

**TECHNICAL SPECIFICATIONS – WASHING FOR ANALYSES OF
DIMENSIONAL ALTERATION AND COLOR TRANSFER
(PLAIN FABRIC AND KNITTED)**

1. CONCEPT

1.1. Dimensional Alteration

It is the variation in length or width suffered by the test frame after going through the washing process. It may be positive (increase in the specified dimension) or negative (decrease in the specified dimension).

1.2. Color transference

It is the color migration after the washing of a colored fabric to the sample.

1.3. Fabric load

It refers to the fabric used to complete the weight established by the manufacturer of the washing machine in a normal washing process.

1.4. Sample:

It refers to the fabric being sewn together with the fabric to be tested, to assess the color transfer. 2 (two) units are always used, at wit: One in 100% white cotton and the other in the same composition of the fabric to be tested, all must be cut in 7x10 dimensions.

2. MATERIAL RESOURCES

The following are necessary for the execution of the process:

- Domestic washing machine;
- Cloth washing tank;
- Drier type "Enxuta";
- Clothesline;
- Soap Powder "Omo Multiação";
- Tape Measure;
- Iron;
- Load fabric patches of cloth of 50x50 cm pieces of 50x50 cm in white poplin, overlooked on the whole contour.

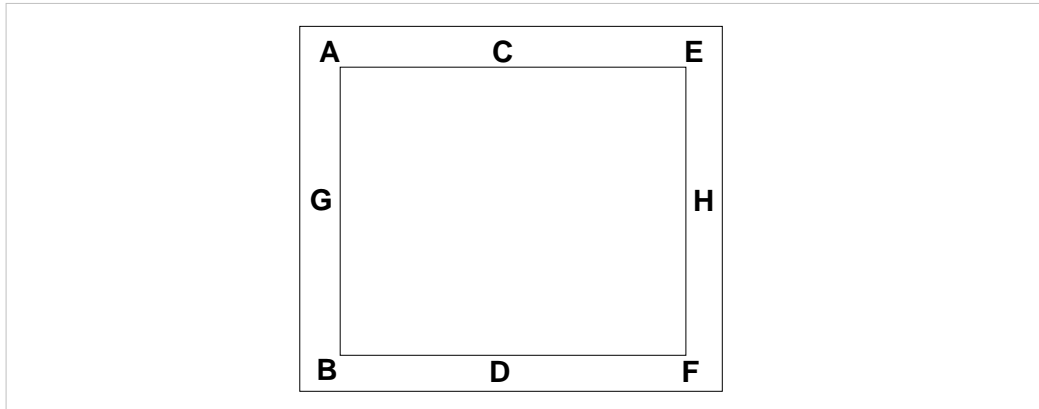
3. TEST FRAME PREPARATION

FOR DIMENSIONAL ALTERATION TEST

- To cut three (3) TESTING CLOTHS from the piece of fabric in the dimensions 50x50 cm,
- In the center of this square, draw another square with indelible pen (which cannot be deleted) in the dimensions 40x40 cm;
- Make the markings as the following drawing:

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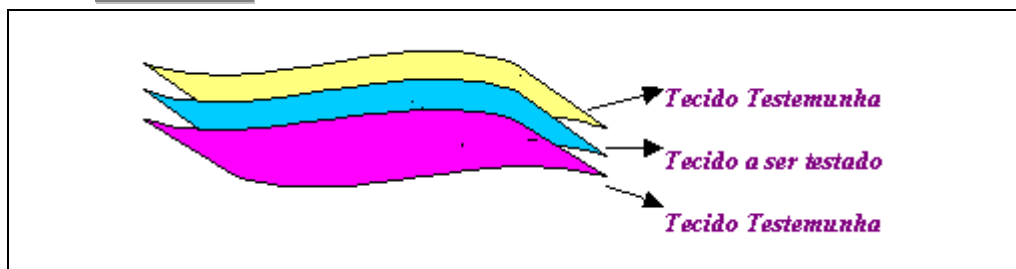
PICTURE 1 DRAWING FOR DIMENSIONAL ALTERATIONS TEST



FOR COLOR TRANSFERENCE TEST

- To cut three (3) rectangles of the fabric to be tested in dimensions 7x10 cm;
- To cut three (3) rectangles of testimony fabric 100% cotton, in white color;
- To cut three (3) rectangles of testimony fabric with the same composition of the fabric to be tested, in white color;
- To prepare • "sandwiches", using one of each fabric above mentioned, always positioning the fabric to be tested between the testimony fabric, as shown in Picture 2;
- To sew the sides and prepare three (3)
- .

FIGURA 1 PICTURE 4 TESTING CLOTHS FOR COLOR TRANSFERENCE TEST



4. VERIFICATION BEFORE THE WASHING

With the test frame extended on a smooth and flat surface, make the primary measurements, using the measurement tape, as described below:

NOTE: To verify if the fabric does not present or any stains or irregularities in the dye before the washing.

- Length: _____
A0B0, C0D0, E0F0: 3 (Three) measures in the length direction.
- Width: _____
A0E0, G0H0, B0F0: 3 (Three) measures in the width direction.

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5. WASHING, DRYING AND IRONING PROCEDURES

The washing process (hand or washing machine) indicated in the piece tag legal instructions must be used.

WASHING IN THE WASHING MACHINE

- Adjustments of the Machine:
 - Quantity of powder detergent:: 50 g (equivalent to 1 small coffee glass);
 - Short cycle;
 - Medium level.
- With the washing machine empty, put the amount of powder detergent into the compartment indicated in the machine, close the compartment and close the lid of the machine, turn the machine on in medium level.
- To weight the total quantity of testing cloths to be washed. If a weight of 2.5 kg is not reached, complete this value with *load fabric*.
- After the machine has reached the water level desired, put the pieces already measured and the load fabric if needed, into the internal basket.
- If the use of the high level of the machine becomes necessary, the following adjustments must be made in the machine.
 - Total weight (garments to be washed plus load): 4,5 kg;
 - Washing level: high;
 - Short cycle;
 - Quantity of powder detergent:: 100 g (or the equivalent to two small coffee glasses).

NOTE: Do not mix white pieces with the colored ones in the same washing basket.

HAND WASHING

- Cover the tank (previously cleaned) and prepare it:
 - To fill up to the middle (20 l) with water;
 - Dissolve well 50 g of powder detergent (or the equivalent to a small coffee glass).
- To immerse the testing cloths until they are completely soaked, wash one by one, rinse well under running water, wring the units one by one.
- For the color transfer analysis, maintain the test frame soaked for 20 minutes.

DRYING

- Conditions: Time: 60 minutes; Temperature: medium
- To hang the testing cloths twisted or spin dried on Enxuta drier machine, place the machine protective plastic and turn on.
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NOTE: If the testing cloths are not completely dry after this time, keep hanging on clothesline until they dry.

- For the color transfer analysis, unsew the “sandwich”, rinse well and dry.

IRONING

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- After being dried, iron the testing cloths at the temperature indicated in the inner piece tag legal instructions and separate the part for analysis.

6. DETERMINATIONS AFTER WASHING

6.1. Measurement

With the part washed, dried and ironed extend it on a smooth and flat surface, make the primary measurements, using the measurement tape, as described below:

- Tops:
 - **T1**: measure the chest after washing, going from one side to the other of the part, from the armhole.
 - **C1**: total length of the part after washing, from the highest part of the shoulder, not including the collar, measured of the left side of the part.
 - **M1**: greatest length of the left sleeve of the part after the washing.
 - **L1**: measure from one lateral to the other, from the hem, after washing.
 - **X1**: smallest measure taken from the hem up to the lateral joining seam of the top after the washing.
- Bottoms:
 - **P1**: total length of the bottom, taking the measure of the left lateral of the part in straight line, including the waistband when there is one.
 - **Q1**: Hip measure after washing, taken 22 cm below the waistband for garments with high waist and 18 cm below the waistband for garments with low waist.
 - **B1**: total width of the hem after washing, from one side to the other.
 - **Y1**: smallest measure taken from the hem up to the lateral joining seam of the leg after the washing.

7. EVALUATION

7.1. Dimensional Alteration

The following formulas should be used for the calculating of the dimensional variation in %. The result can be positive (in case of increase of the measure after washing) or negative (in case of shrinkage).

- Chest: $(T1 - T0) / T0 \times 100$
- Length: $(C1 - C0) / C0 \times 100$
- Sleeve: $(M1 - M0) / M0 \times 100$
- Hip: $(Q1 - Q0) / Q0 \times 100$
- Bottom: $(P1 - P0) / P0 \times 100$

7.2. Color transfer

- To separate the sample used during the washing process;
- To separate samples of these same fabrics in the original (no washing);
To compare the difference of color between the fabrics (original and washed) in order to verify if there was color transfer from the fabric tested;
- Scale for evaluation: To use the gray transfer scale of AATCC color, where the grades correspond to the following values:
Grade 5 – There is no color transfer

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- Grade 4 – There is little color transfer
- Grade 3 – There is regular color transfer
- Grade 2 – There is much color transfer
- Grade 1 – There is excessive color transfer

NOTE: *intermediate values (as $\frac{3}{4}$, for ex.) can be adopted.*

