АНАЛИЗ ФИЗИКО-МЕХАНИЧЕСКИЙ СВОЙСТВ МАТЕРИАЛОВ ДЛЯ ВЕРХНЕЙ ОДЕЖДЫ

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Аннотация: В данной статье исследуются физико-механические свойства плащевых материалов для верхней одежды и рекомендуемое их производство.

Ключевые слова: Одежда, предел прочности, абсолютное удлинение, относительное удлинение, трение, воздухопроницаемость, ткань.

ANALYSIS OF PHYSICAL AND MECHANICAL PROPERTIES OF MATERIALS FOR OVERWEAR

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Annotation: This article examines the physical and mechanical properties of coat materials for outerwear and recommends their production.

Keywords: Clothing, tensile strength, absolute elongation, relative elongation, friction, air permeability, fabric.

Clothing can be called a person's second skin. It creates an alternative environment, a microclimate, to keep the heat around the body evenly, which is extremely important for human life activities, maintaining a high level of working capacity and health. Therefore, the demand for a product is determined by the interaction of the "clothing-man-environment" system.

Clothing with different appearance and function, claimed by consumers on the one hand, and manufacturers on the other, meets a complex set of requirements (GOST 4.45-86). Therefore, the diversity of this requirement is assessed by two

groups of indicators - consumer and producer, or technical and economic indicators of quality.

The research examined the types, properties and characteristics of promising fabrics used for special clothing.

The following is a table and text of information on the fabrics used in the sewing of outerwear. To do this, we took samples from three coat materials and studied some of their properties.

Physico-mechanical and technological parameters of outerwear materials

Table 1

Indicators	I	II	III	GOST
Air permeability V, sm^3/sm^2 sec	83,3	43,7	41,7	Gost 12088-77
Friction resistance, I, thousand circles	32120	33873	37200	Gost 16486-93
Tear force, R, N	448	369	1061	
Absolute elongation, mm	15,9	14,2	26,2	
Relative elongation, L,%	7,95	7.1	13,1	

The air permeability coefficient V (sm^3/sm^2 sec) is determined by the following formula.

$$V=\frac{V_{(air\ volume)}}{S\cdot T}\ sm^3/sm^2\cdot \text{sek}$$

V is the amount of air passing through the fabric at a given pressure difference ΔR, sm^3;

S- fabric area, sm^2;

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

The air permeability properties of the above samples vary from 41.7 $sm^3/sm^2 \cdot \cdot$ sec to 83.3 $sm^3/sm^2 \cdot \cdot$ sec.

The lowest air permeability was observed in our sample III and its amount 41.7 $sm^3/sm^2 \cdot \cdot$ sec. This figure is 4.6% lower than our II coat material. The highest air permeability was in our sample material. Its value was 83.3 $sm^3/sm^2 \cdot \cdot$ sec.

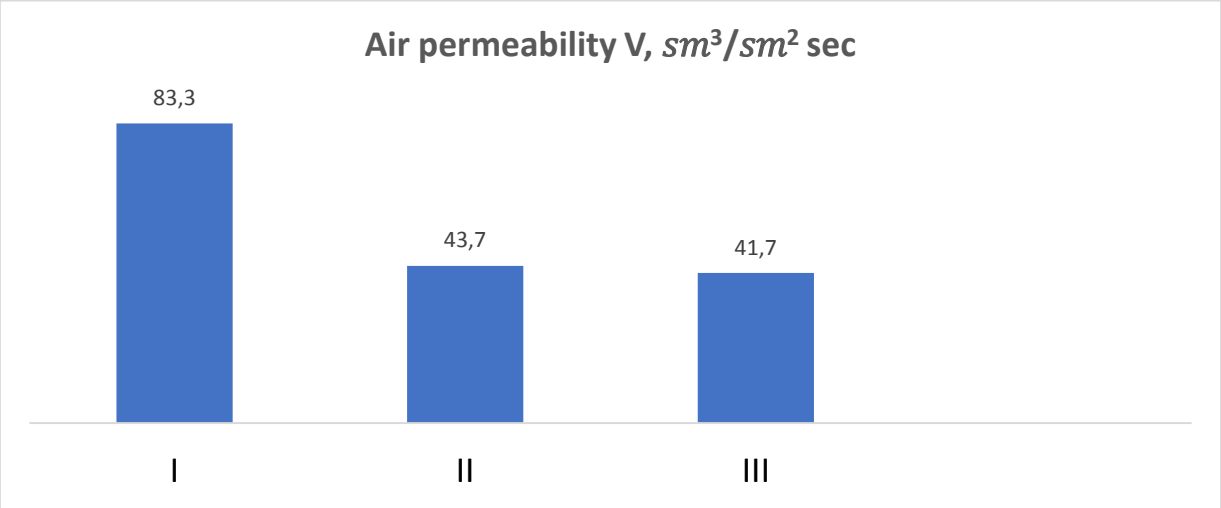


Figure 1. Air permeability diagram.

The breakdown of textiles is mainly due to friction. The abrasion resistance of textile fabrics depends on their fiber structure.

First of all, the ends of the fibers protruding from the surface of the fabric are subject to friction. The fibers protruding from the bends of the threads in the fabric begin to break down. Some parts of the surface of the fabric are damaged and the fibers break.

The abrasion resistance of fabrics is characterized by the number of friction cycles from the beginning of the test until the hole appears in the sample.

The abrasion resistance of our first sample was 32,120 times. Our most abrasion-resistant specimen was the third specimen, with 37,200 revolutions. That's 14% more than our first sample.

The tensile strength of materials is the force expended to break these samples. It is denoted by the letter “R” and is expressed in Newton (N) units. The tensile strength indicates the strength of the material. The strength of materials depends on their fiber content, the structure of the yarns and the linear density, weave, density, type of finishing. Fabrics made of synthetic fibers are durable. The thicker the yarn and the

denser the fabric, the stronger it is. In addition to determining the tensile strength, the elongation of the material is also determined. Elongation is the difference between the initial length of a material and its elongation before breaking. When expressed in millimeters, it is called absolute elongation, and “

”Is indicated. If the elongation of a material is expressed as a percentage, it is a relative elongation (percentage) and is calculated based on absolute elongation:

$e_n=(L_{uz} / L_{gis})$ 100, (percentage)

L_{uz} - absolute elongation of the material, mm;

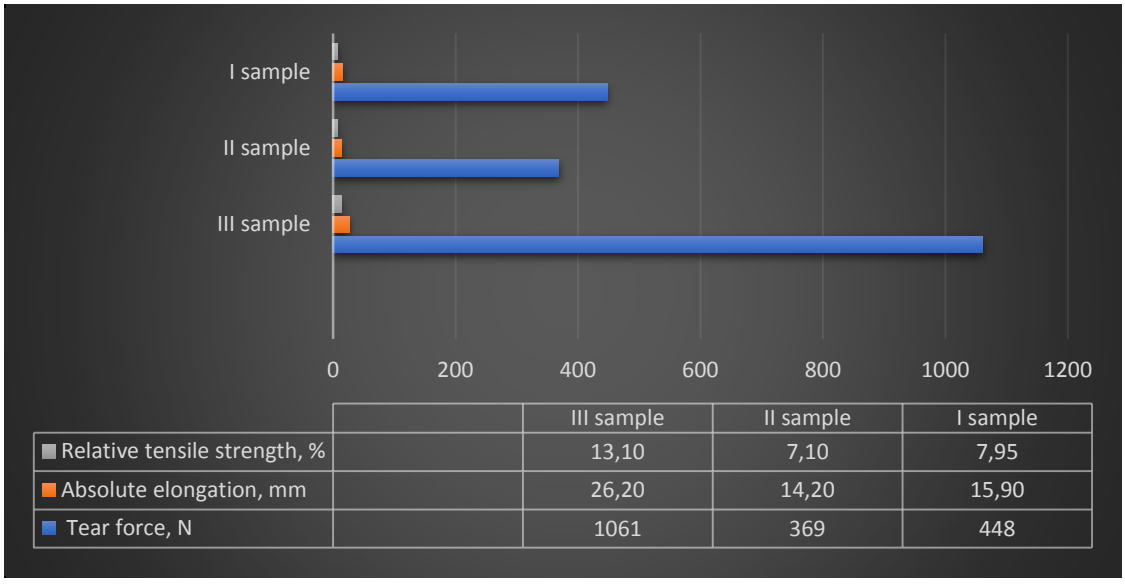
L_{gis} - The distance between the shorts of the cutting machine, mm.

The tensile strength of our third sample material was 1061 N tons. We learned from experience that this sample is much stronger than our first and second samples.

The tensile strength of our third sample material was 1061 N tons. We learned from experience that this sample is much stronger than our first and second samples.

The absolute elongation strength of our first sample was 15.9 mm. This is 11% more than our second sample, but the absolute elongation of our third sample is 40% greater than the absolute elongation of our sample I.

The relative elongation strength of our first sample was 7.95%, and the relative elongation strength of our second sample was 7.1%. In our third sample, the figure is 13.1%.



		III sample	II sample	I sample
Relative tensile strength, %		13,10	7,10	7,95
Absolute elongation, mm		26,20	14,20	15,90
Tear force, N		1061	369	448

Figure 2. Diagram of tensile strength, absolute elongation and relative elongation of samples of coated materials.

In conclusion, we can conclude from the above results that we have made sure that the air permeability level of our sample is much higher than that of the other samples. The best abrasion resistance was observed in our sample III. The best performance in terms of tensile strength, absolute elongation and relative elongation of the samples was also observed in our sample III. Among the samples we provide, we recommend our cloak material of sample III for outerwear.

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