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TECHNOLOGY FOR OBTAINING KNITTED FABRICS FROM VARIOUS RAW MATERIALS

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Abstract: The textile and clothing and knitwear industry occupies a leading place in the world. The production of textile and garment and knitwear products is increasing day by day, the reason for this is the increase in the level of consumption on a global scale.

Keywords: textile, fabrics, technological and physical-mechanical indicators, lastic 2+1, lastic 1+2, lastic 1+1, cotton, silk and viscose, polyester.

Introduction. Scientific research is being conducted aimed at creating innovative technologies for the textile industry, providing for the effective use of modern scientific and technical achievements, and improving existing ones. Currently, the low cost of knitted products is ensured by the production of knitted fabrics with specified structural and special properties. One of the important tasks is the development and scientific substantiation of the regularities of the influence of the structure, composition, and production process of knitted fabrics on product quality [1].

One of the scientific and practical problems facing scientists in the textile industry is the development of a new resource-saving technology for obtaining new knitted fabric using existing technologies, the effective use of local raw materials, research on quality indicators, expanding the range of products, reducing the cost of production, and expanding the technological capabilities of knitting machines by improving the technology for obtaining knitted fabrics with a new structure [2; 42-46p].

Methodology & Empirical Analysis. The structure of knitted fabric is an important characteristic of it, and its filling with threads per unit area is less than that of knitted fabrics. For this reason, knitted fabrics have a high volume content (knitted fabric density 0.2-0.3 g/sm^3, fabric density 11.3 g/sm^3) [3; 9-12 p].

The raw material consumption for the product obtained by the knitting method is higher than for the product obtained by the knitting method.

The composition of knitted fabric is rich in various weaves, which cannot be analyzed without practical knowledge. Currently, a wide range of various knitted fabric samples are being produced that combine external effects and physical-mechanical properties [4.,513-514p].

By introducing patterned fabric elements into the structure of knitted fabric, it is possible to reduce raw material consumption.

Currently, there is great interest in obtaining knitted fabrics produced on circular two-bed jacquard machines, which are widely used in local enterprises for the production of outer knitwear [5.,397-404p].

On the basis of patterned knitted fabrics, knitted fabrics with new properties are obtained by introducing additional elements (half-rings, loops, additional threads) or by changing the production process [6.,87p].

Technological and physical-mechanical indicators of knitted fabrics were determined experimentally in the laboratory for testing knitted and textile products of the Namangan Institute of Engineering and Technology.

Clothes made with the full use of synthetic threads have lower hygienic properties, but if a certain percentage of synthetic threads are added to natural raw materials, the marketable properties of the product are significantly improved [7., 65-73b; 8., p.17-19].

Results. Knitted fabric samples were obtained using different raw materials, and the structure of the fabric based on plain and elastic weave was obtained by the same method. Sample I is made of 50% cotton yarn and 50% viscose yarn, Sample II is made of 85% cotton yarn and 15% silk, Sample III is made of 15% silk and 85% viscose [9].

Sample IV was developed using 100% cotton yarn, and sample V - 50% cotton yarn and 50% polyester.

1st sample

2nd sample

3rd sample

4th sample

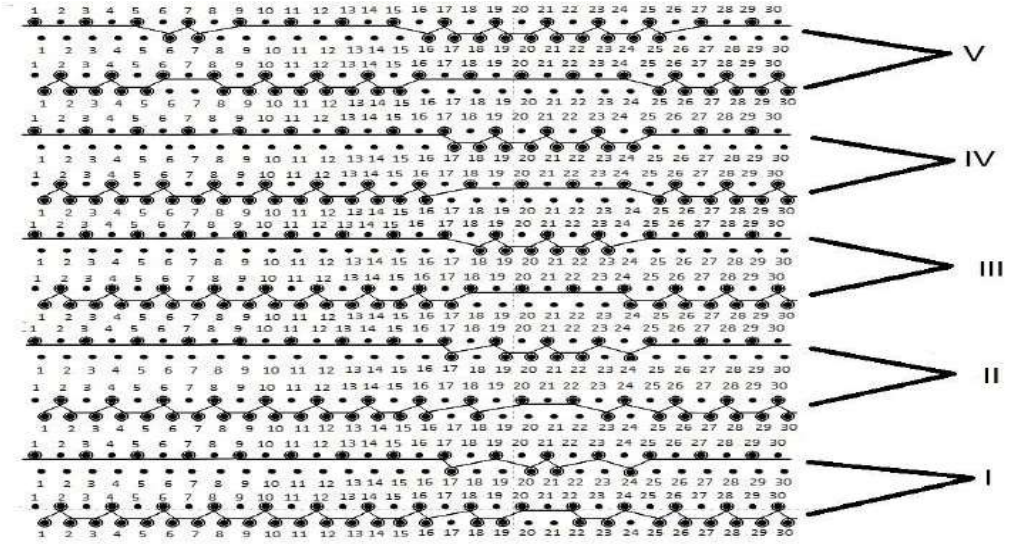
5th sample

Pic 1. Appearance of knitted fabrics obtained from various raw materials

The type of raw material used in knitted fabrics, yarn and yarn number, and fiber composition influence its various properties.

In all variants of knitted fabric obtained from different raw materials, the structure of the fabric is the same, and two loop-forming systems are involved in its production on a double-circular needle bed machine: a cylindrical needle bed and a rib washer.

As a result of the operation of loop-forming systems in the given sequence, horizontal rollers are formed on one or both sides of the knitted fabric. In the loop-forming system for knitting heddle rows, the design of the lifting wedges should be such that the wedge ensures the operation of all the needles in the cylinder and disk, which means that each system should have a two-stage wedge in the cylinder and disk. The resulting knitted fabric has a diamond-shaped pattern, which is obtaine by rubbing the needles of the knitted fabric (pic. 1).



Pic 2. Graphical recording of knitted fabric samples obtained from various raw materials

When producing knitted fabrics, the maximum capabilities of the double-circular needle bed machine were widely used.

When creating a double-layered patterned knitted fabric, a patterned fabric was obtained by blending lastic 2+1, lastic 1+2, lastic 1+1, and derivative smooth knitted fabric using ribs and cylindrical needles (Fig. 2).

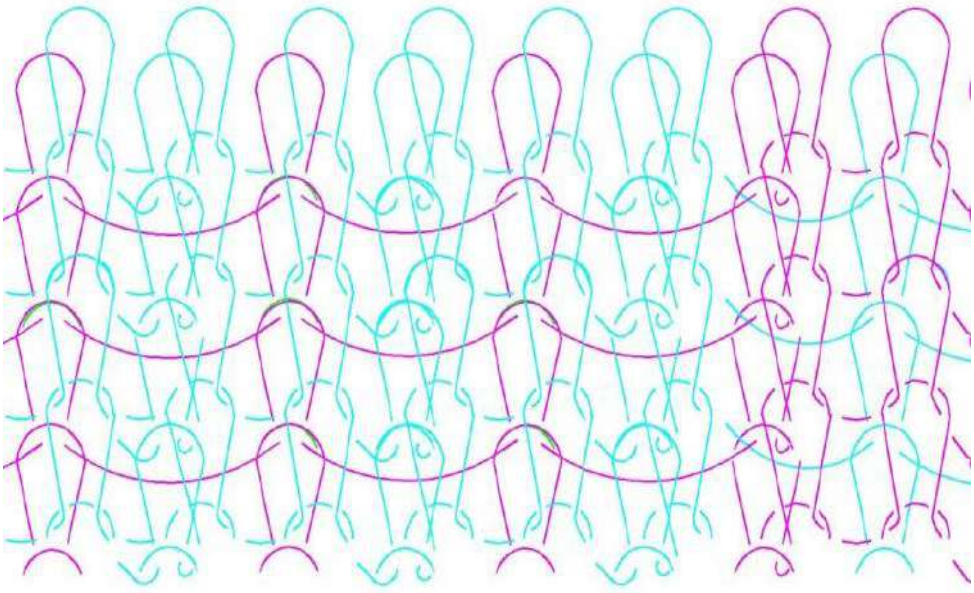
The repeat of this knitted fabric was 5 lengthwise and 30 crosswise.

The first row is woven using two threads. From yarn 1, 16 needles of the cylinder needle box and two needles of the ribshaibe needle box, i.e., on needles 2, 4, 6....16, a lastic 2+1 knitted fabric was formed, then from the needle of the cylinder needle box, one needle was dropped to form a lastic 1+2 and two needles were dropped to form a lastic 1+2 knitted fabric, and another needle was dropped to form a lastic 2+1 knitted fabric. From the 2nd yarn, through the needle on the ribsheba needle to the needle 17, the derivative knit, on the needles 17 of the cylinder and ribsheba needle bed, the elastic 1+1, on the needle 20 of the cylinder and on the needle 19 of the ribsheba, the elastic 1+1, this process was repeated once on the needles 21 and 22, 23, from the needle 25 the knitting of the derivative knit continued. It should be noted that rings were formed on all the needles of the cylinder and ribsheet needle beds.

The 2nd row is woven using two threads. From yarn 1, through 16 needles of the cylinder needle bed and two needles of the ribsheba needle bed, i.e., on needles 2, 4, 6....16, a knitted fabric of elastic 2+1 is formed, then one needle is dropped from the needle of the cylinder needle bed to form a knitted fabric of elastic 1+1 and a derivative plain on the ribsheba needle, and from needle 23, knitted fabric of elastic 2+1 continues.

The 3rd row is also woven using two threads. From yarn 1, 17 needles of the cylinder needle bed and two needles of the ribsheba needle bed, i.e., on needles 2, 4, 6....16, elastic 2+1 knitted fabric was formed, then on needles 18, 20, 22, 24 of the ribsheba needle bed, through the needle, derivative plain fabric was woven, and on needle 24 of the cylinder needle bed, elastic 2+1 knitted fabric was woven. From the 2nd yarn to the 17th needle, through the needle, from the 18th needle to the 23rd needle, a derivative knit fabric of elastic 1+1, elastic 2+2 was formed.

The 4th row is also woven using two threads. From yarn 1, 16 needles of the cylinder needle bed and two needles of the ribsheba needle bed, i.e., on needles 2, 4, 6....16, elastic 2+1 knitted fabric was formed, then on needles 18, 20, 22, 24 of the ribsheba needle bed, through needles, derivative plain fabric was woven, and on needles of the cylinder needle bed 24, elastic 2+1 knitted fabric was woven. From the 2nd yarn to the 17th needle, through the needle, derivative plain, from the 18th needle to the 23rd needle, lastic 1+1 and lastic 2+2 knitted fabrics were formed.



Pic 3. Fabric structure of knitted fabric samples obtained from various raw materials

The 5th row is also woven using two threads. From yarn 1, 5 needles of the cylindrical needle bed and two needles of the ribshaibe needle bed were used to create a 2+1 elastic knitted fabric on needles 2, 4, on needles 6, 8 of the ribshaibe needle - a derivative plain, on needles 8 and 16 - a 2+1 elastic knitted fabric, on needles 16-24 of the ribshaibe needle bed - a derivative plain, from needles 25 to 30 - a 2+1 elastic knitted fabric.

Due to the use of these weaves, a diamond pattern was obtained on the surface of the knitted fabric. Due to the effective use of inter-needle derivative plain and elastic knitted fabrics, an improvement in the quality indicators of the fabrics was achieved.

The obtained knitted fabrics can be obtained on circular knitting machines using various local raw materials and are intended for cutting and sewing outer knitted products.

Conclusion. The technological capabilities and all systems of modern two-bed knitting machines were studied, and a technology for producing knitted fabrics of a new structure from local raw materials was created, widely using the capabilities of two-bed circular knitting machines. On a double-circular knitting machine, knitted fabrics based on cotton, silk and viscose, polyester from local raw materials with the same fabric structure were obtained.

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