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# Effect Of Yarn Shortening On The Structure Of The Fabric

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#### ABSTRACT

It is theoretically and experimentally established that the shrinkage and processing of threads in a towel sample based on various weaves affects its structure, length and width. The bulk of the sample is looped weave and edge and border pieces -plain weave, which fabric has a different degree of shrinkage of the main and the weft yarn, which increases the possibility of using yarns. It is also necessary to take into account the linear density of yarn, the density of fabrics, and their ratio.

#### **KEYWORDS**

Base, weft, weave, shrinkage and working, width, length, roughness, edge, Terry, border.

#### **INTRODUCTION**

The fabric is formed by the interaction of the loom and the warp and weft yarn on the loom.

During this period, the threads change from a straight line to a wavy shape. The degree of

bending of the yarns in this process depends on several factors that determine the structure of the fabric [1-7].

The generalized indicator of the factors determining the structure of the fabric is also characterized by the amount of shrinkage of the warp and weft yarn in weaving.

## **MATERIALS AND METHODS**

The length of yarn consumed in the fabric as a result of bending the yarns during the process of tissue formation is greater than the size of the fabric formed.

The percentage of this quantity is called the shrinkage of the yarn in weaving, and it can be defined as follows.

$$a_T = \frac{l_T - l_{T\kappa}}{l_T} \cdot 100\% \tag{1}$$

Where:  $a_T$  - the amount of yarn shrinkage during weaving,%.

- $\mathsf{I}_{\scriptscriptstyle T}$  the length of the yarn used for weaving, cm.
- $I_{\text{Tk}}$  the length of the connective tissue, cm.

The amount of yarn shrinkage during weaving  $(a_A)$ 

$$a_A = \frac{l_A - B_X}{l_A} \cdot 100 \tag{2}$$

where:  $I_A$  - the length of the weft yarn spent on the fabric, cm;

 $B_X$  - width of raw fabric, cm.

The amount of shrinkage of the warp and weft yarn in weaving affects not only the structure

of the fabric but also the number of raw materials used in it [4-6].

There are several practical ways to determine the amount of yarn shrinkage in weaving:

- Find the percentage of the difference between the length of the yarn taken from the fabric sample and the size of the sample;
- To determine the difference in the lengths of the fabric formed by sizing the warp yarn in the fabric production;
- Separation of the width of the raw tissue from the width of the tissue along the blade and other methods.

The amount of yarn shrinkage in weaving is also affected by the structural phase of the fabric.

Because in the process of weaving fabrics, the weft and warp yarns bend to each other. The amount of bending of the yarns depends on many factors: the thickness of the weft and warp yarns; to yarn stiffness; type of weaving; density on the weft and warp; to the tension of the yarns during weaving. [8-11]]

After studying all the conditions of bending of yarns in the fabric, Prof. NG Novikov identified 9 phases of the fabric structure. These phases are given for plain weaving.

The surface of the fabric is smooth and flat, because the weft and warp yarns lie in the same plane. The base surface is large and resistant to abrasion.

Weaving fabrics (plain, canvas, sarja, satin (atlas)) are mainly woven in 2, 3, 4 phases.

Phases can change during the process of fabric finishing.

The structural phase of the fabric affects the abrasion resistance of fabrics under friction. [12-17]

In order to determine the change in the contraction of the fabric on the body and back, we used an APPLE type towel 50x85 cm, produced on a loom GTM500 ITEMA (Italy) taken as a sample.

Tissue setting parameters were calculated for this sample.

In order to effectively use the width of the loom in the process of weaving on the loom, 6 towels were woven at the same time.

In the pattern of towel tissue, the rings are formed in the direction of the warp.

The length of the sample towel is 105 cm. If this length is 81 cm. the terry part, 8 cm. part of two curbs and 4cm. consists of two gum parts.

Nº	Item of technological processes	Overall width		The wic terry	lth of the	Breast				
		Right		Left		Right		Left		
		SM	%	SM	%	SM	%	SM	%	
1	Stopping parameters	59.8	0	54.54	0	2.63	0	2.63	0	
2	Size after weaving	56.93	-4.79	52.07	-4.52	2,52	-4,18	2,52	-4,18	
3	Dimensions after Tambler	49.88	-16.58	45.23	-17.07	2.36	-10,26	2.33	-11.4	
4	Dimensions after stabilization machine	52.21	-12.6	47.65	-12.63	2.21	-15,96	2.39	-9,1	
5	The size of the finished product	49.3	-17.55	47.77	-12.41	0.73	-	0.75	-	

## Table 1. Tissue width

The fabric pattern is woven in the ring part of the terry, and the gum is woven by plain. The reduction of the sample in the towel production process was measured on the warp and weft, as well as the length and width of the towel [17-23]. Dimensions for the width and

length of the tissue sample are determined by formulas (1,2). The results are given in Table 1 for the width of the tissue and in Table 2 for the length.

N⁰	Item of technologic al processes	Total length		The width of the terry		The length of the upper part of the curb		The length of the lower part of the border		The length of the upper part of the breast		The length of the lower part of the breast	
		cm	%	cm	%	cm	%	cm	%	cm	%	cm	%
1	Stopping parameters	105.0	0	0'26	0	8.0	0	8.0	0	4.0	0	4.0	c
2	Size after weaving	95.53	-9,01	88.95	-8,2	5,70	-28,7	5,70	-28,7	3,27	-18.2	3,27	-18.2
3	Dimensions after Tambler	92,05	-12,3	85,57	-11,7	5,72	-28,5	5,74	-28,2	3,36	-16	3,38	-11.0
4	Dimensions after stabilization machine	92,03	-12,3	85,69	-11,6	5,66	-29,2	5,67	-29,1	3,34	-16.5	3,29	۲.71-
5	The size of the finished product	99.48	-5.26	85,4	-11,9	5,56	-30,5	5,57	-30,3	1,45	1	1,50	,

## Table 2. Along the length of the tissue

As can be seen from the tables, the width of the towel tissue sample was reduced by 10.5 cm (17.55%) along the weft. In terms of length reduced by 5.52 cm (5.26%), which is the warp.

This means that in the towel fabric sample, the shrinkage is higher along the weft (or width) than against the warp yarn (or length). Also, the length of the towel sample (or warp orientation) is 14.48 cm longer than the finished towel product. This is due to the fact that there is little penetration into the warp and a one-and-a-half-layer braid is used on the terry of the towel. Towel weaving is used in the width (or weft) of the towel pattern. It is also necessary to take into account the linear density of yarns, tissue density, and their proportions.

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