THE ANALYSIS OF THE PHYSICAL PROPERTIES OF SPECIAL FABRICS

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Abstract

Strong and durable clothes are necessary for many areas of human activity - at work, in service and at leisure. Such textiles are made of special rip-stop fabrics. The purpose of the work: design of the fabric for tear resistance, determination of initial technological factors and production of this fabric.

Keywords: special fabrics, polyester, cotton, thread, density, abrasion resistance, breaking strength.

Special clothing as personal protective equipment in the workplace, in addition to performing protective functions, has high comfort and hygienic properties during long-term use. Therefore, a mixed fibre fabric consisting of 50-60% cotton and 40-50% polyester with a density of 220 to 250g/m^2 is often used for the production of overalls [1-4].

To give additional fire-resistant properties to combinations made of similar fabrics, a one-sided surface coating with non-flammable silicone or teflon is used. Fire resistance is also ensured by the inclusion of parameramide fibres in the material. For example, a woven fabric consisting of 65% viscose, 25% para-aramid, and 10% nylon has high mechanical and additional thermal strength [4-7].

Today, special clothes are not only an external distinguishing feature that belongs to a certain enterprise (and a certain profession). Special clothing (its appearance, functions, durability, abrasion resistance and special properties) should meet the characteristics of professions [8-10].

When wearing work clothes, the fabric made of them should be comfortable and breathable, because the employee will be in work clothes for a long time, and his health will directly affect the efficiency. Modern uniforms have serious requirements for protection: the compliance of special clothes with health safety standards is given priority [11-15].

Experimental and existing samples of the newly designed special fabric were taken and their physical and mechanical properties were obtained and compared. Experimental samples of special clothing fabrics designed based on design indicators of fabric breaking strength and technical parameters of technical ironing were woven in the conditions of the production enterprise, and the physical and mechanical properties of the fabric samples were determined in the test laboratory. The following physical-mechanical properties of woven samples were studied [15-18].

1) Determination of air permeability of samples. We used the AP-360SM Air Permeability Tester. The air temperature in the room should be 20±3 °C and humidity should be 60±5%. Sample 160x160mm. When conducting an experiment, a nozzle with the required diameter should be selected based on the thickness of the fabric. When using the equipment, the water level should be in the specified place. The machine works from a source of electrical energy with a voltage of 220 V and a frequency of 50 Hz.

2) The abrasion resistance of the samples was determined. We used the "M235/3" friction tool to determine this property. The air temperature in the room should be 20±3 °C and the humidity should be 60±5%. Sample sizes are 0 38 mm and 0 140 mm and are cut using special cutting equipment. During the experiment, the applied loads should be selected depending on the thickness of the fabric (9 or 12 kPa). When casting the upper part of the machine, it is necessary to pay attention to the correct fall of the metal balls.

3) Determination of thermal conductivity of the sample. In this case, the AW-2 thermal conductivity test device. This device is used to check the thermal conductivity of various types of fabrics. The air temperature in the room should be 20±3 °C and humidity should be 60±5%. The sample is taken as 300x300 mm. Before starting the experiment, all three heaters of the equipment must be heated to the required temperature.

During the experiment, air temperature and humidity should be measured simultaneously. The equipment operates from a source of electrical energy with a voltage of 220 V and a frequency of 50 Hz. All experimental tests were conducted on the laboratory equipment installed in the "SENTEXUZ" quality testing laboratory at TTESI. Currently, special attention is paid to the in-depth study of special clothing, which requires updating and improving the design, and choosing the appropriate material with certain characteristics.

Table 1. Factors of experimental samples of special fabrics produced from local raw materials

N:	Indicators		Апитекс				
			Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
1.	Fibre content	warp	47% cotton, 53% polyester	45% cotton, 55% polyester	100% polyester,	100% polyester	100% polyester
		weft	43% cotton, 57% polyester	47% cotton, 53% polyester	100% пахта	100% cotton	100% cotton
2.	Linear density of tissue, tex warp weft		30 30	37 29	29 53	29 53	28 40
3.	weaving		canvas	canvas	Twill	canvas	canvas
4.	Surface density, g/m2		196,7	213	210	215,9	211,3
5	The number of threads in 10 cm warp weft		210 400	190 420	390 210	410 190	360 230
6	Tensile strength, N warp weft		854 652	936 735	1000 552	1000 390	1000 700
8.	The number of threads in the cage warp weft		- 11	21 12	21 12	22 9	20 11
9.	Number of forcing threads warp weft		- 1	2 2	2X2 2	4 2	2 3

The 1st sample produced at the "Apiteks" enterprise was selected based on the project for clothing fabric intended for special purposes. The engineered fabric is manufactured with a rip-stop weave for durability. The fabric is made of cotton and polyester fibres. Woven in linen weaving. As we know, canvas shears are more durable than other shears. The linear density of the warp threads in the fabric is TT = 30 tex, and the warp threads Ta = 30 tex. The density of the surface is 200 g/m^2, the density of the fabric is RT = 210 threads/dm, and Ra = 400 threads/dm. The main indicator of the fabric intended for special clothes is the breaking strength, which is 854 sN on the body and 652 sN on the hem.
According to GOST 21790 - 2005, the strength of the body should be 569 sN, and the strength of the beam should be 343 sN. Air permeability 15 dm^3/m^2·sec. The problem of creating comfortable special clothing with specified characteristics is one of the most urgent tasks because special clothing is an important factor that has a special impact on the employee's

ability to work. The design, elements and composition of the fabrics used must meet modern requirements and specific climatic conditions of the country.

In conclusion, the assortment of special tissues and their peculiarities information have not been sufficiently studied. Therefore, new types of special fabrics and production methods based on new designs were used in modern looms based on mastering the special fabric production technology.

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