

ANALYZING PHYSICAL-MECHANICAL PROPERTIES OF INTERLOCK STRUCTURE WITH DIFFERENT PATTERN EFFECTS

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Abstract. *In this article five variants of interlock structures with different patterning of knitwear were developed to determine technological parameters and physical-mechanical properties in knitwear, which differ from each other by laying the yarn on the needle in the rapport of the interlooping to form patterns.*

Key words: knitted fabric, interloping, cardigan patterned structure, interlock structure, air permeability, breaking load, tensile elongation, surface density, patterning, selection mechanisms.

Textile industry is a strategic sector for the economy of Uzbekistan, providing a high level employment of the population, contribution to the economic and industrial potential and the international prestige of the state. The unique geopolitical position of Uzbekistan makes it possible to be in direct economic dialogue with many countries and to pursue mutually beneficial business cooperation with both the countries of Europe and Asia.

The most important task set by the state is to achieve a sustainable place of textile products in the international market and contribute the achievement of the level of economically developed countries of the world.

Based on the importance of the textile industry for the economic development of the country, Uzbekistan is implementing a Program of measures for further development of the textile, garment and knitwear industry for 2017-2019. According to the Program, by 2020 the production of cotton yarn is planned to increase by 2.5 times, finished fabrics – by 2.8 times, silk fabrics – by 2.7 times, nonwoven materials – by 1.5 times, knitted fabric – by 2, 7 times. It is planned to increase the output of garments by 3.2 times, knitwear by 2.1 times, production of raw silk by 2.1 times.

The production of knitwear is developing at priority rates, new technologies are being applied and the range of knitwear is expanding.

In industry, commerce and services, the production of knitwear, combining high technology and low cost with good consumer properties is urgently needed. Therefore, the solution of the above problems in the technology of knitwear production is particular important and necessary.

For projecting every fabric, before using cardigan patterned structures with various color and texture effects, first of all, should be intended the possibility of producing different assortments of garments on a particular type of equipment. It is necessary to take into account the influence of the structure of knitwear on the visual perception of the pattern during projecting the garments. Therefore, pattern-forming questions are paramount important.

One of the trends in the transformation of modern industrial production, caused by changes in the demand of the population is a constant reduction in the proportion of similar types of mass-produced products and a simultaneous increase in the share of small-scale production. The change in the artistic direction of fashion entails a change in the design of knitwear, which creates a number of difficult problems for modern mass production of clothing.

In knitting cardigan patterned fabrics, the selection of needles or other working bodies on knitting machines is carried out in a predetermined sequence for different purposes, for example, for full looping, for making tuck stitches, for ensuring the non-working position of the needles or for transferring the loops. The method of needle selection determines the character and repeatability of the cardigan pattern, formed on the fabric and it is ensured by the appropriate construction of the selection mechanisms, which are used on knitting machines [1, 2].

In the department "Technologies of textile fabrics" performed a research work, related to the study and expansion of the technological capabilities of modern knitting machines. The computer equipment of the machines allows individual selection of needles when creating cardigan patterns on garments with using different colors, as well as the size and repeat of the created pattern. This makes it possible to achieve a different types of pattern which visually create different emotional expressiveness.

To determine technological parameters and physical-mechanical properties in knitwear, five variants of interlock structures with different patterning of knitwear were developed and produced on the TERROT interlock machine. The results of analyses given in table 1.

Table 1 – Indicators of physical-mechanical properties of knitting

Options	Air permeability B (sm ³ /sm ² s)	Breaking load P(N)		Tensile elongation, L(%)		Shrinkage of the fabricY, %		The surface density of knitwear, Ms (gr/m ²)
		Acrossthe length	Acrossthe width	Acrossthe length	Acrossthe width	Acrossthe length	Acrossthe width	
1	211,9	278,3	232,6	95,0	153,2	22,4	12,34	191,3
2	216,3	271,8	221,3	91,0	144,4	17	19	187,78
3	211,9	264,7	195,2	77,7	134,2	17,8	18,4	194,12
4	249	172,7	142,7	61,5	159,3	21,9	12,1	171,28
5	232,6	240,9	219,8	75,5	145,8	20,3	16,8	182,6

The patterned effect on the surface of the fabric is due to the selection of needles in the cylinder and the machine's rippershaibe.

To determine the technological parameters and physical-mechanical properties of knitting were analyzed by the following indicators: air permeability, breaking load, tensile elongation, shrinkage of the fabric, the surface density of knitwear.

From the results of the analysis, it was determined that the highest air permeability is observed in option 4, and the lowest in options 1 and 3, the difference between the maximum and minimum values is 15%. The highest breaking load in length is 278 N, and the lowest is 172 N, the difference is 38%. The highest breaking load in width is 232 N, and the lowest - 142 N, the difference is 38%. The highest rate of tensile elongation in length is 95%, and the lowest is 61%, the difference is 36%. In width, the highest rate of tensile elongation is 159%, and the lowest is 134%, the difference is 16% (Fig. 1,2).

Patterning on knitting machines is an interesting direction. From this point of view for projecting knitwear, knitting machines present the great interest, which allow to make patterned knit structure. Due to a wide range of patterned capabilities, construction of selection mechanisms of knitting machine allows to diversify the range of garments. The use of various structures of knitting in the creation of knitwear garments allows expand the range of garments, improve the appearance and quality of garments significantly by using the technological capabilities of equipment, as well as supplying the market with competitive products.

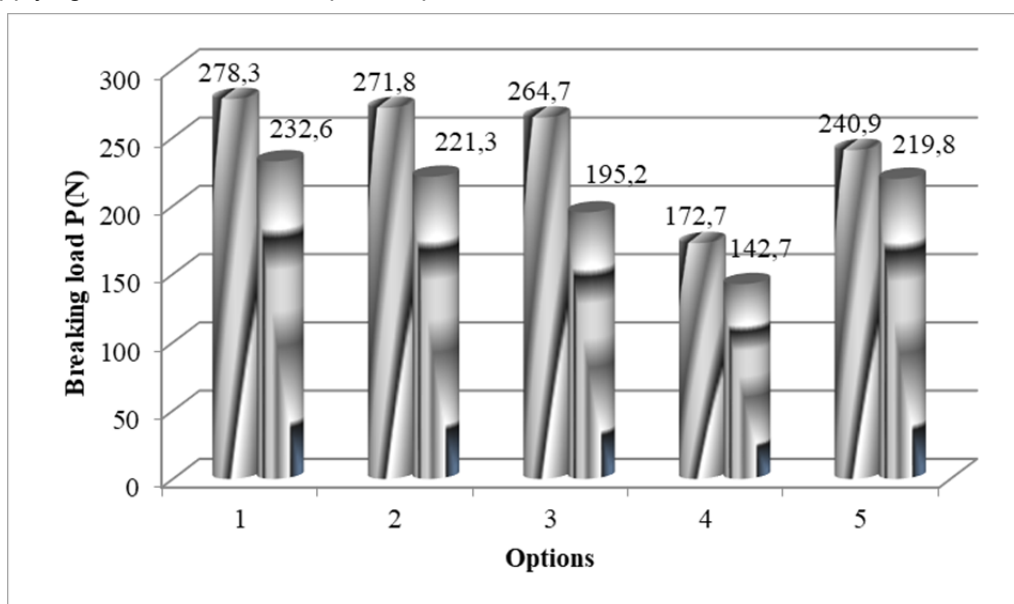


Figure1 – Breaking load by options

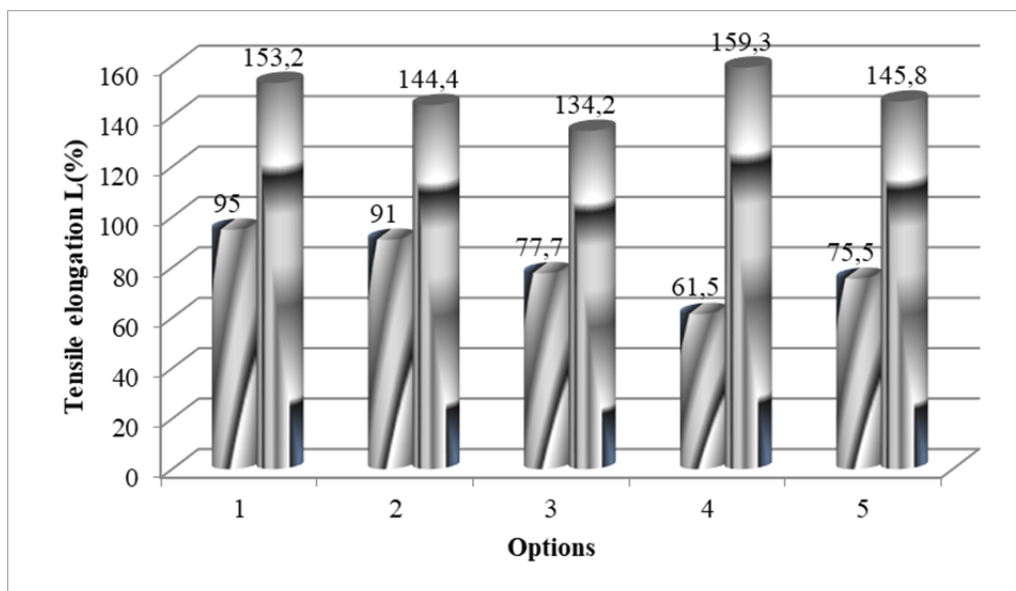


Figure 2 – Tensile elongation by options

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ИССЛЕДОВАНИЕ ДЕФОРМАЦИОННЫХ ХАРАКТЕРИСТИК УТОЧНОГО ДВУХСЛОЙНОГО ТРИКОТАЖА

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Реферат. Разработана новая структура уточного двухслойного трикотажа, получены образцы, в которых в качестве сырья для обоих слоёв и для уточной нити применялась полиакрилонитрильная пряжа линейной плотностью 31 тексх2, и исследованы их свойства.

Ключевые слова: уточный трикотаж, двухслойный трикотаж, верхний трикотаж, плосковязальная машина, структура, свойства.

В зависимости от назначения трикотажного полотна и условий его эксплуатации подбираются показатели для характеристики его структуры, физико-механических и физических свойств, так же как и перечень дефектов полотна в зависимости от его назначения и вида того оборудования, на котором оно получено.

Такие показатели, как водопоглощение и гигроскопичность, очень важны для бельевых полотен, которые соприкасаются непосредственно с телом человека и должны способствовать эвакуации образующейся на нем влаги.

Для изделий верхнего ассортимента эти показатели существенного значения не имеют.

Двухслойный трикотаж может содержать любые известные элементы петельной структуры в разных сочетаниях, поэтому отдельные его виды могут входить в различные группы предлагаемых в настоящее время систем деления трикотажа комбинированных переплетений по сочетанию элементов структуры. Но наличие нескольких общих черт, обусловливаемых особенностями строения любого двухслойного трикотажа, позволяет изучать его структуры в одной работе [1].