RESEARCH OF PHYSICAL-MECHANICAL PROPERTIES OF KNITTED MATERIALS INTENDED FOR DAILY CLOTHING

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Abstract

In order to study the needs and requirements for everyday clothes and to eliminate the problems arising in them, the analysis of fabrics was carried out on the basis of modern equipment. Fabrics resistant to deformation were chosen for everyday wear.

Keywords: Daily wear, deformation, breaking strength, weight, thickness.

Introduction

In the world today, special attention is being paid to improving the quality of textiles and ready-made sewing and knitting products by introducing new technologies. Production of materials for sewing and knitting products in the world textile market is 120 billion square meters. is The global practice of developed countries shows that a vertically integrated industry consisting of five stages, such as cotton-fiber-yarn-fabric-ready-made garment products, will be efficient and competitive [1-4]. A comprehensive analysis of the development of the textile and sewing-knitting industry, the changing conjuncture of the world market in the face of increased competition requires the development of mechanisms for the industry's state support, more stable and rapid development. It is of great importance to pay special attention to the production of new materials and articles based on knitting, to increase the volume of exportable products, to reduce the flow of imports from abroad, and to meet the growing demand of the population [5-9].

It is known that if the fabric structure or yarn composition of the knitted fabric changes, its physical and mechanical properties also change. Air permeability is one of the main features that provide comfortable conditions for consumers during the use of knitted products [10-14].

Air permeability coefficient V (cm³/ cm²·sec) is determined by the following formula

$$B = \frac{V}{S \cdot T}, \ cm^3 / cm^2 \cdot se\kappa \tag{1}$$

where: V is the amount of air passing through the fabric at a given pressure differenceΔR, cm³;

S - fabric area, cm²;

T` is the time of passage of the air passing through the fabric, sec.

The following table shows the physical and mechanical parameters of knitted fabrics.

Table 1

Indicators		Options			By default
		I	II	III	
Type of thread, line density		Polyester and lycra 2 thread 30/150	3-thread 30/75 lycra	Supreme	
Air permeabilityV (cm3/cm2·Sec)		4.81	22.33	26.18	*Outerwear 40-100* GOST 31410-2009
Breaking strength R (N)	By height	85	297	201	*At least 80N*
	By width	605	712	157	*GOST 28554*
Elongation to break L (%)	By height	212.6	162.2	133.7	*Up to 40% at 6N*
	By width	155.1	168.1	294.2	*1 group* 40-100% at 6 N- *2 groups* *GOST 28554*
Irreversible deformation en (%)	By height	3	12.8	30	*Not more than 15-20%* GOST 28882
	By width	8	68	59	
	By height	97	87.2	70	

Return strain eo (%)	By width	91	32	41	
Friction resistance I (thousand cycles)		Above 40000	Above 40000	Above 40000	*30-60 years 61-120 solid GOST16486*

30/1 suprem and 30/150 2 yarn fabrics of knitwear to create sportswear that meets the needs of the consumer in terms of comfort, aesthetics, and performance. analysis was carried out. Air permeability of materials, its thickness, tensile strength of fabric, deformation of fabric, friction resistance were determined. The thickness of Supreme fabric was 0.0258 mm [15-19].

The raw material composition of knitted fabrics is the same,designed using polyester and lycra thread.Air permeability of knitted fabric samples intended for the researched sportswear is 4.81cm3/cm2·from Sec26.2cm^3/cm^2·Secchanged to
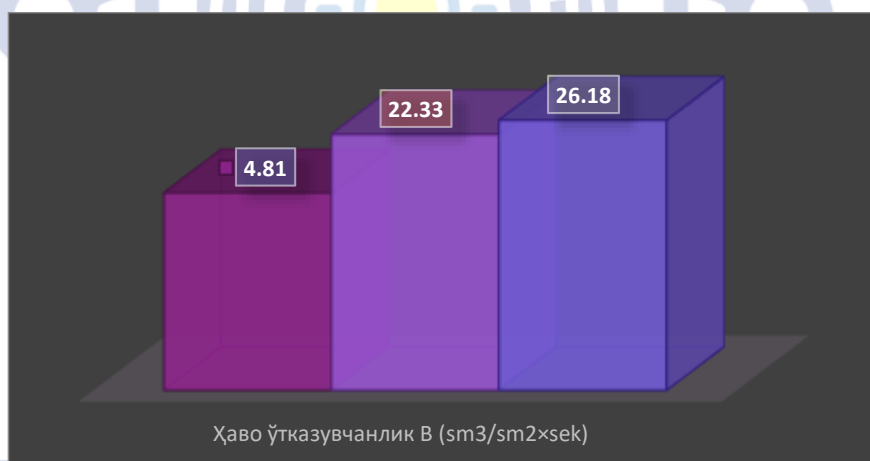

Figure 1. Air permeability histogram of knitted fabrics

The lowest air permeability was determined in the 1st option of knitting and its indicator is 4.81cm3/cm2·sec,the most air permeability was in the 3rd option. Air permeability in option 3 is 26.2cm^3/cm^2·constituted sec.

One of the parameters that determine the quality of knitwear is its stiffness. The maturity characteristic of knitwear is formed in its breaking strength and elongation to break indicators.

All GOSTs and TSHs used for knitted fabrics include normative indicators for elongation at break and tensile strength. Breaking strength is the force used to break a sample when stretched at a given size and speed. Breaking force is expressed in newtons. The tensile strength of the knitted samples under test was determined using a "YG-026T" dynamometer according to the standard method [17-20].

The analysis of tissue hardness, i.e. breaking strength, shows that the most mature tissue in terms of height is variant 2, its indicator is equal to 297 N, and the lowest indicator is 1- option and its indicator is 85 N. (Table 1, Figure 2). The stiffness of the fabric across the width was observed in option 2, the tensile strength across the width of the fabric was 712 N, and the lowest tensile strength was observed in option 3, its indicator was 157 N.
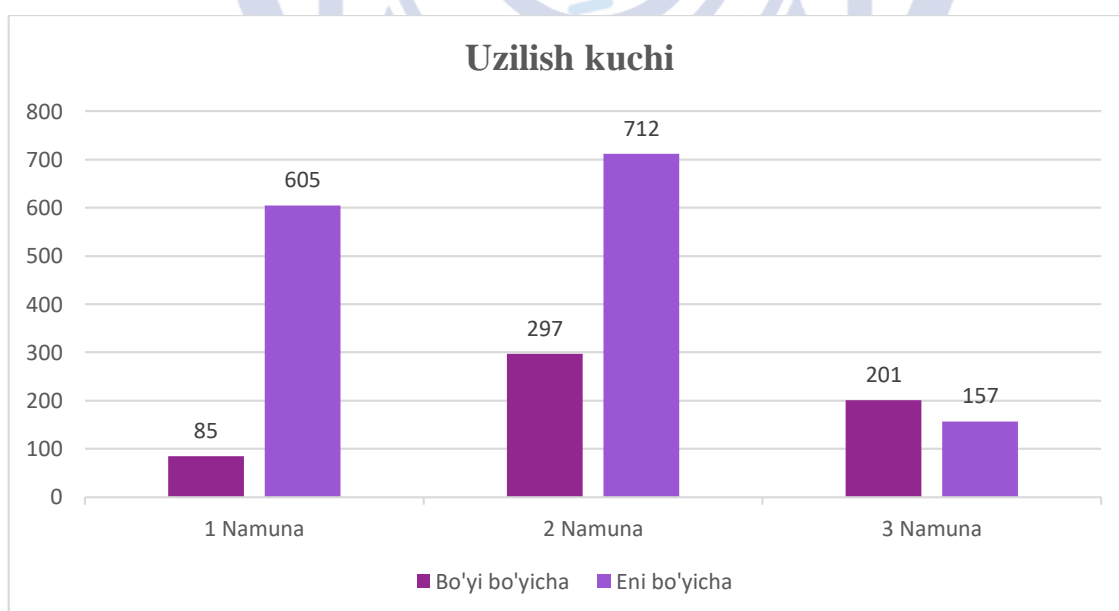

Figure 2.Knitted fabrichistogram of breaking strength change

Knitted materials for everyday wearfrom the analysis of physical and mechanical properties, it was found that although the composition of raw materials is the same, the properties of air permeability, hardness, elasticity and abrasion resistance are different.

Based on the above results, when choosing material for sportswearwoven from polyester, cotton and lycra threadit is advisable to use knitted materials.

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