PREDICTING PHYSICAL AND MECHANICAL PROPERTIES OF SPECIAL FABRICS

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ABSTRACT

This article analyzes the production technology of special fabrics, the composition of fabrics and their physical and mechanical properties.

АННОТАЦИЯ

В данной статье анализируются технология производства специальных тканей, состав тканей и их физико-механические свойства.

ANNOTATSIYA

Bu maqolada maxsus to‘qimalar ishlab chiqarish texnologiyasi, to‘qima tarkibi va ularning fizik mehanik xususiyatlari tahlil qilingan.

Special fabrics designed to provide reliable protection from aggressive environmental conditions are used for the production of overalls. Overalls are required in all spheres: food production, metallurgy, oil refining, construction, medicine. In addition, uniforms should be worn by service personnel in hotels, shopping centers and other public places. Clothing should provide comfortable and safe working conditions.

Special clothing has not only protective properties, but also supports the image of the company. Employees who wear uniforms with the company logo, create a good impression of the organization and increase customer loyalty.

Modern fabric for sewing overalls should be durable and wear-resistant. The material must withstand numerous washings, and the form for medics is also subjected to multiple sanitary treatment, including sterilization in the autoclave. Quality suits

hold their shape well and do not give shrinkage, do not shed and do not burn out in the sun. The density of the weave should provide a smooth surface of the fabric without puffs and lint.

Fabrics for overalls are selected in accordance with the field of activity. Materials from natural fibers (cotton, linen, wool) have excellent hygroscopicity. They allow air to pass through and provide normal thermoregulation of the body. In summer in such clothes is not hot, vapor does not appear, as moisture is quickly removed to the outside. In winter in jackets with wool insulation is comfortable to work even in the hardest frost, while entering the room, the employee does not sweat. Jackets, coveralls, dungarees and pants for welders are made of natural cotton. Fabric made of 100% cotton with a density of 400 g/sq. m with fireproof impregnation perfectly withstands all tests.

The combination of natural and synthetic fibers in different proportions allows to create ultra-durable materials, which absorbed all the best characteristics. Natural fibers provide good air exchange, while synthetics allow the garment to stretch and fit. Stretchy fibers perfectly withstand the impact of any cleaning agents, do not shed and do not give shrinkage. Finding a suit made of blended fabric that will fit well is easier than finding cotton clothing with a suitable fit.

Synthetic fabrics are made of acetate, viscose, triacetate and other fibers. The weave can be of different types: twill, plain weave or diagonal weave. Clothing made entirely of synthetics is used in construction and high-rise work.

Interstate standard GOST 11209- 2014 "Fabrics for special clothing General technical requirements" applies to finished fabrics from cotton fibers, fabrics from blends of cotton with viscose, polyamide, polyester fibers; fabrics containing polyester, polyamide yarns in the base and cotton fibers or mixed yarns in the weft; fabrics from aramid fibers (yarn), intended for the manufacture of special clothing for protection against harmful and hazardous production factors and adverse environmental conditions. The standard establishes technical requirements, test methods of protective properties of fabrics for the manufacture of special clothing.

Table 1

Physical and mechanical parameters of special fabrics.

Group of fabrics (by raw material composition)	Name of indicators, units.							
	Surface, gr/m^2	Breaking load, N, not less		Tensile load, N not less		Resistance abrasion resistance, cym, not less	Change dimensions after wet processing or dry cleaning, %, not more	
		warp	weft	warp	weft		warp	weft
Cotton fabrics	200-250 251-300 300 not less	600 700 800	400 500 600	20 25 30	25 30 35	2500 3000 3500	-3,5	-2,0
Cotton fabric of moleskin type	250 not less	400	600	20	30	2000	-3,5	св. 250
Fabrics with mixed content of cotton and synthetic fibers up to 20%.	200-250 251-300 301 not less	650 800 900	500 600 700	30 30 35	30 30 40	3000 4000 5000	-3,5	- 2,0
Fabrics with mixed content of 20-50% cotton and synthetic fibers.	180-220 221 not less	700 900	400 700	30 35	30 35	3500 4500	-2,0	-1,5
Fabrics with a mixed content of 50-80% cotton and synthetic fibers.	180-220 221 not less	900 1000	600 700	30 40	30 40	4500 5OOO	-2,0	-1,5
Fabrics with a mixed content of 50-80% viscose and synthetic fibers.	180-220 221 not less	900 1000	600 700	30 40	30 4 0	4500 5OOO	-2,0	-1,5
Polyester, polyamide on the warp and cotton or blended cotton on the weft.	180-200 201-250 251 not less	700 1000 1300	5OO 500 500	45 50 55	25 35 35	4500 5000 6000	-3,0	-2,0
Aramid fiber fabrics	180-200 201-250	900 1000	600 900	60 70 80	70 80 100	5OOO 6OOO 8OOO	-2,5	-2,0

The requirements of this standard must be taken into account when putting products into production and confirmation of conformity. The standard does not apply to fabrics used for the manufacture of departmental clothing, protective clothing for protection against thermal risks of electric arcs, for protection against sparks and splashes of molten metal (for welders), clothing for firefighters.

At present, the most promising direction in the manufacture of clothing is the production of textile fabrics from a mixture of different fibers, allowing to give materials specific properties, thereby increasing performance and improving the range. When producing fabrics from different fibers, the negative influence of properties of some components is eliminated and the degree of use of useful properties of other components is increased. Nevertheless, the fabric properties also largely depend on the physical and mechanical properties of the yarn and its structure. Therefore, the correct choice of raw materials and the selection of fiber properties depending on the purpose of the yarn are of great importance.

The study of the reasons for the change of clothing by construction workers gave the following information: the main reason is that it loses its properties after repeated washing, that is, the lack of friction cycle. This situation accounts for 47%. External random factors, cuts 23%, color change in the sun 17% and other reasons. When we studied consumer opinion, 37% of construction workers favored specialty clothing made of blended cotton and chemical thread fabrics. 23% preferred clothing made of natural fabrics only. The rest did not recognize that the composition of raw materials is not important when choosing clothing.

According to the survey, the most important factors for construction workers when choosing clothing are durability, seams, breathability and low price. As a result of the analysis of consumers' requirements regarding fabric quality, it is found that they unanimously recognize the importance of the following quality indicators:

- breathability;
- friction resistance;
- appearance;
- color consistency
- good ironing ability;
- easy to wash.

A complex set of various hygienic, physical-mechanical, technological and aesthetic requirements is imposed on modern human clothing. Establishing the degree of influence of individual factors on the operational properties of fabrics is one of the most important tasks in the scientific development and design of products, since the

production of high quality clothing is possible only when producing fabrics taking into account various parameters.

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