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Research Article

STUDY OF TECHNOLOGICAL INDICATORS OF DERIVATIVE PLAIN WEFT KNITTED TISSUE IN A NEW STRUCTURE

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ABSTRACT

New structures of knitted fabrics and methods for their production have been developed by expanding the technological capabilities of modern knitting equipment, which allows solving a number of important tasks in knitting production: obtaining competitive products of a new range with regulation of properties and prices in a wide range. All variants of knitwear were developed under the same conditions: the tension, the depth of the thread culling and the pulling force of the knitwear were the same. The studied samples of knitwear were produced from different structures in various located loops and elongated broaches. The type of structure and graphics used for knitwear samples affects its technological parameters, despite the fact that all samples are made with the same yarn. This means that it is possible to expand the range of knitted fabrics and reduce the consumption of raw materials in the development of it, not only by changing the yarn, but also by choosing the right weave patterns.

KEYWORDS

knitting, weaving, derivative plain, technological parameters, loop, loop step, loop row height, horizontal and vertical density, loop yarn length, surface density, bulk density.

INTRODUCTION

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Issues of expanding the range of competitive knitted products due to the effective use of additional elements in modern knitwear production, producing clean knitted products with high ecological and hygienic properties from natural raw materials, mastering new types of raw materials and types of patterns, improving the quality indicators of knitted products are becoming more and more important. Also, the development and implementation of resource-saving technologies is considered a priority, and in developed countries "Special attention is paid to filling the foreign and domestic market with 75-85 percent domestic products due to the textile industry and sewing production being directed".

In addition, using technologies for the production of knitted products with high hygienic properties, changing the structure of fabrics and adding additional elements to fabrics, increasing resource efficiency and reducing the cost of products due to the effective use of raw materials is one of the most important tasks of today.

The structure or construction of knitwear, like any textile product, is determined by the size, shape and relative location of its constituent elements. Depending on the shape, the elements of the knitted structure can be loops, arcs and additional yarns. In some types of knitting, along with loops, arcs and tuck stitch, pieces of additional thread (elements) can be included in the structure. A knitted fabric is formed by connecting the elements of the knitting structure in a certain sequence.

The columns of the front and back rings alternate in the derivative plain, the rows themselves are derivative, and the connecting elements - the tuck stitches of the front loops - are in front of the rear loops, and the projections of the rear loops - behind the front loops.

In Figure 1. It shows the interlacing of threads in the proposed fabric. It can be seen that all front 1 and rear 2 rings are located in separate columns.

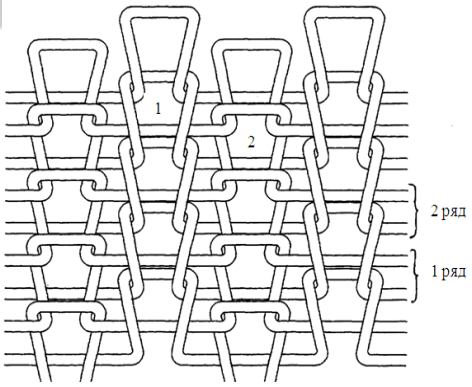

Figure 1. Structure of a one-layer derivative plain weft knitted fabrics

The offered knitted fabrics can be used for sewing children's outerwear. As the first option (base fabric), the derivative plain fabric, which is knitted in knitwear production enterprises and used for sewing children's tops, was selected, and fabric samples are produced based on the modification of this fabric. New sample variants of manufactured knitted fabric are shown in

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Fig. 2. Polyacrylonitrile yarn with a linear density of 20 tex x 2 was used as a raw material.

The technological parameters of the proposed knitting options were determined by the standard method in the laboratory of the Namangan Institute of Textile Industry, and the results are presented in Table 1.

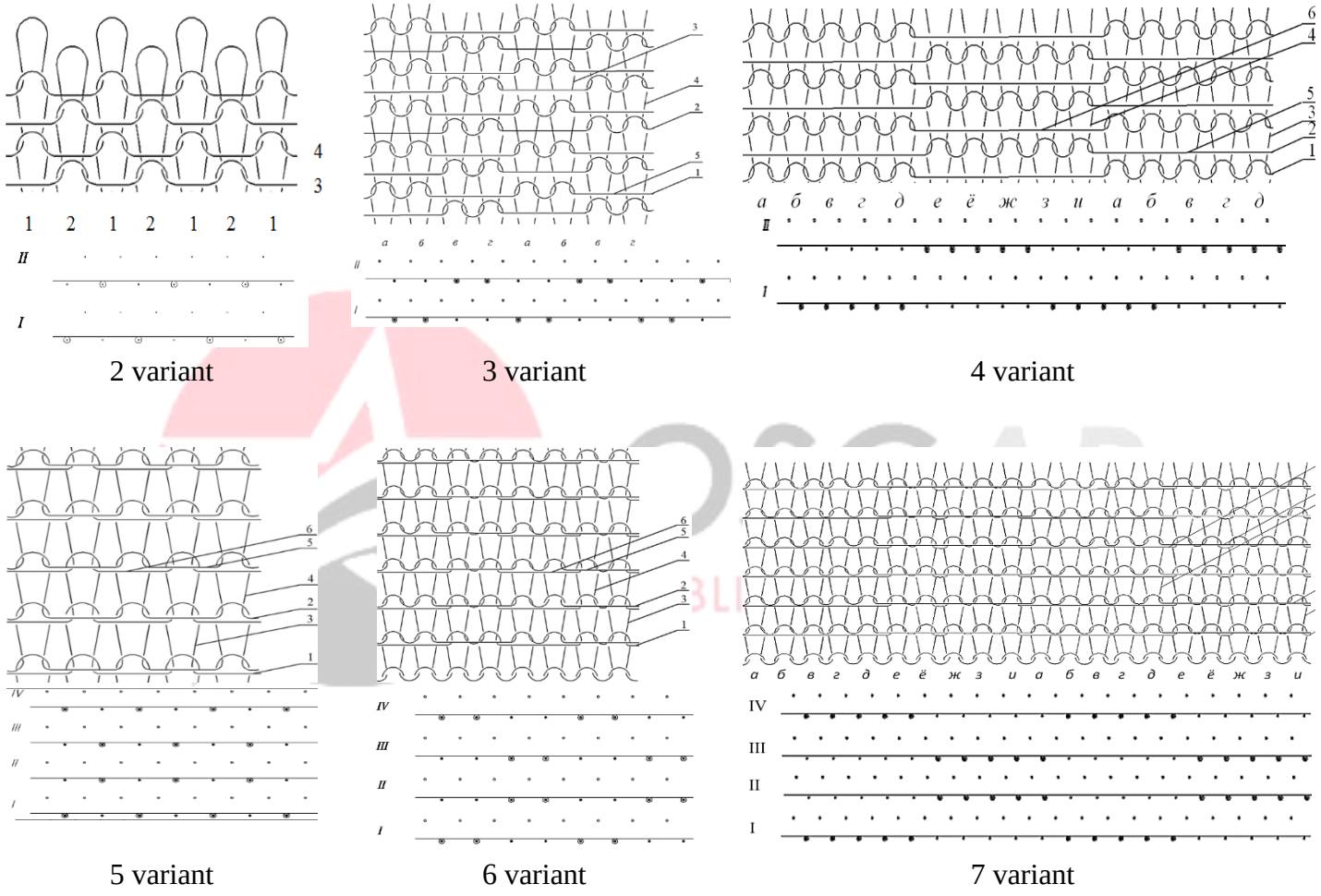

Figure 2. Structure and graphic notation of knitted fabrics in a new structure

By analyzing the results of the research, it can be noted that in the production of knitwear samples, despite the fact that all samples are produced with the same type of yarn, the change in structure affects its technological parameters.

Technological indicators of sample options of knitted fabric of the new structure

Indicators	Variants

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	I	II	III	IV	V	VI	VII
Thread type and linear density	Polyacrylonitrile PAN 20 tex x 2						
Loop pitch A, mm	1,42	1,11	1,11	0,83	1,35	1,43	0,83
Loop row height B, mm	1,0	1,11	1,11	1,25	1,03	0,9	0,9
Horizontal density R_h,	35	45	45	60	37	35	60
Vertical density R_v,	50	45	45	40	53	55	55
The length of the loop thread is l, mm	5,28	4,74	4,02	4,38	3,76	3,6	4,4
Surface density M_s, g/m^2 ,	192,6	222,1	240,1	291,3	253,6	288,2	369,8
Thickness T, mm	0,6	0,7	0,8	1,2	0,9	1,18	1,2
Bulk density δ, mg/sm^3	321	317,3	300,12	242,7	281,7	244,2	308,2
Absolute volume density Δδ, mg/sm^3	-	3,7	20,88	78,3	39,3	76,8	12,8
Relative volumetric lightness θ, %	-	1,2	6,5	24,4	12,3	24	4

Comparing the obtained results with each other, we can conclude that the best options are knitting options IV, V and VI.

These options are resource-efficient and feature high form retention. Therefore, we can recommend for the production of high-quality outerwear products for adults and children.

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