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RESEARCH AND ANALYSIS OF PHYSICAL AND MECHANICAL PROPERTIES OF THE NATIONAL FABRIC - ADRAS

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Abstract
Adras fabrics were selected to create new models of women's luxury shirts, and their composition, physical and mechanical, as well as hygienic properties were studied in the research laboratory and production facility of the institute. The analysis of the results of experiments on the choice of fabric for the shirt showed that the physical, mechanical and hygienic characteristics of the selected materials fully meet the requirements of the consumer on all parameters.

Keywords: resistant to mechanical impact, silk fabric, finishing operations, textile materials, friction forces.

Introduction
The wear of a garment is mainly caused by the forces of friction, which stretch, crush and bend it. Therefore, the resistance of the fabric to various mechanical influences, ie the mechanical properties, plays an important role in the good preservation and long-lasting shape of the garment [1-7].

The mechanical properties of the fabric include toughness, stiffness, drapery. Hygienic properties of the fabric. The hygienic properties of silk fabrics ensure that it is safe and harmless to human health. Accordingly, silk fabrics must have the properties of hygroscopicity, air permeability and vapor permeability. Toughness of fabric - Tensile strength of fabric is one of the most important indicators that determine its quality [8-17]. Tensile strength of a fabric means its load resistance.

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Materials and Methods

The minimum load sufficient to break a fabric sample of a known size is called the tensile strength. The sample is cut on a cutting machine to determine the breaking force. The fabric sample is clamped between 2 clamps. The electric motor moves the lower clamp up and down, the upper clamp is connected to the load lever. When the lower clamp is lowered, the sample stretches and pushes the upper clamp down. As a result, the loaded pendulum power meter tilts [18-31]. Under the influence of an tensile force, the sample elongates and the distance between the clamps increases. The arrow indicates the elongation value on the elongation scale. For the test, three samples are cut from the fabric on the tanda machine and 5 samples on the back. The width of the sample piece is 50 mm. The distance between the dynamometer clamps is 100 mm for wool fabrics and 200 mm for other fabrics.

The length of the sample piece is taken to be 100-150 mm from the distance between the clamps. The breaking force is separate for the body and separate for the back.

The tensile strength of fabrics depends on their fiber content, yarn or yarn number, density, type of impact, the nature of the finish. Fabrics woven from synthetic fibers have the highest tensile strength. The thicker the yarn and the denser the fabric, the tighter it will be. The use of short strokes also increases the toughness of the fabrics [27-39].

Therefore, while all other conditions are the same, woven fabrics are the most durable when beaten on a canvas. Finishing operations such as pressing, appretting, steaming increase the toughness of the fabric. Bleaching and dyeing operations slightly reduce the toughness of the fabric.

Along with determining the toughness of the fabric on the cutting machine, its elongation is also determined. The increase in the length of the specimen during rupture can be expressed in millimeters (absolute elongation) or expressed as a percentage of the initial length of the specimen (relative elongation).

The formation of wrinkles and creases in the fabric when folded and pressed is called wrinkling. Wrinkles and creases are formed only by plastic ironing, which causes wrinkles. Fibers with a much larger proportion of elastic and elastic elongation flatten a little slower or faster after bending and tensile deformation, and assume their initial state, so that wrinkles disappear [40-47].

Drapery is the formation of soft, round folds in fabrics. Drapability depends on the mass, hardness and softness of the fabric. Hardness is the property of a fabric to resist

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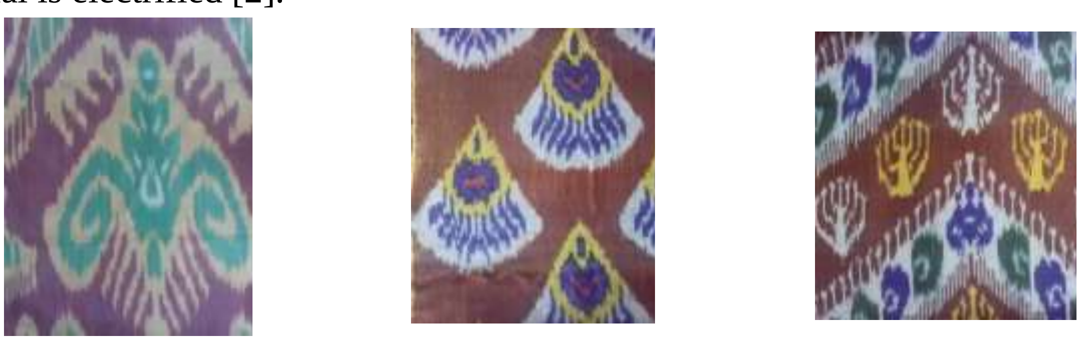
changing its shape. Flexibility is the inverse property of stiffness, which determines the ability of a fabric to easily change its shape. Physical properties of fabrics include hygroscopicity, air permeability, vapor permeability, water permeability, moisture content, dust permeability, electrical conductivity and other properties. The requirements for physical properties are determined by the function of the fabrics and depend on their fiber composition, structure and finish. Hygroscopicity determines the ability of the fabric to absorb moisture from the environment [48-53]. In assessing the hygroscopic properties of textile materials, their true moisture characteristics are often used. Actual humidity W_x (%) indicates the amount of moisture in the material at the actual humidity of the air.

Air permeability is the air permeability of a fabric: it depends on its fiber content, density and texture. Rare fabrics are air permeable, dense fabrics, impregnated with waterproof solutions, rubberized fabrics are completely impermeable or poorly permeable to air.

Water permeability is the property of a fabric to resist water infiltration. Water permeability is especially important for special fabrics (tarpaulins, tents, sails), cloak fabrics, coat and suit wool fabrics. Water permeability depends on the fiber content, density, texture of the fabric.

Electricity is the property of materials to accumulate static electricity on their surface. In the process of preparation and use, textile materials, of course, touch and rub other things. Then electrical charges accumulate and dissipate continuously on their surface. If the balance between the accumulation and distribution of charges is disturbed, static electricity accumulates on the surface of the material and the material is electrified [2].



A B V

Figure 1. Adras fabrics. Experimental samples

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Important properties of experimental samples

The thickness of the fabric. It was measured with a special device YG141D - thickness gauge. The fabric sample was placed between two glossy plates; one of the plates was movable and attached to the needle of the instrument. The arrow indicates the thickness of the material in millimeters. The results are shown in the table.

Table 1. Fabric thickness indicators

№	Indicators	Fabrics		
	Fabric pattern	A	B	V
1	Fabric thickness, mm	0,38	0,68	0,65

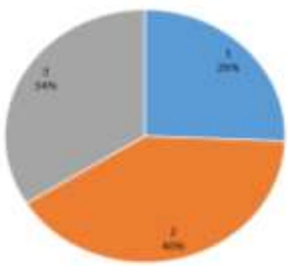

Figure 2 Histogram of fabric thickness.

Figure 3 Fabric thickness measurement device

Elongation strength of samples (kg/s)

The tensile strength of the fabric is one of the most important indicators of its quality. The tensile strength of a fabric is defined as its resistance to breaking forces. The tensile strength of the fabric is determined on an AG-1 machine using a special computer program. Before starting work, the initial data required for the experiment is entered into the program. Samples are made in accordance with GOST in the size of 300 x 50 mm in the direction of the body and back. The finished samples are clamped (the distance between the clamps is 200mm). Then the START button is pressed and the top clamp starts to rise. When the sample is broken, the experimental results are displayed on the screen in the form of graphs and tables.

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Table 2. Toughness of samples (kg/s).

Indicators	Fabrics		
examples	A	B	V
Tensile strength, kg/s			
Tanda			
Power (N)	677	458	475
Length (mm)	29,7	38,6	28,4
Percentage of elongation%	14,85	19,30	14,20
Energy (J)	5,8	3,6	3,4
Time (S)	8,93	11,60	8,52
weft			
Power (K)	299	295	266
Length (mm)	29,8	26,2	35,2
Percentage%	14,90	13,10	17,6
Energy (J)	3,9	2,8	2,9
Time (S)	8,96	7,86	10,58

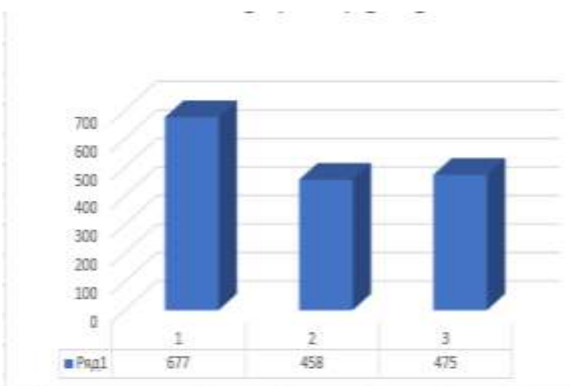

Figure 4. Diagram of the tensile strength (kg/ s) of the samples.

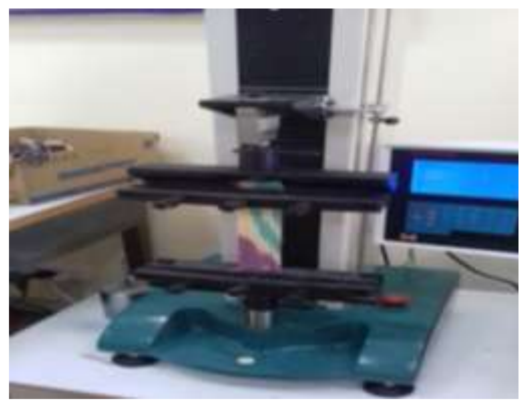

Figure 5. The process of testing samples for rupture.

Abrasion resistance of samples

In this case, the resistance of the fabric to various corrosive factors is called friction resistance. This is done in the laboratory using the M 235/3 machine. In this case, the samples are cut into circles using a special cutter and fastened in series to the desired location. When the machine is started, the samples are rubbed against a special solid and rotated. The perforated sample stops moving and the result is displayed on the screen.

Figure 6. The process of checking the abrasion resistance of samples.

Air permeability of samples

The samples themselves have air permeability, which is different in each material. The air permeability of the materials was determined using a tester YG861E, the detection process is shown in the figure, the results are shown in the table.

Table 3. Air permeability of samples.

	Indicators	Fabrics		
	Air permeability	A	B	V
	(cm^3/cm^2 sec).	22,2	34,980	29,387

Figure 7. Air permeability histogram.

Figure 8. The process of testing air permeability

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Elongation of the Fabric At Break

Interruption elongation "YG026A-III", 2019, is checked using the following special device The inspection process is shown in Figure. The proportions of the total elongation of the specimens in terms of composition are given in the table below.

Table 4. Results of elongation at break of the fabric in the sample

№	Indicators	Fabrics		
1	Elongation of the fabric at break	A	B	V
2	Tanda			
3	Freight (kg) Time (minutes) Initial state (mm) Length (mm) Return (mm)	30 20 20,6 20,3	30 20 20,9 20,3	30 20 20,8 20,4
4	weft			
5	Freight (kg) Time (minutes) Initial state (mm) Length (mm) Return (mm)	30 20 20,8 20,7	30 20 20,3 20,2	30 20 20,7 20,5

Figure 9. The process of checking the elongation at break of the fabric.

Conclusion

The results of the experiments obtained in the above diagram show that the physical-mechanical and hygienic parameters of the adras fabric can meet the consumer requirements in all respects. After experimental studies, it was concluded that: Fabrics are high-density, as well as resistant to tearing due to the weaving of the fabric, the elasticity of cotton fibers leads to the restoration of the shape of the fabric after deformation, increasing the non-wrinkling properties; Woven from natural fibers, it fully meets the hygienic characteristics of the fabric, increases the level of hygroscopicity.

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5) Material permeability device. “YG861E”, 2019.
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