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ANALYSIS OF PHYSICAL-MECHANICAL PROPERTIES OF KNITTED KNITWEAR FABRICS WITH HIGH SHAPE PROPERTIES WITH CHEMICAL YARN

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Abstract: In this article, 3 samples of knitted knitwear with high raw material storage modification were taken and their physical and mechanical properties were studied and analyzed experimentally. LONG-XING LXA 252 (China) 12th grade flat needle experimental samples of single-ply knitted fabric were developed on the bench and graphic notation was given.

Keywords: knitwear, double knit, hoop, yarn, flat, dimensional lightness, hoop height, surface density, pattern, density, hoop thread length, polyacrylonitrile, cotton thread, polyester.

The knitting industry is one of the youngest emerging industries in the light industry. The main reasons for this are the diversity of types of knitted goods produced and their specificity.

Properties and performance of cross-linked and longitudinally woven double-layered knitted fabrics with different structures can meet the requirements for technical and upper knitted products in production practice.

The nature of the raw material used, the type of fabric and the method of processing are the main factors influencing the performance of any knitted fabric. A two-layer knitted fabric may consist of two identical or two different independent fabrics that differ from each other in performance. This is due to the interaction of the independent layers. When one independent layer is attached to a second layer, it can change its initial performance, while the other, in turn, can change the performance of the first layer. Therefore, it is not possible to determine the length and density of the loop strip in the structure of double-layered knitted layers applied to single-layered fabrics, respectively. In addition, these indicators will depend on the type and method of attachment. Technological parameters of knitted fabric can be determined using three methods:

In order to reduce the consumption of raw materials and expand the range of knitted fabrics, as well as to make full use of the technological capabilities of the LONG-XING LXA 252 12G (China) flat needle machine, 3 variants of double-layer knitted fabric and its weaving method were developed. The developed options of single-layer knitted fabric differ from each other in the type of raw material, shape retention properties and a number of other indicators. Technological parameters of single-layer knitted fabric were determined by the experimental method in the laboratory of the Namangan Institute of Engineering Technology, the measurement results are given in the table. As a result of practical research, the texture structure, physical properties and appearance, which characterize the quality indicators of knitwear, were identified.

Indicators that characterize the structure of knitted fabric are: surface and volume density, density in width and length (number of rings per unit length), length of loop

thread, angle of intersection of loop rows and loop columns, thickness of knitted fabric. A graphic representation of the single-layer knitted fabric produced is shown in the figure.

The raw material was 35 tex x 2 polyacrylonitrile, 17 tex x 4 polyester, 20 tex x 4 viscose yarn.
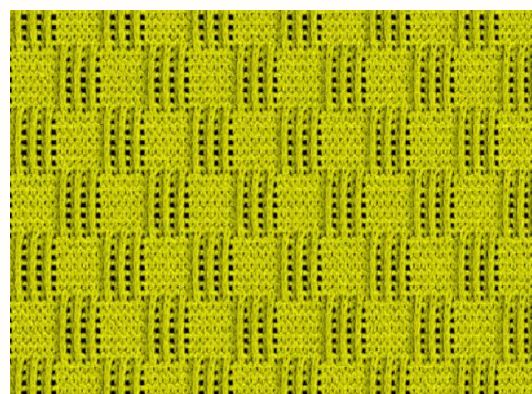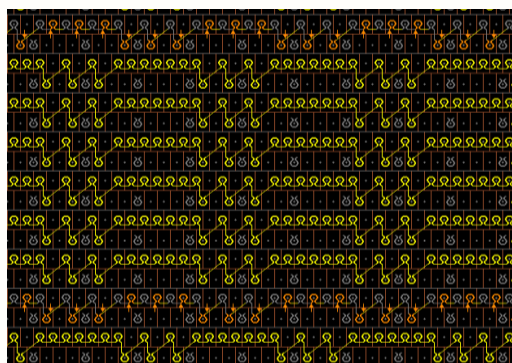
Graphic notation of knitted fabric

It was found that the volume density index of single-layer knitted knitwear in all variants changed significantly compared to the base fabric due to the use of different raw materials in the patterned knitted structure. The volume density of knitwear is one of the main technological indicators, which shows the amount of raw material consumption in knitwear.

As the composition of the raw material in the knitted fabric changes, its thickness and other technological properties change.

Technological parameters of knitted fabric

Table 1

Indicators		Options		
		1	2	3
Type of yarn, linear densities and% amount in fabric	Back layer	Polyacrylonitrile 35 тех x2	Polyacrylonitrile 35 тех x2	Polyacrylonitrile 35 тех x2
	Front layer	Polyacrylonitrile 35тех x2	Viscose 20тех x4	Polyester17 тех x 4
Loop step A (mm)		1.79	1.79	1.79
Loop height V (mm)		1.38	1.3	1.16
Horizontal density Rg (number of loops)		28	28	28
Vertical density Rv (number of loops)		36	43	43
Loop strip length L (mm)	Front layer strip	6.22	7.69	6.11
Knitted surface density Ms (gr / m2)		362	484	462

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Knitting thickness T (mm)	2.46	2,6	2.3
Volume density d (mg / cm3)	150.2	186.2	156.3
Air permeability	43.052	47.34	40.32

The bulk density of the knitted fabric varies considerably over a wide range, depending on the type and thickness of yarn used, the density of the knitting and the type of fabric and the machine class.

The advantages and disadvantages of the raw material were identified by changing the type of raw material in the developed single-layer knitted fabric structure and mixing them together.

The change in the linear density of the raw material of the knitwear leads to an increase in the density of the knit, an increase in its surface density and thickness.

To know the raw material consumption of knitwear, we analyze its bulk density. The change in the type of raw materials in the variants of single-layer knitwear had an impact on the increase in their thickness.

Thus, by changing the raw material type of double-layered knitwear, the production of single-layered knitted fabric with different characteristics, as well as changing the type of raw material to increase cost-effectiveness, improve quality performance, increase shape retention and expand the range of knitted fabrics.

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