STUDY OF TECHNOLOGICAL PARAMETERS AND PHYSICAL-MECHANICAL PROPERTIES OF RIB FABRIC KNITTED FROM SPINNING COTTON-NITRON YARN

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Chemical fibers have different haze colors, penetration, twistability, different geometric parameters, dyeing, luster and strength properties. The influence directed at the structure of polymer chains allows obtaining special properties of yarns. Resistant to various chemical effects, non-flammable and anti-bacterial, as well as high-modulus bicomponent, core and other yarns are widely used. For example, more than 400 types of textured polyester threads are used in the world, and their differences in color are an exception. High tenacity (high modulus) yarns have a wide range of potential, including metal, glass, carbon, arimide, and liquid crystalline polyester polyolefin yarns with long molecular chains.

The use of partially oriented fibers and yarns is growing, which allows to improve the properties of fabrics: high elasticity, resistance to abrasion, toughness, high penetration (more than 50%) during heat treatment, which allows to give high shape retention properties. Completely new materials and fabrics are being created on the basis of chemical fibers and threads. Textile materials are used in the field of nature protection (geotextile), radiolocation and communication, medicine, agriculture. Geotextile allows solving many important problems. Non-knitted fabrics, knitted and knitwear provide performance of mechanical

(separation, protection, reinforcement, leveling along the surface, formation of barriers, reinforcement, adsorption), hydraulic (drainage, filtering), radiotechnical tasks. Composite materials are emerging [1-8]

The main types of chemical fibers used in the cotton thread and knitted production industry are ordinary viscose and polyester fibers.

Polyester fibers have a low price and are universal in terms of use. These fibers are most commonly used in blends with cotton fibers, although pure cotton fibers are used to blend yarns with cotton fibers to increase the softness of fabrics. This is achieved in two ways: creating staple fibers of different lengths and improving their sorption properties.

Many foreign scientists have been engaged in making textile products by preparing yarn spun from a mixture of natural and chemical fibers [9-14].

It is known that the spun cotton thread is used to make inner knitwear and hosiery products, and when outer knitwear products are produced, the knitwear has high hygienic properties and low shape retention properties. For this reason, in this work, parameters and physical-mechanical properties of fabrics that can be used in the production of outer knitted products using spun cotton-nitron yarn mixed with nitron and cotton fibers were studied [15-20].

In production conditions, 4 types of rib stitch fabric were knitted on the PAILUNG circular knitting machine. In the production of rib stitch knitted samples, spun cotton yarn with a linear density of 20 tex, spun cotton-nitron (85/15) yarn with a linear density of 20 tex, and lycra yarn were used. The difference between the samples is in the raw materials used in their development.

To obtain the I-obtion of the rib stitch fabric, the spun cotton-nitron (85/15) yarn with a linear density of 20 tex and the lycra yarn were used.

To obtain the II-obtion of the rib stitch fabric, a spun cotton-nitron (85/15) thread with a linear density of 20 tex was used.

Option III was made using lycra yarn and spun cotton yarn with linear density of 20 tex.

A spun cotton thread with a linear density of 20 tex was used to obtain the IV-obtion rib stitch fabric.

Technological parameters and physic-mechanical properties of the obtained rib stitchknitted samples were analyzed experimentally in the "CENTEX UZ" laboratory and the results are shown in Table 1.

According to the results in the table, technological parameters and physic-mechanical properties of knitwear are changed depending on the type of raw material.

The surface density of the rib fabrics were higher in the samples made with lycra. The surface density of the 1st obtion knitted by adding lycra to the cotton-nitron yarn is 25.7% higher than the surface density of the second obtion knitted from the cotton-nitron yarn. The surface density of the III-obtion knitted fabric by adding lycra to the spun cotton yarn is 25.2% higher than the surface density of the IV-rib stitch fabric knitted from the cotton yarn.

If we compare the surface density of the rib stitch fabric knitted from cotton yarn with the same linear density to the rib fabric knitted from cotton-nitron yarn, the surface density of cotton-nitron knitted fabric is 5.6% less than the surface density of cotton-containing rib stitch fabric.

Table1

Indicators		**Obtions**			
		1	**2**	**3**	**4**
Types of threads, linear density		Cotton-nitron yarn (85/15) 20 tex +lycra	Cotton-nitron yarn (85/15) 20 tex	Cotton thread 20 tex+lycra	Cotton thread
Surface Density (gr/m^2)		193.7	154.1	204.3	163.2
Fabric thickness (mm)		0.7	0.55	0.8	0.6
Bulk density (mg/sm^3)		276.7	280.2	255.4	272
Air permeability (см^3/см^2·сек)		162.2	211.9	141.1	211.9
Abrasion resistance, thousand/rotation		22.5	20.0	24.0	18.1
Tensile strength, N	Height	290.6	322.5	394.4	340.8
	Width	124.0	95.5	154.8	94.5
Stretching to break (%)	Height	16.4	8.9	12.96	7.4
	Width	121.0	98.9	102.7	79.3
Irreversible deformation (%)	Height	10.0	26.3	23.6	26.7
	Width	12.3	26.1	14.6	17.1
Reverse deformation,(%)	Height	90.0	73.7	76.4	73.3
	Width	87.7	73.9	85.4	82.9
Shrinkage , (%)	Height	14.0	12.5	16.5	12.0
	Width	4.0	1.5	2.0	4.0

The analysis of the thickness of the knitted fabric showed that the options knitted from the spun cotton thread are thicker. The thickness of knitted samples with lycra thread will be greater than the thickness of non-lycra options. Then the thickness of the I-obtion was 27.3% greater than the thickness of the I-obtion, and the thickness of the II-obtion was 33.3% greater than the thickness of the IV obtion.

Conclusion

Analysis of the penetration properties of knitwear shows that the penetration of knitted samples obtained from cotton-nitron yarn is less than the penetration of knitted samples obtained from spun cotton yarn.

From the analysis of the technological and physical-mechanical properties of rib stitch knitted fabrics obtained from different raw materials, it was found that the knitted fabric made from cotton-nitron yarn is lighter, more resistant to friction and has higher shape retention properties than the knitted fabric made from cotton yarn.

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