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Ясси игнадонли трикотаж тўқув машинасида олинган жаккард тўқималарида лайкра ипининг тўқима физик механик хусусиятларига таъсири тадқиқи

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Аннотация: Ушбу мақолада, ясси икки игнадонли трикотаж машиналарининг имкониятларидан фойдаланиб махаллий хом ашё яъни йигирилган пахта ипидан фойдаланиб нақшли жаккард трикотаж тўқимасига лакра ипини қўшиш орқали ишлаб

чиқариш технологияси ишлаб чиқилиб физик механик кўрсаткичлари тадқиқ этилган. Нақшли жаккард трикотаж тўқимасининг 3 та наьмунаси олиниб, уларни технологик кўрсаткичлари ва физик-механик хусусиятлари эксприментал усулда ўрганилиб, жадвада келтирилди ва тахлил қилинди. LONG XING LXA 252 12G русумли икки ясси игнадонли трикотаж ишлаб чиқариш дастгохида нақшли жаккард трикотаж тўқималари экспериментал намуналари ишлаб чиқилди ва график ёзуви келтирилди.

Таянч сўзлар: трикотаж, йигирилган пахта ипи, Лайкра ипи, нақшли жаккард трикотаж, икки қаватли трикотаж, халқа, ип, ясси, хажмий енгиллик, халқа баландлиги, юза зичлик, нақш, зичлик, халқа ипи узунлиги.

Аннотация: В данной статье с использованием возможностей плоских двухигольных вязальных машин разработана технология производства нанесения лаковой нити на узорное жаккардовое трикотажное полотно с использованием местного сырья - хлопчатобумажной пряжи и исследованы физико-механические показатели. Были взяты 3 образца узорного жаккардового трикотажного полотна, экспериментально изучены их технологические параметры и физико-механические свойства, представлены в таблице и проанализированы. Вязальная машина с двойной плоской иглой LONG XING LXA 252 12G разработала экспериментальные образцы жаккардового трикотажного полотна с рисунком и дала графическую запись.

Ключевые слова: трикотаж, хлопковая пряжа, пряжа лайкра, узорчатый жаккардовый трикотаж, двухслойный трикотаж, пряжа, пряжа, плоская, объемная плотность, высота пряжи, поверхностная плотность, узор, плотность, длина пряжи.

Abstract: In this article, using the capabilities of flat double-needle knitting machines, the production technology of adding lacquer yarn to patterned jacquard knitted fabric using local raw material, i.e., spun cotton yarn, was developed and its physical and mechanical parameters were researched. 3 samples of patterned jacquard knitted fabric were taken, their

technological parameters and physical-mechanical properties were studied experimentally, presented in a table and analyzed. LONG XING LXA 252 12G double flat needle knitting machine produced experimental samples of patterned jacquard knitted fabrics and gave a graphic record.

Key words: knitwear, cotton yarn, lycra yarn, patterned jacquard jersey, two-ply jersey, yarn, yarn, flat, bulk density, yarn height, surface density, pattern, density, yarn length.

Textiles and light industry are important sectors of the economy that form the budget of many countries. Innovative opportunities are considered a strategic resource that determines the place of the national economy in the system of the world economy. Applying the integration of scientific achievements to production is a necessary condition for improving the quality indicators and competitiveness of local products that replace imports and expand the export structure.

It is strategically important to ensure high and stable growth rates in the textile and sewing-knitting industry in our republic, by attracting and absorbing direct foreign investments, producing and exporting competitive products, modernizing enterprises, technical and technological updating, and introducing an improved "cluster model". systematic works aimed at creating high-tech new jobs are being carried out at the expense of project implementation.

Production of knitted products with high hygienic properties, effectively using local raw materials in the production of knitted products, is one of the current problems. As the standard of living of the people living on earth improves, the demand for textile products with high hygienic properties is increasing. Therefore, the knitting industry is considered the most important branch of the textile industry today. Knitted products are modern, practical, convenient and affordable. The knitting industry has the following specific advantages:

- in the field of expanding the product range, there is a wide opportunity to obtain various mixed fabrics that provide different properties and appearance of the knitted fabric;

- high resistance to repeated deformation conditions, complex physical and mechanical properties such as friction, wrinkling, high hygienic properties (hygroscopicity, air permeability and properties that provide a number of comfort conditions), a unique consumer characteristic of knitted fabric describing complex aesthetic indicators;
- the availability of a wide technological possibility for regular and semi-regular production of products.

It allows to develop new types of patterned knitted fabrics, to increase the share of local raw materials in knitted products, to expand the range of knitted fabrics, as well as to develop the production technology of patterned knitted fabrics in order to expand the technological capabilities of the LONG-XING LXA 252 12G (China) flat double-needle machine. 3 samples were developed by changing the type and proportion of raw materials. The developed patterns of knitted fabric differ from each other in the proportion of raw materials in the fabric. The technological indicators and physical-mechanical properties of the patterned knitted fabric were determined by the experimental method in the laboratory of the Namangan Institute of Textile Industry, the measurement results are given in the table. As a result of the conducted practical research, the fabric structure, physical mechanical properties and external appearance were determined, which describe the quality indicators of the knitted product.

The parameters describing the structure of the knitted fabric include: surface and volume density, width and length density (number of loops per unit length), loop thread length, the angle between the rows of loops and loop columns, and the thickness of the knitted fabric. A graphic record of the newly produced two-layer knitted fabric is presented in Fig.

20 tex x 4 spun cotton yarn, 35 tex x 2 polyacrylonitrile 17 tex x 4 polyester yarn were used as raw materials.

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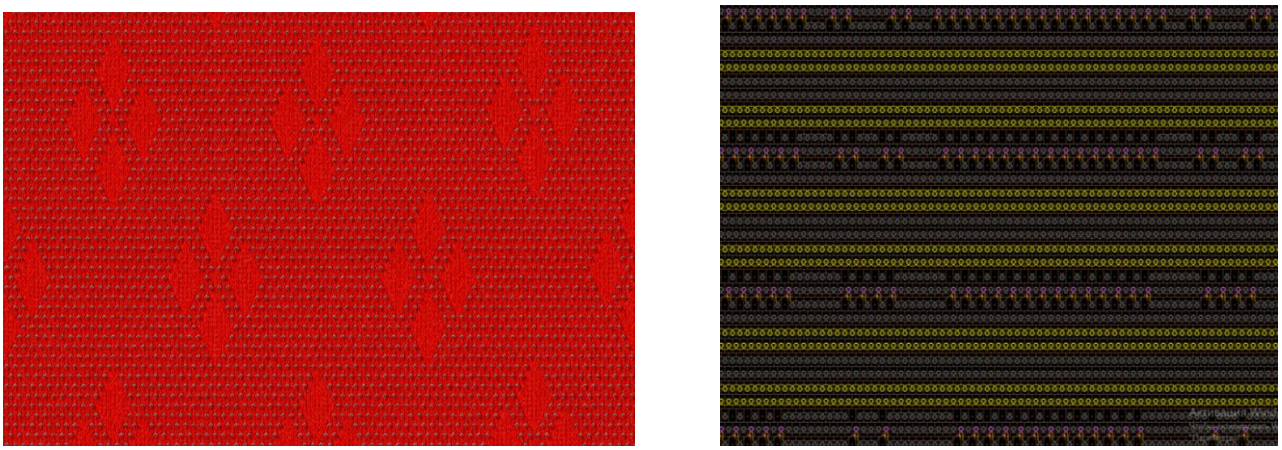


Figure 1. A graphic record of knitted fabrics in a new structure

LONG-XING LXA 252 12G flat double-needle knitting machine changes the position of loops, densities, length of loop thread and a number of other parameters automatically during the production of knitted products. This makes it easy to get a variety of knitted fabrics. In order to improve the air permeability of the obtained sample, patterns were created using the front and back needles. As a result, it was possible to obtain a knitted fabric with a unique pattern, improved shape retention and air permeability. (Figure 1)

Due to the change in the percentage of local raw materials in the composition of the patterned knitted fabric, it was found that the volume density index of the patterned knitted fabrics of all samples changed significantly compared to the base fabric. The volume density of knitted fabric is one of the main technological indicators, which indicates the consumption of raw materials in the knitted fabric.

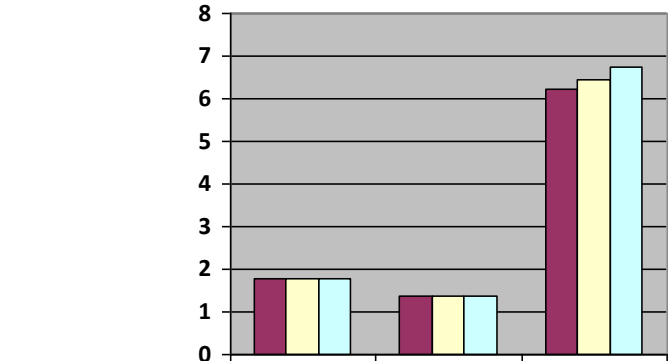
Technological indicators of knitted fabric

Table 1

Indicators	**Samples**		
	1	**2**	**3**
Thread type and linear densities	**Polyacrylonitrile 35 tex x2**	**Cotton 20 tex x4**	**Cotton 20 tex x4**
	Polyacrylonitrile 35 tex x2	**Polyacrylonitrile 35 tex x2**	**Cotton 20 tex x4**

Ring step A (mm)		1.79	1.79	1,79
Row height B (mm)		1.38	1.38	1,38
Horizontal density R_h		28	28	28
Vertical density R_v		43	43	43
Ring strip length L (mm)		6.22	6.44	6,74
Knitted surface density Ms (gr/m^2)		362	473	543
Knitting thickness T (mm)		2.41	2.52	2.61
Volume density δ (mg/sm^3)		150.2	181.5	226.4
Air permeability		43.052	39.32	28.68
Breaking force	height	489	543	548
	width	264	403	432
Узулишдаги чўзилиш (мм)	бўйига	158,6	98,1	100,7
	энига	234,4	239,3	231
Stretching to break (%)	height	79,3	45,35	48,35
	width	117,2	106,15	110,5
Узулишдаги сарифланган энергия (Ж)	бўйига	23,8	20	24,2
	энига	17,7	29	30,2
Revensible deformation , $\varepsilon_н$, %	height	23,5	20,7	21,8
	width	34,3	31,5	28
Irrevensible deformation, ε_o, %	height	76,5	79,3	78,2
	width	65,7	68,5	72

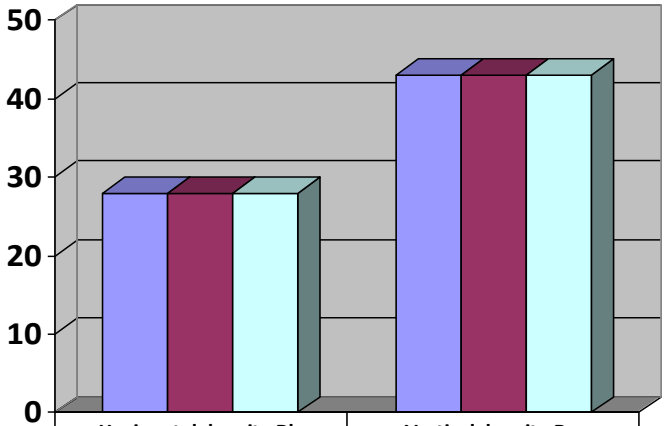
Due to the fact that the structure of the knitted fabric and the linear density of the threads are close to each other, a number of technological indicators have been improved due to the change of the raw materials in the fabric..



	Ring step A (mm)	Row height B (mm)	Ring strip length L (mm)
Poliacrilnitril/Poliacrilnitril	1,79	1,38	6,22
Poliacrilnitril/cotton	1,79	1,38	6,44
Cotton/ Cotton	1,79	1,38	6,74

Figure 2. A histogram of the warp pitch, warp row height, and warp thread length of a patterned knit

In all samples, the pitch is 1.79 mm, and the height of the row is 1.38 mm. We can see that the yarn length has changed slightly due to the change in the composition of the raw material of the knitted fabric. (Figure 2)



	Horizontal density Rh	Vertical density Rv
Poliacrilnitril/Poliacrilnitril	28	43
Poliacrilnitril/cotton	28	43
Cotton/ Cotton	28	43

Figure 3. Horizontal and vertical density histogram of patterned knitted fabric

Horizontal and vertical densities are the same in all samples, that is, the number of 50 mm long rings is 28 and 43, respectively.

(Figure 3)

The lowest air permeability was observed in sample III of the patterned knitted fabric and its amount was 28.68 cm3/cm2□sec. The highest air permeability was observed in sample I of knitted fabric samples, and its amount was 43.052 cm3/cm2□sec, which is 43.4% more than that of fabric (variant III). (Figure 4)

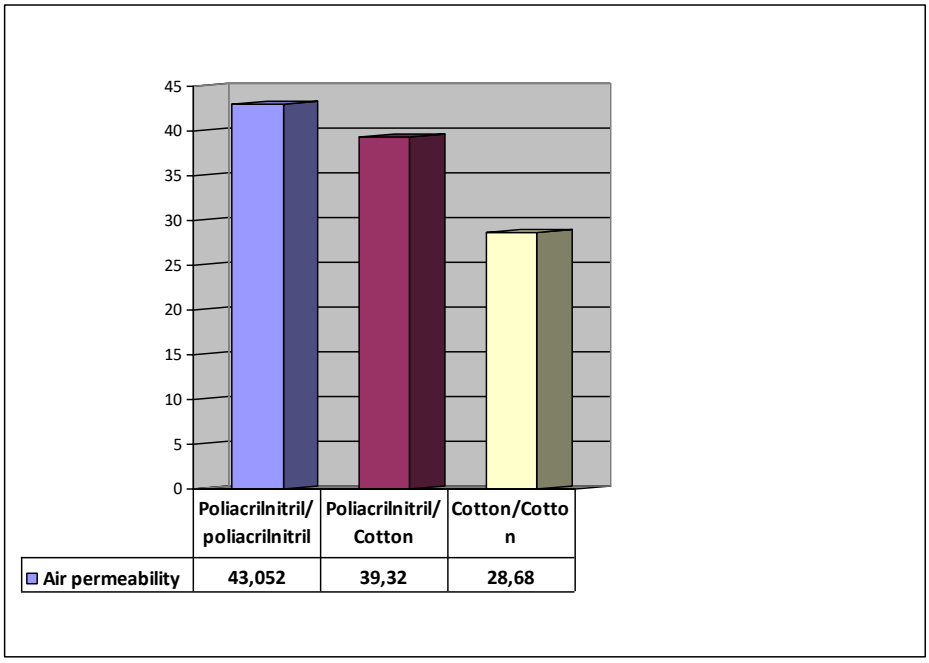
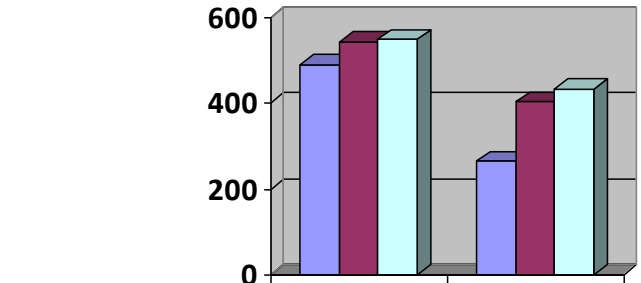


Figure 4. Air permeability histogram of patterned knitted fabric

The break characteristic is the main parameter accepted for evaluating the quality of knitted fabrics. All GOSTs and TShs used for knitted fabrics include normative indicators for elongation at break and tensile strength. Breaking strength is the force used to break a sample when stretched at a given size and speed. Breaking force is expressed in Newton (N). The tensile strength of the presented samples was determined using a "YG-026T" dynamometer according to the standard method.

The analysis of tissue toughness, i.e. breaking strength, shows that the toughest tissue in terms of length is sample III, its index is equal to 548 N, and it was found that the hardness is 11.8% higher than that of sample I (Table 1, Figure 5).

The transverse stiffness of the fabric was also observed in sample III, the tensile strength of this fabric was 432 N, which was 39% higher than that of sample I.



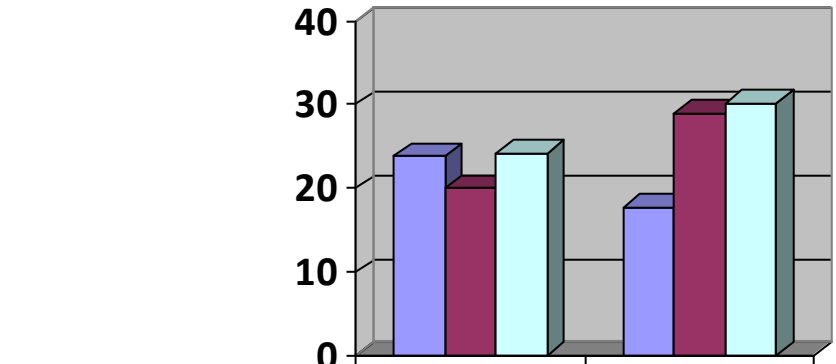
	height	width
Poliacrilnitril/Poliacrilnitril	489	264
Poliacrilnitril/cotton	543	403
Cotton/ Cotton	548	432

Figure 5. Histogram of tensile strength of patterned knitted fabric

Calculated breaking energy is defined as the amount of energy used to break a sample when stretching it at a given size and speed. The energy stored in the break is expressed in the unit of Joule (J). The rated breaking energy of the presented samples was determined by the standard method using a "YG-026T" dynamometer.

The analysis of tissue toughness, i.e., the amount of total energy at break, shows that the most mature tissue in terms of length is sample III, its average energy at break is equal to 24.2 J, and it was found that the hardness is 18.4% higher than that of sample I (Table 1, 6 - picture).

The stiffness of the fabric in width was also observed in sample III, the totalized energy of breaking in the width of this fabric is 30.2 J, which is 41.39% more than the fabric in sample I.



	height	width
Poliacrilnitril/Poliacrilnitril	23,8	17,7
Poliacrilnitril/cotton	20	29
Cotton/ Cotton	24,2	30,2

Figure 6. Histogram of the normalized breaking energy of a knitted fabric

From the analysis of the physical and mechanical properties of the knitted fabrics mentioned above, it was found that the change in the percentage of spun cotton raw materials in the fabric, as a result of the positive effect of the knitted fabric on the air permeability properties, hardness and stretchability properties of the knitted fabric, strengthened the properties of keeping the shape of the knitted fabric.

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