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Research Of Physical And Mechanical Indicators Of Jense And Knitted Fabrics Recommended For Children's Combined Outerwear

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ABSTRACT

The article examines and analyzes the physical and mechanical properties of different proportions of jeans and knitted fabrics recommended for children's combined outerwear. It also offers the most alternative fabric patterns for children's outerwear.

KEYWORDS

Fabric, denim, knitting, air permeability, mass, tensile strength, elongation, breaking force, deformation, thickness, Lycra.

INTRODUCTION

In today's world of clothing, not only the consumer demand or fashion trend, but also the right choice of fabric to suit the product, depending on who and for what purpose, for what season, at the same time, special

attention is paid to creating a model that matches the characteristics of the fabric.

The expansion of these issues also includes tasks such as improving the technological

processes of production, labor productivity, and product quality. By designing high-quality children's sportswear and correctly approaching the modern economic features of their production, production as a high quality seasonal sewing item.

The practical and scientific design of clothing plays a leading role in solving the problems of the garment industry, because at this stage of design, the social and technical-economic requirements for clothing and its quality must be fully taken into account. Based on these requirements, a new clothing model will be developed. In children's sportswear, first of all, the fabric chosen for sewing clothes should be resistant to the dynamic movements of children, which should serve to improve air circulation in them. In a market economy, the demand for knitwear is growing day by day. One of the main requirements of today is to expand the range of top knitwear for children, given the current technological capabilities. It is known that different types of knitted fabrics are produced: glad, fleece, chain, knitwear, sukno, sharme, and others. Due to the high

natural properties of the study - cotton, linen, wool - fibrous fabrics were selected as the preferred fabrics for children's combined clothing, knitwear of different sizes and denim fabric were selected. In order to determine the physical and mechanical properties of knitted fabrics from 10% lycra with 90% cotton fiber, 7% lycra with 93% cotton fiber, 5% lycra with 95% cotton fiber, as well as from 50-60 tex warp and weft yarns, samples with a mass of 282-340 g of 1 m² of fabric woven in twill weaving were performed on modern equipment installed in the testing laboratory of the Namangan Institute of Engineering and Technology in order to determine the physical and mechanical properties of the selected fabrics.

Sampling of knitted fabrics was carried out in accordance with GOST 8844-75. Using the DW-1111 machine, the samples were cut to 100x100 mm and the weight of the fabric was measured using an ZK-200C electronic vacuum scale (Fig. 1- (a, b, c, d)).

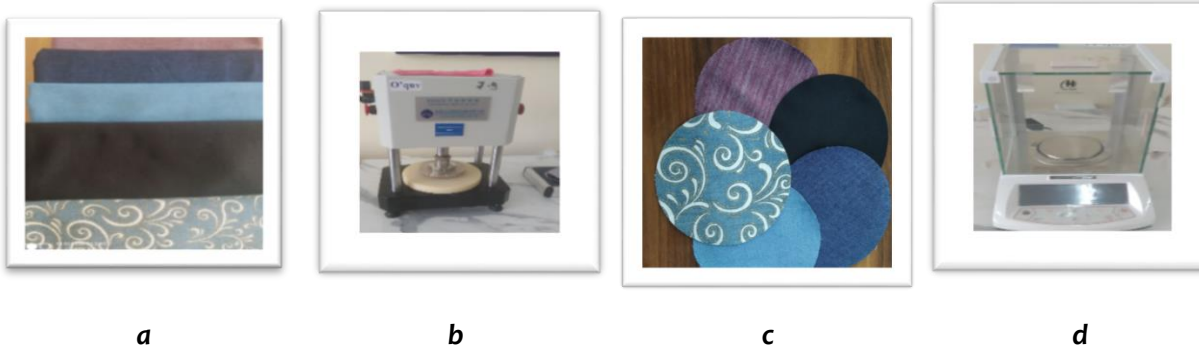


Fig. 1. a) Fabric range b) DW-1111 sample cutting machine c) Samples d) ZK-200C electronic vacuum scales

Table 1.

ITEM parameters	1-variant	2-variant
Count of yanr in fabric, (%)	Spun cotton fiber 90, lycra 10	Spun cotton 95, lycra 5
Knitted surface density ms (gr / m2)	133	249
Knitting thickness T (mm)	0.158	1.030
Volume density d (mg / cm3)	8.41	2.14
Air permeability V (cm3 / cm2 · sec)	44.86	58.05

It is known that denim are made of cotton yarn or yarn mixed with polyester.

Denim fabrics belong to the group of garment fabrics, which are woven from combed yarn and carded yarn spun with a relative linear density of 60 to 100 tex and above, and the mass of 1 m2 of fabric is 250-300 g. will be.

Clothing is in direct contact with the body, and its quality is taken into account in the design of the product.

Therefore, it is necessary to determine the fiber content and physical properties of the fabric.

The air permeability of fabrics is one of the hygienic indicators for children's outerwear, determined by the coefficient indicating the amount of air passing through 1 cm² of fabric per second from the pressure difference applied on both sides of the fabric. Air

permeability on the device YG-461E in accordance with the standard B (cm³/cm² sec) GB / 5453 (ISO 9237) for ready-made garments - pressure - 100Pa, range size - .08.0 mm under normal conditions tested and determined using the following formula.

$$B = \frac{V}{S \cdot T}, \text{ cm}^3 / \text{cm}^2 \cdot \text{sec}$$

Here:

V - the amount of air passing through the fabric at a given pressure difference ΔP, cm³;

S - fabric area, cm²;

T - is the time taken for the air to pass through the fabric, sec.

The air permeability in the selected knitted fabrics varied from 44,865 cm³ / cm² sec to 58,051 cm³ / cm² sec (Fig. 2).

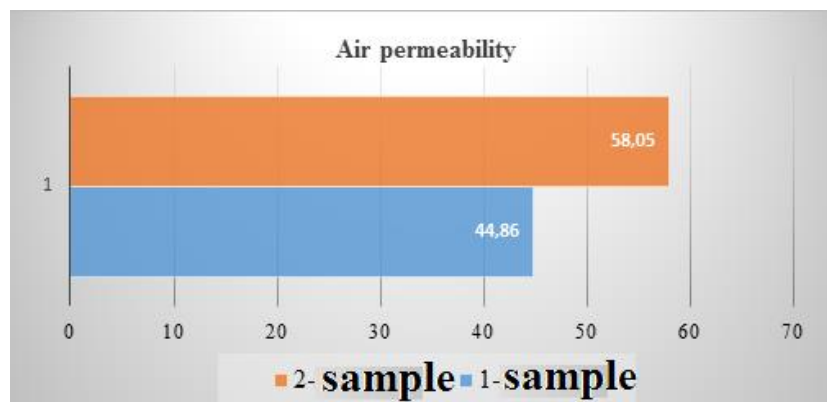


Fig. 2. Analysis of air permeability of samples

The linear density of the fabric is one of the most important indicators of the garment, and the weight should be taken into account,

especially when sewing children's clothes. The selected fabrics were determined in T (mm) units for the thickness of the fabrics for children's outerwear.

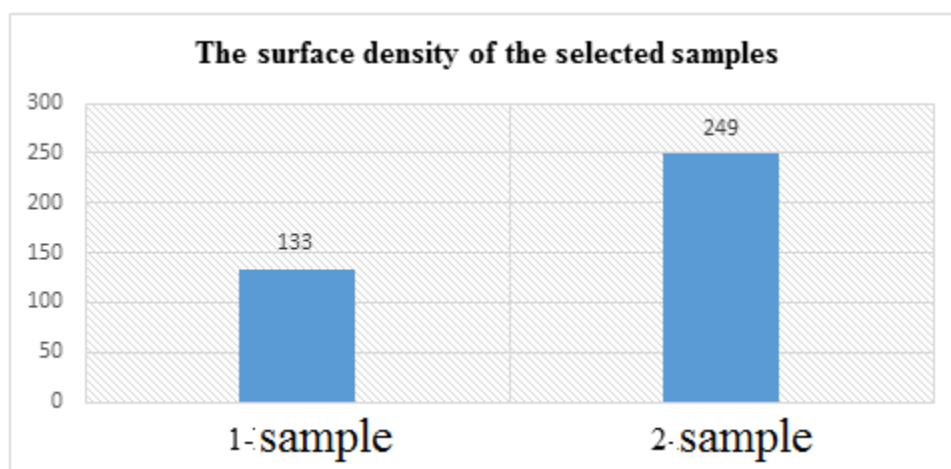


Fig. 3. Surface density of knitted patterns

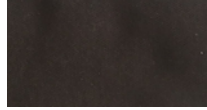

The main quality indicator of fabrics is characterized by tensile strength. In the research work, the breaking force was prepared according to the standard method, the length and width of the samples were 30 x 5 cm, and for 30 minutes using a dynamometer "YG-026T" - 454 x 3 (13 N). results were obtained. The results obtained were calculated using the following formula (Table 2).

$$e = 100 (L_2 - L_1) / L_1 * 100$$

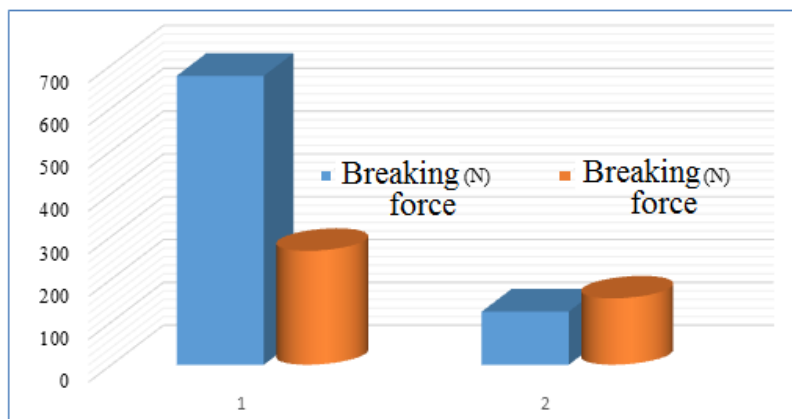
Here:

L1- Initial length of sample, mm., L2 - length at break, mm

Table 2. The tensile strength of knitted patterns

ITEMS		Knitted fabric samples	
		I 	II 
Breaking force P (N)	Height	675	124
	Width	266	155
Elongation L (%)	Height	65.45	82.15
	Width	139.6	126.8
Irreversible deformation, ϵ_H (%)	Height	02.ИЮ/1	99.93
	Width	34.98	36.2
Reversible deformation, ϵ_o (%)	Height	97.3	0.07
	Width	65.02	63.80
Friction resistance I (thousand. circle)		85.700	21.400

In the analysis, the re-deformation (height) of the sample varied from 0.07% to 97.3%. The lowest result was observed in variant- II knitted fabric (Fig. 4).



The relative elongation in the selected jeans fabrics ranged from 10.50% to 38.95%. The lowest relative elongation was found in variant 1 fabric.

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In denim fabrics, the lowest air permeability from 3,751 cm³ / cm²*sec to 5,260 cm³ / cm²*sec was observed in the selected variant 1 of Denim fabric (Table 2).

The results show that the knitwear patterns have significantly higher elongation than Denim fabrics and have changed significantly even under the influence of a small force. The results obtained from the selected fabric samples showed that the re-deformation

varied from 0.07% to 97.3%. The lowest result was observed in the neck deformation of 0.07% of variant II knitted fabric. The reverse deformation of the fabric width increased from 0.19% to 80%. The highest width reverse deformation was observed in Denim fabric with 80% result in variant III. The irreversible deformation along the length of the fabric

increased from 2.3% to 99.93%. The highest irreversible deformation was observed in variant II fabric among the selected fabrics. Irreversible deformation rates in the width of the fabric increased from 20% to 99.8%, and the highest rate was observed in the I-variant fabric with 99.8%.

Table 3.

ITEMS		Knitted fabric samples		
		I	II	III
				
Sample surface density (gr / m ²)		1.89	3.74	2.14
Sample thickness, T (mm)		0.123	1.38	0.22
Volume density d (mg / cm ³)		15.36	3.60	9.72
Air permeability V (cm ³ / cm ² · sec)		3.751	5.260	3.93
Breaking force, P (N)	Height	598	508	691
	Width	413	369	391
Elongation, L (%)	Height	9.40	21.35	15.95
	Width	54.65	16.10	35.30
Irreversible deformation, ε _H (%)	Height	90	77.8	75
	Width	99.8	20	87.5
Reversible deformation, ε ₀ (%)	Height	10	22.2	25
	Width	0.19	80	12.5
Friction resistance I (thousand. circle)		76.080	4.132	87.00

Another factor to consider when choosing a fabric for children's outerwear is the abrasion resistance of the fabric. Fabric samples were tested using the YG401B friction tester. Fabric samples of 100x100 mm were subjected to a load of 9 kPa at a speed of 20-70 rpm and placed at 90,000 cycles. The degree of peeling of fabrics was observed from 859 to 2692 cycles when the equipment was started at a speed of 70 rpm under a load of 9 kPa.

The results show that the highest peeling fabric is in the variant III fabric, low-peeling fabric was observed at 2692 cycles in variant I fabric.

Fabric degradation was the highest in the sample, with 19,332 cycles degraded in variant II fabric. The most durable non-abrasive fabric was observed in these I and V variants. The results are given in Table 3.

CONCLUSION

Research shows that it is very important to choose a suitable fabric for children's outerwear, taking into account not only their aesthetic but also their physical and mechanical properties.

High-quality, low-stretch, well-breathable fabrics are always in high demand. The most popular fabrics for children's outerwear are Denim and knitted fabrics made of natural fibers.

REFERENCES

1. Ergashev, J. S., Nazarova, M. A., & Abdurafova, S. Q. (2020). Research of production of kindergarten children's clothes on the basis of analysis of knitted fabrics with high physical and mechanical properties. *ISJ Theoretical & Applied Science*, 10 (90), 63-68. SoI: <http://s-o-i.org/1.1/TAS-10-90-15> Doi: <https://dx.doi.org/10.15863/TAS.2020.10.90.15>
2. Ergashev J.S, O.B. Mamadalieva, V.B. Umarova, Nazarova M.A, (2020). The Importance of Modeling Modern National Clothes. *International Journal Of Advanced Research In Science, Engineering And Technology*. 7(9)
3. Ergashev J.S, Nazarova M.A, Abdurafova S.Q (2020). The research of the preliminary projects for Elaboration of new model of fabric selection on the Basis of the analysis of the children's garments. *International Journal of Research in Economics and Social Sciences(IJRESS)*. 10(8).
4. Juraboev, A. T., Kholiqov, Q. M., & Shog'ofurov, S. S. (2020). The study of the technological parameters of double layer knitwear with various methods of connecting layers. *ACADEMICIA: An International Multidisciplinary Research Journal*, 10(4), 397-404.
5. Kholikov, K. M., Zhuraboev, A. T., Shogofurov, S. S., & Abduvaliev, D. M. (2014). Comprehensive assessment of the two-layer knitwear quality. *The Way of Science*.
6. Максудов, Н. Б., Нигматова, Ф. У., Юлдашев, Ж. К., & Абдувалиев, Р. Р. (2018). Анализ деформационных свойств высокоэластичных трикотажных полотен для проектирования спортивной одежды. *Universum: технические науки*, (9 (54)).
7. Nigmatova, F., Maksudov, N., Kasimova, A., & Shin, E. (2018). Compression Clothes for Sports-Critical. *International Journal of Advanced Research in Science, Engineering and Technology Vol. 5, Issue 12*.
8. ГОСТ 8846-87 Trikotaj matolarining chiziqiy o'lchamlari, xalqa qatori, ustunchalari va xalqadagi ip uzunligini aniqlash;[Determining the linear dimensions of knitted fabrics, loop rows, columns and yarn length in the loop] [in Uzbek]
9. Ergashev, J. S., Rayimberdiyeva, D. K., Ergasheva, R. A., & Kenjayeva, V. K. (2020). Analysis Of Selected Fabric Properties For Children's Light Clothing. *The American Journal of Engineering and Technology*, 2(09), 42-48.
10. Ergashev, J. S., Rayimberdiyeva, D. K., Ergasheva, R. A., & Kenjayeva, V. K. (2020). Analysis Of Selected Fabric Properties For Children's Light Clothing. *The American Journal of Engineering and Technology*, 2(09), 42-48.
11. Ugli, I. M. M., & Ahmadjonovich, K. S. (2020). Experimental Studies Of Shirt Tissue Structure. *The American Journal of Applied sciences*, 2(11), 44-51.
12. Ahmadjanovich, K. S., Lolashbayevich, M. S., & Tursunbayevich, Y. A. (2020). Study Of Fiber Movement Outside The Crater Of Pnevnomechanical Spinning Machine. *Solid State Technology*, 63(6), 3460-3466.
13. Erkinov, Z., Abduvaliyev, D., Izatillya, M., & Qorabayev, S. (2020). Theoretical studies on the definition of the law of

- motion and the equilibrium provision of the ball regulating the uniform distribution of the torque along the yarn. *ACADEMICIA: An International Multidisciplinary Research Journal*, 10(11), 2338-2347.
14. Bobojonov, H. T., Yusupov, A. A., Yuldashev, J. Q., & Sadikov, M. R. (2020). Influence of deformation properties of yarn on the quality of knitted fabric. *Test Engineering and Management*, 29502-29513.
 15. Turdialiyevich, T. S., & Khabibulla, P. (2020). The Influence Of Top Flat Speed Of Carding Mashine On The Sliver And Yarn Quality. *European Journal of Molecular & Clinical Medicine*, 7(7), 789-797.
 16. Tozhimirzaev, S. T., Meliboev, U. H., & Parpiev, H. (2020). Issledovanie vlijaniya skorosti vypuska chesaniya na kachestvennye svoystva prjazhi. *European Journal of Technical and Natural Sciences*, (4), 7-14. <https://www.elibrary.ru/item.asp?id=44206345>
 17. Tozhimirzaev, S. T., Parpiev, D. H., & Omonov, M. (2020). Issledovanie izmenenij svoystv volokon po perehodam v processe prjadeniya. *Universum: tehicheskie nauki*, (6-2 (75)).
 18. Ahmadjonovich, K. S., Lolashbayevich, M. S., Gayratjonovich, M. A., & Erkinzon, S. D. (2021). Characteristics of yarn spun on different spinning machines. *Збірник наукових праць Л'ОГОΣ*. <https://doi.org/10.36074/logos-05.02.2021.v3.10>
 19. Korabayev, S. A., Matismailov, S. L., & Salohiddinov, J. Z. (2018). Investigation of the impact of the rotation frequency of the discretizing drum on the physical and mechanical properties of. *Central Asian Problems of Modern Science and Education*, 3(4), 65-69.
 20. <https://uzjournals.edu.uz/capmse/vol3/iss4/9>
Mirzaboev, J., Jumaniyazov, Q., Mirzabaev, B., & Sadikov, M. (2020). Measures for the formation and use of fibrous waste. *Theoretical & Applied Science*, (12), 177-179.