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TECHNOLOGICAL INDICATORS OF NEW STRUCTURE TWO-LAYER KNITTED FABRICS ANALYZED

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Maqolada zamonaviy ikki yassi ignadonli trikotaj mashinalarining texnologik imkoniyatlaridan foydalanib ishlab chiqiqarilgan ikki qatlamli trikotaj to'qima na'munalarini texnologik ko'rsatkichlarini taxlili natijalari keltirilgan.

Kalit so'zlar: Ikki qatlamli trikotaj, yuza zichligi, qalinligi, hajm zichligi, texnologik ko'rsatkichi.

В статье использованием технологических возможностей современных двухфонтурных плосковязальных машин исследована результаты технологических параметров двухслойных трикотажных полотен.

Ключевые слова: двухслойный трикотаж, поверхностная плотность, толщина, объемная плотность, технологические показатели.
In the article technological capabilities of modern double bed flat knitting machines results of analyses of technological parameters double-layer knitted fabrics.

Key words: double-layer knitting, surface density, thickness, wolume density, technological parameteres.

Changes in the structure of knitted fabrics, composition of raw materials, rapporti and methods of production will definitely affect its technological and quality indicators.
It is known from the scientific research conducted by a number of scientists that reducing the surface density index of knitted fabrics within certain limits leads to saving the consumption of raw materials and does not have a negative effect on the strength characteristics, because the absolute durability of knitted fabrics is high and does not exceed 20% breaking strength in the use of products. it is determined to face tensions.

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The parameters of any knitted fabric are influenced by the properties of raw materials, yarn cutting, finishing method 6-7. Double-layer knitted fabric is composed of two same or two different single-layer fabrics, the performance of one fabric can be much better than the other fabric. This situation depends on the interaction of two monolayers. When one layer is attached to a second layer, it can change its initial parameters, and another, in turn, can change the parameters of the first layer. Therefore, the length and density of the loop yarn forming the layers of the double-layer knitted fabric cannot be determined by the formula for the single-layer fabric. In addition, these indicators depend on the type and method of attachment 8-9.

It is of great interest to study the production of two-layer knitted fabrics of a new structure, because it affects the performance of the fabric.

The impact of one independent layer on the second independent layer depends on the type of yarn, its mechanical properties: the greater the elasticity of the yarn, the more the indicators change as its linear density increases.

Another factor that determines the extent to which one independent layer of a double layer knit fabric affects the second independent layer is the length of the loop yarn. As noted earlier, while the length of the loop thread forming one layer remains constant, the loop thread of the second layer is allowed to change within large limits during the weaving process.

It is recommended to determine the raw pso consumption for cross and flat knitted fabrics according to the following formula:

$$M_S = l \cdot T / A \cdot B \quad (1)$$

where: Ms-knit fabric surface density;

l- A·B ring thread length corresponding to the ring surface (mm);

T-Linear density (tex) of thread.

The length of the loop yarn for each knitted fabric is directly related to the surface of the loop. For any two-layer knitted fabric, because the layers interact with each other and they are at different levels, different descriptive relationships occur.

When the density of two layers of knitted fabric is the same, the knitted fabric can have different values of loop length l and, therefore, different consumption of raw materials per 1m2 fabric unit, or vice versa, when the value of knitting density is different, it can have a constant surface density value. .

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As the loop surface of the two-layer knitted fabric increases according to the near-parabolic law and tends to a certain limit, the first component in the formula gradually decreases, while the second component first decreases and then increases.
Based on the results of scientific research, in order to expand the assortment, save raw material consumption and improve quality, 6 variants of two-layer knitted fabrics of a new structure were woven on a 14-class flat two-needle knitting machine manufactured by the Chinese company Long Xing LXA 252 SC. A polyacrylonitrile thread with a linear density of 30x2 tex was used as a raw material.
The effect of the method of obtaining knitted fabrics and the structure of the fabric on the technological performance of knitting was studied.
A graphical record of the two-layer knitted fabric of the new structure produced is shown in Fig. 1.
The technological parameters of the two-layer knitted fabrics of the new structure were tested in a standard way in the Knitting Test Laboratory at NamMTI, the obtained results are presented in Table 1.
Based on the results of the analysis, technological parameters such as ring pitch, ring row height, density in horizontal and vertical directions, and length of ring thread are determined.

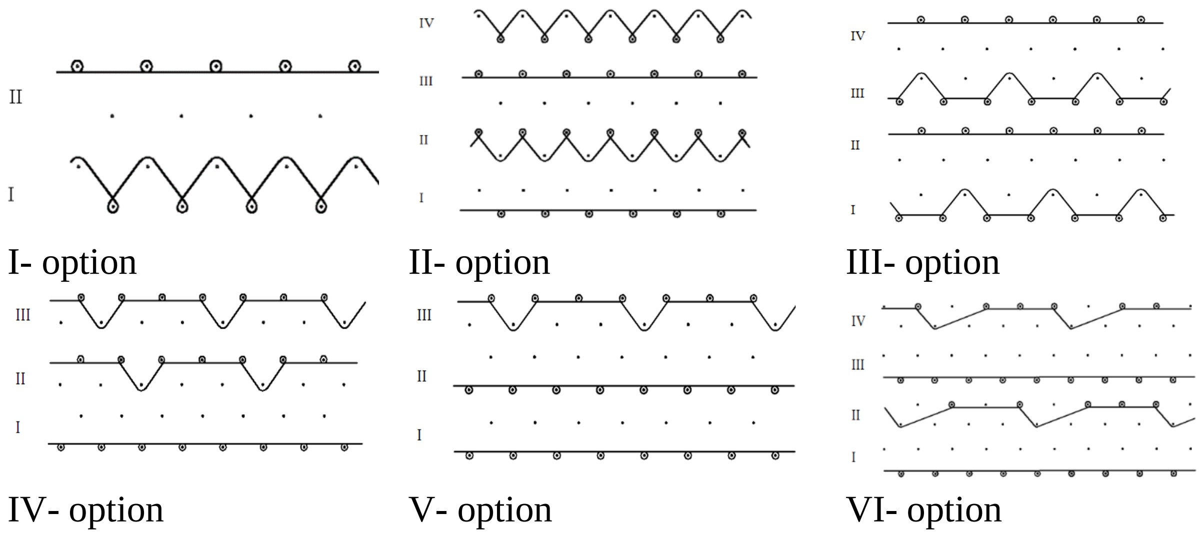

Figure 1. A graphic record of two-layer knitted fabrics in a new structure
Surface density depends on the type of thread used in the fabric, linear density, and also changes in the percentage of threads.
The loop yarn length of the front layer of the new structure double-layer knitted fabric is from 5.5 mm to 9.7 mm, and the loop yarn length of the back layer is

It varied between 4.6 mm and 8.3 mm. This is expressed by the formation of glad rings and press semi-rings, which have a uniform shape when weaving layers. Among the two-layer knitted fabric, the first option was selected as the base fabric (option I, Fig. 1). The resulting knitted fabric consists of a front layer of glad and a press semi-ring, and is connected with glad fabric of the back layer..

Table 1

Technological indicators of two-layer knitted fabrics of a new structure

Indicators		Options					
		I	II	III	IV	V	VI
Thread type and linear density, tex	Front layer	PAN 30 tex x 2, 100%					
	Back layer						
Ring step A, mm	Front layer	2	2	1,7	1,6	1,56	1,56
	Back layer	2	2	1,8	1,6	1,56	1,56
Ring row height B, mm	Front layer	1,1	1,4	1,4	1,25	1,1	1,4
	Back layer	1,1	1,0	1,4	1,0	1,1	1,48
The density of rings on the horizontal, $P_{\text{г}}$,	Front layer	25	25	29	31	32	32
	Back layer	25	25	28	31	32	32
Density of rings in vertical $P_{\text{В}}$,	Front layer	45	36	36	40	45	36
	Back layer	45	50	36	50	45	34
Loop thread length L, mm	Front layer	9,7	6,5/8,5	8,1	5,5	5,4	5,6
	Back layer	6,0	6,3/8,3	4,6	7,7	8,3	6,1
Surface density of knitted fabric Ms, g/m^2		358,6	362,7	370,3	363,6	356,7	346,6
Thickness T, mm		1,5	1,8	1,6	1,77	1,92	1,5
Volumetric density of knitted fabric δ, mg/sm^3		239	201,5	231,4	205,4	185,8	231,1
Absolute volumetric lightness Δδ, mg/sm^3		-	37,5	7,6	33,6	53,2	7,9
Relative lightness θ, %		-	15,7	3,2	14	22,2	3,3

The volumetric and relative lightness indicators of the two-layer knitted fabrics of the new structure were compared to the I-option, and the volumetric and relative lightness indicators of the II option are determined by the following formulas:

$$\Delta\delta = \delta_I - \delta_{II} = 239 - 201{,}5 = 37{,}5\ mg/sm^3 \quad (3)$$

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Here: Δδ - true volumetric lightness, mg/sm^3;

δ_I - base tissue volume density, mg/sm^3;

δ_{II} -bulk density of experimental knitted fabric, mg/sm^3

Relative lightness is defined as follows:

$$\theta = (1 - \frac{\delta_{II}}{\delta_I}) \cdot 100\% = (1 - \frac{201{,}5}{239}) \cdot 100\% = 15{,}7\ \% \qquad (4)$$

in this: θ - relative lightness of the tissue, %.

The values of changes in absolute and relative lightness indicators for further variants of two-layer knitted fabrics in the new structure are given below (Fig. 3).

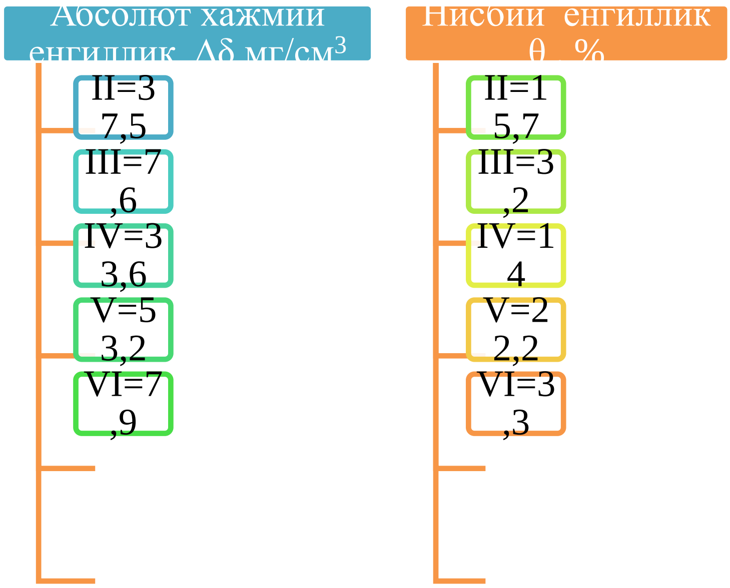

Figure 3. Absolute and relative lightness indicators of two-layer knitted fabrics of a new structure

Another important factor in knitted fabric is the thickness index, and it is one of the factors affecting the volume density of knitted fabric. During the research, the thickness indicators of knitted fabrics were determined using thickness measuring devices (Table 1, Figure 4).

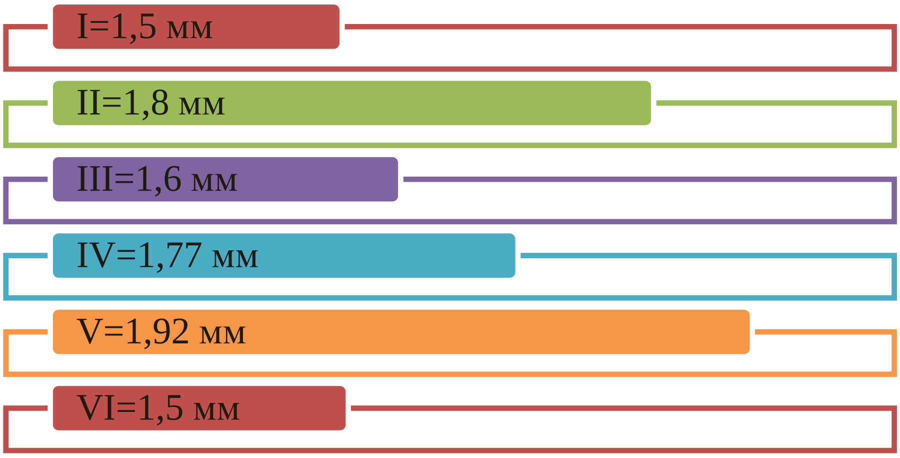

Figure 4. Thickness parameters of two-layer knitted fabric of new structure

The thickness indicators of the two-layer knitted fabric samples in the new structure changed from 1.5mm to 1.92mm. The greatest thickness indicator was observed in the V-variant, which consisted of a front layer of glad and press semi-ring backing, and a back layer of full glad rings, and it was 28% thicker than the base fabric and was 1.92 mm (Table 1, Figure 4).

It was found that the raw material consumption indicators of two-layer knitted fabrics of options II, IV and V are less than the base fabric due to the change of the fabric structures of the new structured two-layer knitted fabric samples, as well as the placement of needles in elastic order during fabric extraction.

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