ISSN NO: 2770-4491
Date of Publication:11-02-2023

Complex Evaluation Of Quality Indicators Of Two-Layer Knitted Fabrics In New Structure

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Annotation: The article presents comprehensive assessment of the quality indicators of double-layer knitted fabrics of a new structure, produced by needles in rib arrangement, using the technological capabilities of modern double bed knitting machines.

Key words: ribana, needle, double-layer, knitting, quality, indicator, comprehensive assessment.

The fact that each independent layer of a two-layer knitted fabric is a basic, derived, patterned or mixed single-layer fabric is considered common to all fabric structures. [1].

It is known that obtaining mixed fabrics in the repetition of fabric rows or separate elements in a certain order is one of the most promising directions for creating a new range of knitted fabrics. One of them is dubrilinization of single-layer fabrics by weaving. In two-layer knitted fabrics, these fabrics are attached to each other by loop elements during the knitting process.

In the production of mixed double-layer knitted fabrics, knitted fabrics with their own characteristics are woven from two yarns, one of which forms the loops of the front side and the other of the loops of the back side. It was called two-layer tissue by E.P. Pospelov [2].

It is known that when evaluating the quality of knitted fabrics, it is necessary to take into account the technological and physical-mechanical indicators of the fabrics.

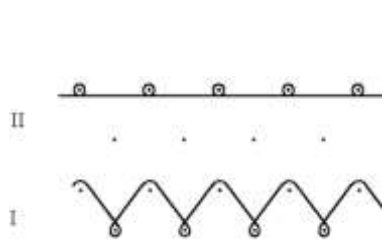
Some of the scientific researches conducted in this direction are studied below.

As a result of the analysis of the technological indicators and physical-mechanical properties of the knitted fabric, it was determined in the next study that the consumption of raw materials per unit of product was reduced from 10% to 12% due to the use of the structure and production method of the two-layered knitted fabric presented in the preparation of knitted products □3 -6□. The effect of the type of yarn used on the parameters and properties of the two-layer knitted fabric was studied in detail. Bonds have been studied for cotton, wool and synthetic yarns made by different methods.

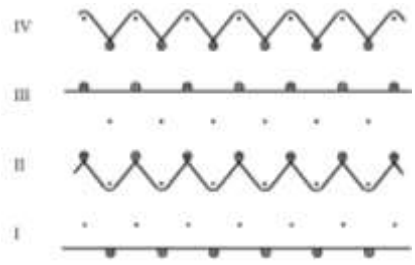
In order to expand the assortment of knitted fabrics, reduce the consumption of raw materials and improve quality indicators, 6 variants of two-layer knitted fabric samples of a new structure were woven on a 14-class flat double-needle knitting machine manufactured by Long Xing LXA 252 SC. The effect of knitting fabric production method and fabric structure on the quality parameters of knitting was investigated by means of a comprehensive evaluation method.

Accordingly, two-layer knitted fabrics of a new structure were woven using polyacrylonitrile (PAN) yarn with a linear density of 30 tex x 2. The new two-layer knitted fabric samples differ from each other in the production method and the change in the fabric structure.

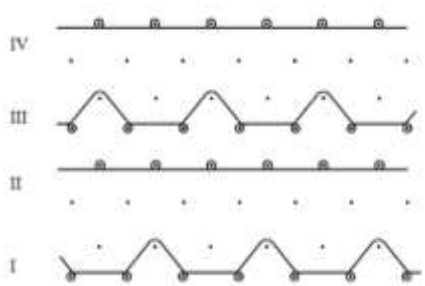
A graphical record of the two-layer knitted fabric of the new structure produced is shown in Fig. 1.



I- option



II- option



III- option

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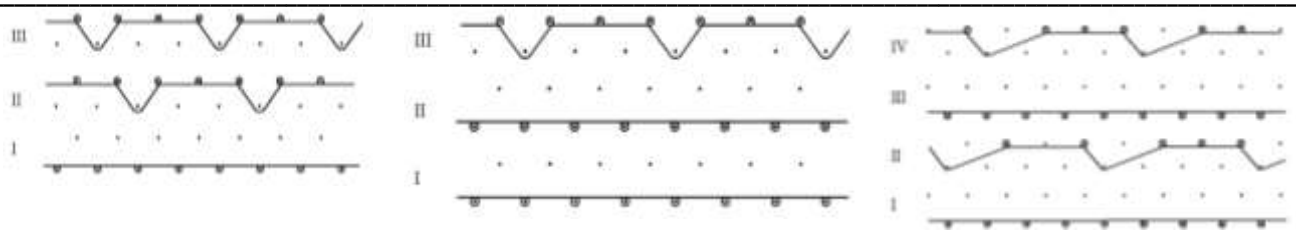

IV- option V- option VI- option

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

There are several methods of evaluating the quality of textile materials, including experimental, organoleptic, expert, sociological, calculated, differential, complex and mixed.

The method of complex quality assessment - joint assessment of the material according to individual indicators of quality sometimes leads to the need for a general assessment of several complex main properties of the material in one indicator [12].

In order to determine the best samples of two-layer knitted fabrics of a new structure, taking into account the above points, and processing the obtained test results, a complex evaluation method of quality indicators was used.

The diagram provides graphical representations of the quality analysis results of knitted fabrics. The graph of the complex diagram is constructed in such a way that its largest contour shows the best quality parameters of the manufactured knitted fabrics, that is, the closer the contour is to the outside, the higher the quality parameters of the knitted fabrics and the closer they are to the requirements.

When distributing the number of indicators and physical mechanical properties of the obtained knitted fabric, the function of the fabric, compliance of the indicators with the established norms and given requirements are taken into account. Therefore, for example, the air permeability of knitted fabrics intended for underwear should have a high value, and for knitted fabrics, it should be less. The function of the fabric is equally important when considering the durability characteristics of a knitted fabric.

In this diagram, the quality indicators of the two-layer knitted fabric samples of the new structure of six options are performed on the basis of comparative analysis. Figure 2 shows the comprehensive evaluation diagram of the quality indicators of the produced two-layer knitted fabric samples, and Figure 3 shows the quality evaluation histogram.

During the research, the most desirable properties needed for outerwear products were collected. For example, the surface and volume density, thickness and air permeability, which describe the heat storage properties of the knitted fabric, friction resistance and breaking strength, which describe the hardness, elongation at break, which describe the shape retention properties, return deformation and penetration indicators are among them. Below is a comprehensive assessment diagram (Figure 2).

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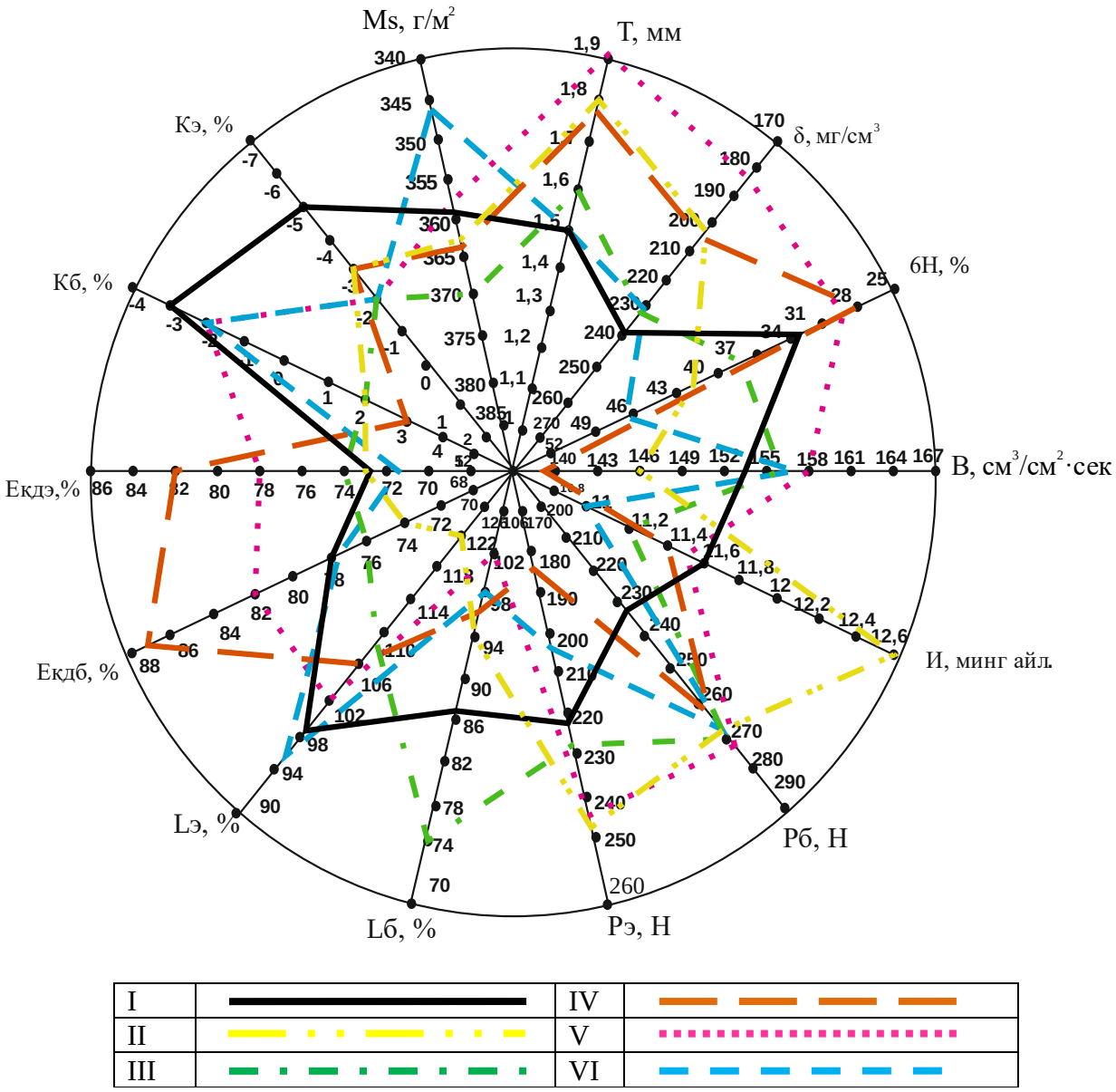

Figure 2. Diagram of comprehensive assessment of quality indicators of double-layer knitted fabric of new structure

After developing a comprehensive evaluation diagram of the quality indicators of the two-layer knitted fabrics of the new structure, the surface of the boundary created by combining with the appropriate lines belonging to each option is calculated using the formulas related to finding the surface of the triangle. The value of the angle between the lines where each quality indicator is located also plays an important role in the calculations.

The values obtained from the comprehensive assessment chart are represented by a comparative histogram.

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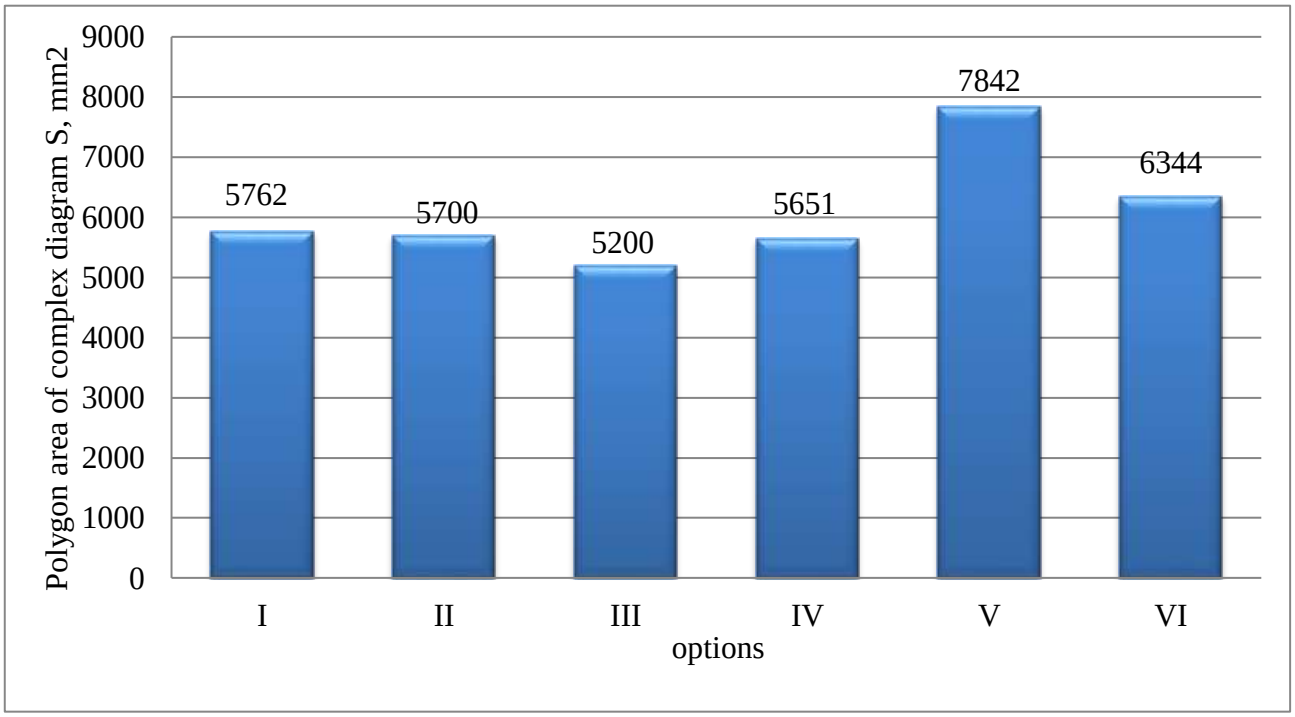

Figure 3. Histogram of comparative comparison of the quality indicators of two-layer knitted fabrics of the new structure

From the analysis of the comprehensive evaluation diagram and comparative comparison histograms of the new structure knitted fabric, it was found that V-variant (7842 mm2) and VI variant (6344 mm2) of the new structured double-layer knitted fabric obtained from polyacrylonitrile raw material with a linear density of 30 tex x 2 recorded the best performance. At the same time, the base. It was determined that the value of the V-variant sample compared to the I-variant was 36.1% higher, and the value of the VI-variant sample was 10.1% higher, and it was recommended for production.

The samples of this option were considered to be two-layer knitted fabrics of a new structure, whose quality indicators were at the level of standard requirements, and whose needles were arranged in a rubbery arrangement with shape-keeping properties and low consumption of raw materials. Double-layer knitted fabrics can be widely used in knitting enterprises, thereby achieving an expansion of the range of products.

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