TECHNOLOGICAL INDICATORS AND PHYSICO-MECHANICAL RESEARCH OF FLEECE KNITTED FABRICS WOVEN FROM SPUN COTTON NITRONE YARN

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Approximately 20,000 tons of nitron fiber are produced in Uzbekistan per year. The Republic of Uzbekistan has the opportunity to expand the field of application of nitrone polyacrylonitrile fiber obtained from acrylonitrile copolymer, methyl acrylate and itaconic acid. Due to the increase in high demand for it, the question of increasing its production is being considered, for this it is necessary to increase its hygienic properties, which will allow to use it in the production of children's clothes, special clothes, and to expand the range of knitwear made from a mixture of this fiber with cotton. One of the ways to solve this task is to modify the newly formed fiber with a solution of natural silk production waste. The obtained finished modified fiber will have the hygienic and textile-technological properties of natural fiber. Polyacrylonitrile has high physico-mechanical properties, resistance to melting, heat resistance and resistance to the movement of microorganisms while maintaining fiber properties.

The mixture of modified polyacrylonitron fiber with cotton fiber opens up new possibilities for production of products with new and improved properties [1-8].

The right choice of knitting method in the production of knitted products made of mixed yarn with improved hygienic properties.

The spun cotton yarn is used in the production of inner knitwear and hosiery products, and when outer knitwear products are produced from this yarn, the knitwear has high hygienic properties, as well as low shape retention and wearability. For this reason, the parameters and physical-mechanical properties of woolen knitted fabrics, which can be used in the production of outer knitted products, were studied using spun cotton-nitron yarn mixed with nitron and cotton fibers in the scientific work. For this purpose, 4 variants of woolen knitting samples were knitted on a Pailung knitting machine. Fluffy knitting patterns differ from each other in the types of yarn used. As raw materials, spun cotton yarn with a linear density of 20 tex, spun nitron and cotton-nitron yarn with a linear density of 30 tex were used. The indicators and physical-mechanical properties of the woolen knitted samples were determined and analyzed. It is known that outer knitted products woven from cotton thread have good hygienic properties, but due to their low operational performance and low shape retention properties, the quality indicators of the external appearance of the product are also much lower than those of inner knitwear. This in itself reduces the purchasing power of the product and the demand for the product is very low. The spun cotton-nitron thread made it possible to increase the types of knitted products with high operational, physical and mechanical properties and beautiful appearance. The analyzes carried out in the scientific work show that the mixture with its own characteristics is a 50/50 spun cotton-nitron thread [9-15].

In order to study the characteristics of woolen knitting during the scientific work, nitron yarn with a linear density of 30 tex, spun cotton yarn with a linear density of 20 tex and spun cotton-nitron yarn with a linear density of 30 tex were selected.

In order to study the effect of raw materials on the technological parameters and physical-mechanical properties of woolen knitted fabrics, samples were taken in 4 different options.

The samples obtained differ from each other in the types of raw materials used in production.

Option 1 used spun cotton yarn with a linear density of 20 tex x 2 as the pile yarn and spun nitrone yarn with a linear density of 30 tex x 2 as the base yarn.

Option 2 used spun nitrone yarn with a linear density of 30 tex x 2 as the pile yarn and spun cotton yarn with a linear density of 20 tex x 2 as the base yarn.

Option 3: In the production of woolen knitwear, spun cotton-nitron yarn with a linear density of 30 tex x 2 was used as the pile yarn, and spun cotton yarn with a linear density of 20 tex x 2 was used as the base yarn.

Option 4 used spun cotton yarn with a linear density of 20 tex x 2 as the pile yarn, and spun cotton-nitron yarn with a linear density of 30 tex x 2 as the base yarn.

The technological parameters and physico-mechanical properties of all these options were analyzed by experiment and the analysis results are shown in Table 1. Conclusions obtained from the results of the analysis show that option 4 has the lowest volume density - fleece knitwear. It uses a spun cotton yarn with a linear density of 20 tex x 2 as the pile yarn, and a spun cotton-nitron yarn with a linear density of 30 tex x 2 as the base yarn.

Technological parameters and physico-mechanical properties of woolen knitted fabrics obtained from spun cotton-nitron yarn

Table 1

Indicators		Options			
		I	**II**	**III**	**IV**
Types of threads, linear density		Nitron 30 тex x2 38%	Cotton 20 тex x2 23%	Cotton 20 тex x 2 24%	Cotton-nitron 30 тex x 2 34%
Surface Density (gr/m^2)		487.7	516.25	500.6	489.7
Fabric thickness (mm)		1.52	1.53	1.56	1.61
Bulk density (mg/sm^2)		320.8	337.8	320.9	304.2
Air permeability (sm^3/sm^2·sec)		58.3	65.3	72.6	58.3
Abrasion resistance, thousand/rotation		46.3	53.8	43.6	51.4
Tensile strength, N	height	262.5	245.6	203.2	265.8
	width	190.3	146.1	137.5	214.2
Stretching to break (%)	height	58.7	81.7	64.2	78.8
	width	190.3	154.4	122.2	108.0
Irreversible deformation (%)	height	6.5	10.3	11.4	13.0
	width	28.8	33.8	32.6	19.3
Reverse deformation,(%)	height	13.9	18.2	16.8	10.7
	width	17.2	26.4	21.8	15.1
Tissue penetration, (%)	height	86.1	81.8	83.2	89.3
	width	82.8	73.6	78.2	84.9

The elongation at break values of the samples ranged from 64.2% to 81.7%. Elongation at break in length was the least result seen in option 3 and it was 64.2%, the highest was in option 2 it was 81.7%.

The width development of fleece knitting results in elongation at break from 108% to 190.3%. The smallest result of drawing in its production came out in 4 options, and it was 108%. The biggest result was seen in option 1, and it was 190.3%.

One of the main requirements for the production of knitted outerwear is its shape retention feature, that is, it is important that it retains its shape when used, especially after washing. Having a high rate of shape retention is the main positive side of knitting. In the process of using knitted products, there are small but frequently repeated factors imposed on it.

The change in shape and size of knitwear is also caused by small factors accumulated due to stretching.

One of the most important factors for upper knitted products is that the knitted fabric does not deform during use, that is, it can quickly maintain its original state after the pressure applied to it. This is due to its shape retention property. In the results of the table, we can see that the spun cotton-nitron yarn sample is close to the same level as the spun nitrone yarn sample in terms of its tensile properties. It can be seen that the increase in the percentage of deformation recovery had a very positive effect on the shape retention of the cotton-nitron sample.
The sample obtained from the spun cotton-nitron yarn differs significantly from the sample obtained from the spun cotton yarn by its high shape retention properties. This was especially evident in the case of the use of cotton-nitron yarn spun as the base yarn and cotton yarn spun as the pile yarn (option 4) in the development of woolen knitwear. [16-20].

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