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Research Article

ABOUT PHYSIC-MECHANICAL PROPERTIES OF A NEW TYPE OF DOUBLE-LAYER KNITTED FABRICS

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ABSTRACT

The article presents the results of a research carried out on the methods of producing quality and competitive double-layer knitted fabrics using a wide range of technological capabilities of circular and flat double bed machines.

KEYWORDS

Knitting, needle, double knitting machine, flat knitting machine, circular knitting machine, double-layer knitted fabric.

INTRODUCTION

The development of knitted production is determined by the principles of the world market, the creation of new technologies and more effective equipment.

Uzbekistan, one of the world's leading cotton producers, has taken important steps in recent years to develop the textile industry. Currently, products with

the trademark "Made in Uzbekistan" are exported to more than 70 countries, including the EU, CIS and Latin American countries, the Republic of Korea, China, Singapore, Iran, Israel, the United States and others [1].

Today, the industry has become one of the leading places in the domestic real sector of the economy. The



introduction of new production technologies, the using of high-performance modern equipment in combination with effective management ensure high labor productivity in the textile industry enterprises, an increase in the volume of industrial production and improving the quality of products [2].

The most important and urgent problem of the knitting industry is to improve the quality of products, increase and upgrade their assortment. Theoretically, the solution to this problem is the further development of the theory of knitting, the creation of new types of knitting, the development of highly effective knitting processes with optimal parameters of knitting properties. The most promising direction in the creation of a new assortment of double-layer knitted fabrics.

Two-layer knitted fabric is produced in machines with two needles. When choosing the type of machine, it is necessary to rely on the working efficiency of the machine, adequate control devices and automation, the class of machine, as well as on the high level of tissue knitting capabilities [2-3].

Double circle needle MAYER & CIE knitting machine is used in the production of double and two-layer knitted stitches. This machine is used for the purpose of manufacturing domestic knitted products and light top knitted clothing (men, women, children) products are produced. There are knitting machines of different types are installed in the enterprises.

Physic-mechanical properties of new knitted fabric obtained in double needle bed machines

Table1

Samples	1 Variant	2 Variant
Surface density, g/m ²	209,6	251,2
Thickness, mm	0,8	0,6
Air permeability, cm ³ /cm ² sec	122,9	90,7
Friction resistance, thous. turns	25,5	28
Tensile strength By length, N	568	536
Tensile strength By width, N	534	398
Elongation By length, %	61	44
Elongation By width, %	58	121

Geometric indicators of knitted products, physical, mechanical and other characteristics are formed due to the type of raw materials used in their manufacture, the structure of the knitted fabric and the processes of knitting finishing.

This means that the desired properties of knitted products will depend on the characteristics of the raw material and knitted fabric's structure.



One of the factors that most often affect the consumer properties of knitted fabrics is the shape-keeping property of knitting. One of the factors that affect the shape retention property of knitting is its overall elongation. Of the two samples presented in Table 1, it can be seen that 1-sample has a less elongated property than the other.

The mechanical properties of knitted fabrics indicate their attitude to the influence of different factors [4-6]. While these factors are varied, they can be large or small and have a repetitive effect once or consecutively.

Forces can affect the length of the knitted fabric, in the direction of the wale, course or at an angles in relation to them. As a result, deformation occurs on the knitted fabrics, such as bending, stretching, twisting, etc. In terms of resistance to various deformation, the sample

presented in Table 1 has a higher performance than the latter.

So the conclusion from this is that from these samples, which were produced on the double circle machines, 1-sample are the best in all and there for it is possible to recommend for the production.

Two-layer knitted fabric is obtained on flat knitting machine as follows. In the movement of the knitting system from the left to the right, a cardigan stitch row is knitted, cardigan tucks are formed on the front bed needles, and on the back bed needles loops are formed. To do this, the front knitting bed needles rise not completely (Figure 2, b, I-row).

In the movement of the ring formation system from right to left, cardigan tucks are formed on the back bed needles, and on the front bed needles loops are formed.

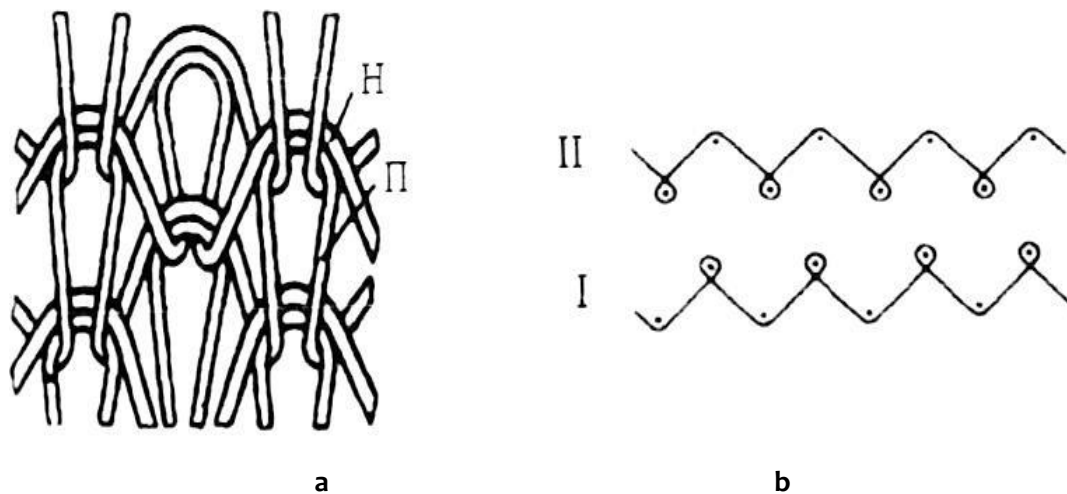


Fig. 2. Structure and graphic recording of two-layer knitted fabric

Knitted fabric consists of two layers, which are attached by half rings. Since the semi-rings are hidden behind the old rings and are not visible on the front, using these textures, it is possible to achieve the effect

of a colored pattern, supporting threads of different colors.



Table 2

Physic-mechanical properties of the new knitted fabric obtained at flat double bed machines

Samples	1 Variant	2 Variant	3 Variant	4 Variant
Surface density, g/m ²	444,6	314,5	391,3	494,5
Thickness, mm	1,75	1,5	1,8	2,4
Air permeability, sm ³ /sm ² sec	87,7	82,7	70,6	168,6
Friction resistance	10,5	24	23,5	25
Tensile strength By length, N	731	568	496	594
Tensile strength By width, N	596	501	391	512
Elongation By length, %	38	61	54	52
Elongation By width, %	51	138	121	94

There are in the table 2, 4 option samples of two-layer knitted fabric were developed on the long Xing rotary machine.

The mutual attachment of two independent layers of knitted fabric is carried out by a press method with the help of a base thread.

Comparing the volume density of two layers of knitted fabric, the following results were obtained: I variant with a surface density of 444,6 gr/m² and a thickness of 1,75 mm while the volume density of knitted fabric was 254 mg/cm³, II variant with a surface density of 314,5 gr/m² and a thickness of 1,5 mm the bulk density of the variant knitted fabric was 217 mg/cm³. The IV variant with a surface density of 494,5 gr/m² and a thickness of 2,4 mm, while the bulk density of knitted fabric is 206 mg/cm³.

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