the specified purchased width shall be graded as second quality.

Defects Rules:

- o A continuous of defect shall be assigned four points for each linear meter or yard in which it occurs.
- o
- o Any piece having a running defect through more than three continuous linear meters or yards shall be rejected. Regardless of point count.
- o
- o Any piece with a full width defect over six inches in length shall be rejected.
- o
- o Any piece that contains more than three full width defects per one hundred linear meters or yards shall rejected.
- o
- o No piece shall be accepted that contains a full width defect in the first and last three meters or yards.
- o
- o A hole or torn is considered to be a major defect and shall be penalized four points.
- o
- o Fabric construction and weight, No tolerance will be allowed.
- o
- o The distance between major defects should be more than 20 meters.
- o
- o All major and full width defects should be seemed a polyester thread at the selvedge.
- o
- o Waviness, tightness, ripples, puckering in body of fabric which would prevent the fabric from lying flat when spread in a conventional manner is not acceptable.



Following defects will be penalized penalty points as per rules;

- Kinks, Knots, slub, contamination, spot, and half/double pick, cockled yarn, coarse pick. Heavy weft bar below 6" in length, set mark, rapping, broken pick, out mark, holes & float up to ¼ "

Following defects are cuttable and will be rejected:

- o Frequent kinks, knots, slub, contamination, spots etc
- o Any continuous defect
- o More than one meters broken end, double end, wrong draw reed mark
- o Holes torn and float above ¼ "
- o Irregular selvedge, light weft bar, count variation, Lecco, shade variation
- o Heavy weft bar above 6: in length

The most commonly used system is the American 4 point system.

The [ASTM D5430 standard](#) explains how to assign points to each defect-mostly based on its size.

The overall result consists of two numbers (and they are all most buyers want to know regarding defects):

- The average number of points (on a 100 meters basis) of all inspected rolls,
- The proportion of rolls above acceptance limit.

How can we measure points on a 100 meters basis?

Maximum Acceptable Points = 20 points per 100 sq. yards

OR

- 22 points per 100 sq. meters.



Calculations:

- $\text{Points} / 100 \text{ sq. yard} = \frac{3600 \times \text{Total points assigned}}{\text{Fabric Length in yards} \times \text{Fabric Width in inches}}$

- $\text{Points} / 100 \text{ sq. mtrs.} = \frac{100.000 \times \text{Total points assigned}}{\text{Fabric Length in mtrs} \times \text{Fabric Width in mm}}$

For example-

- Total Linear points = 13
- Total Length of the roll = 31 meters
- Width of the roll = 166 cm = 1.66 meters

Area = Length x Width

Area = 51.46 m²

51.46 m² has total linear points = 13

1 m² has total linear points = 13/51.46

Points per 100 m² = (13/51.46) x 100 = 25.26 points / m²

Results: Unsatisfactory Roll