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Изменения качественных показателей сорочечных тканей с разными составами волокна

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Аннотация. Качество текстильных тканей оценивают по физико-механическим, потребительским и гигиеническим свойствам. Прочность ткани также характеризуется ее стойкостью к истиранию. В свою очередь, данная стойкость и воздухопроницаемость ткани зависят от многих важных факторов, таких как прочность пряжи, вид волокна, состав пряжи и ее линейная плотность, плотность и толщина ткани, толщина ткани и так далее. Сопротивление истиранию и воздухопроницаемость ткани во многом зависят от ее структурных характеристик, то еесть степени изгиба и плотности основной и изнаночной нитей. Эта степень изгиба определяется площадью той или иной части изделия и изнаночной нити. Эта площадь является опорной поверхностью ткани. В статье выполнено сравнение качественных показателей сорочечных тканей с саржевым переплетением из 100% полиэфирного волокна и 100% хлопчатобумажных сорочечных тканей с саржевым переплетением, а также показано изменение таких их свойств, как воздухопроницаемость, несминаемость, устойчивость к истиранию.

Ключевые слова: полиэстер, волокно, саржа, сорочечная ткань, показатель качества, свойство, трение, синтетика, хлопок, линейная плотность, прочность

Changes in the quality indicators of shirt fabrics with different fiber compositions

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Abstract. The quality of textile fabrics is evaluated by physical, mechanical, consumer and hygienic properties. The durability of a fabric is also characterized by its resistance to abrasion. In turn, this durability and breathability of the fabric depends on many important factors, such as the strength of the yarn, the type of fiber, the composition of the yarn and its linear density, the density and thickness of the fabric, the thickness of the fabric, and so on. The abrasion resistance and breathability of a fabric largely depend on its structural characteristics, i.e., the degree of bending and the density of the warp and purl threads. This degree of bending is determined by the area of one or another part of the product and the purl thread. This area is the reference surface of the tissue. In this article, a comparison of the quality indicators of shirt fabrics with twill weave from 100% polyester fiber and 100% cotton shirt fabrics with twill weave, as well as changes in their properties of breathability, wrinkle resistance, abrasion resistance, was studied.

Keywords: polyester, fiber, twill, shirt, quality indicator, property, friction, synthetic, cotton, linear density, strength

1. Introduction

The implementation of radical changes in the economy of the country, the gradual transition of the republic's economy from raw materials to the production of competitive products, the expansion of the country's export potential, has set new tasks for each sector of production. In particular, the development of the textile industry, the provision of our people with high-quality, beautiful-looking textile fabrics is one of the important tasks facing the industry. The goal is to increase the volume of textile production in the country, to meet the needs of the population in yarn and textiles, to create new types of fabrics to expand production, to introduce advanced technologies leading to the development of the textile industry, to create new designs for fabrics and clothing. , conducting

research in the field of materials science, the use of innovations, training of specialists and experts [1].

The quality of textile fabrics is assessed by the physical-mechanical, consumer and hygienic properties of the fabric. The strength of the fabric is also its resistance to abrasion and abrasion. In turn, the corrosion resistance and air permeability of the fabric depend on many important factors, such as the strength of the yarn, the type of fiber, the composition of the yarn and its linear density, the density of the fabric on the body and back, the thickness of the fabric, the base surface and so on. The abrasion resistance and air permeability of the fabric depend on its structural characteristics, ie the degree of bending and density of the body and back yarns. This degree of bending is determined by the area of a particular part of the body and the back yarn that can be approached by any surface, and this area is the supporting surface of the fabric. The flattening of the base surface opens the porosity between the joints of the body and the back threads and creates conditions for the passage of air. Therefore, in the production of fabrics for shirts, attention should be paid to the evaluation of its surface [2].

The production of a wide range of fabrics is one of the most pressing issues in the textile industry today, so the requirements for the industry are growing. Manufactured fabrics must meet hygienic, physico-mechanical, aesthetic and economic requirements. The properties of different types of woven fabrics depend on the properties, structure and finishing properties of the fibers and yarns that make them up. For the rational use of fabrics and the production of a wide range of high-quality shirts, it is important to know their fiber composition, structural parameters and properties. One of the important tasks in this regard is to carry out targeted research, including scientific research in the following areas: development of effective technology to eliminate unevenness before the formation of cotton fibers; preparation of yarns with reduced unevenness for fabric production and development of methods for designing shirts of different compositions. The above-mentioned scientific research explains the relevance of this work [3].

Such fabrics have a constant serviceability, ie durability plays an important role in their performance. A complex (common) feature that determines their durability during operation is their resistance to decay.

2. Materials and methods

The service life of the fabric can be achieved by changing its base surface, including by avoiding excessive investment. In order to achieve the sustainability of products, it is necessary to conduct maximum research in any conditions. Their optimization should be done taking into account the period of obsolescence in terms of improvement. Durability depends, in particular, on the composition and structure of the raw yarn, on the fabric being woven, and on the decoration.

However, in almost all cases, the conditional diameter of the yarn, the density of the fabric on the body and back, the surface of the base, the phase of the structure play a special role in achieving stability. At present, the requirements for the physical stability of fabrics, especially in the case of their structure, are relevant. The service life of the fabric can be achieved by changing its base surface, including by avoiding over-allocation. A number of scientists have studied the effect of the structure of cotton yarns on their abrasion resistance, and found that the effect of weaving on durability is mainly due to changes in waveforms, especially the radius of curvature of the yarn on the fabric surface. The bending radius increases with the elongation of the coatings, resulting in an increase in the amount of fibers that are prone to corrosion and, consequently, in the amount of yarn consumed [4].

The main characteristics of textile fabrics are air permeability, non-shrinkage, abrasion resistance. The ability of textiles to transmit air, water, gas, steam, dust, smoke, and radioactive rays is permeability.

Air permeability is the ability of a sample to conduct air by itself, which is measured by the air permeability coefficient. The air permeability coefficient is the amount of air that passes through 1 square meter of surface in one second under known conditions of air pressure on both sides of the sample.

Fabrics bend and wrinkle as a result of bending and compression deformations. Wrinkles and creases can be removed only by wet ironing. The shrinkage of fabrics depends on their fiber content, the thickness of the yarn used in their structure, the type of weaving and dyeing, and the density.

Flexibility of fabrics is one of their negative features. It spoils the appearance of the item. Fabrics that are easily crumpled will wear out quickly because they are more likely to rub in bent and twisted areas. Non-shrinkage of fabrics is understood as their resistance to shrinkage and their return to their original state after shrinkage.

The fabrics are rubbed as well as wrinkled. Erosion of fabrics is mainly due to friction. The abrasion resistance of fabrics depends on their fiber content and surface texture. 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 areas of the fiber surface are damaged and the fibers break. The yarns also break as some fibers or pieces of fiber come out of the yarn. The bends of the threads protruding from the surface of the fabric are the first to be eroded by friction [5].

The larger the base surface of the fabric, the higher its resistance to abrasion. By strengthening the base surface of the fabric, its abrasion resistance can be increased. For this purpose, long-coated wraps (satin, satin), abrasion-resistant fibers (kapron, lavsan) or finishing processes (appreting) are used.

The abrasion resistance of knitted fabrics also depends on the amount of base surface. At the same time, when the yarns that make up the knitwear are rubbed off, the loops on the hoop poles or rows come out of each other, depending on the weave of the fabric, and the structure of the fabric is damaged. The breakdown of non-woven fabrics obtained by weaving is also mainly due to friction. During friction, the fibers in the fabric's fibers do not bond well to each other, leaving the fabric structure, and the threads that hold the fibers together are rubbed and torn [6].

Friction degradation of fabrics containing short fibers, especially synthetic fibers, usually begins with the appearance of peeling. In the most exposed areas of the product, soft balls are formed from tangled fibers. First, the ends of the fibers protrude to the surface of the fabric, then they become tangled [7].

3. Test results

Research has been carried out to study these characteristics of fabrics, and the air permeability, non-shrinkage and abrasion resistance of shirt fabrics have been determined using modern equipment.

The test results are shown in table 1.

Table 1. Changes in air permeability, non-shrinkage and abrasion resistance of shirt fabrics with different fiber content.

Fiber content	Harvesting	Air permeable, sm^3/ sm^2sek	No wrinkles,%	Friction resistance, cycle
100% synthetic fiber	Sarja	55.7	78.7	16900
100% cotton fiber	Sarja	53.3	53.3	12600
100% synthetic fiber	Sarja	62.1	58.2	12100

Based on the results in table 1, figures 1-2 show graphs of changes in air permeability, non-shrinkage, and abrasion resistance of garment fabrics with different fiber content.

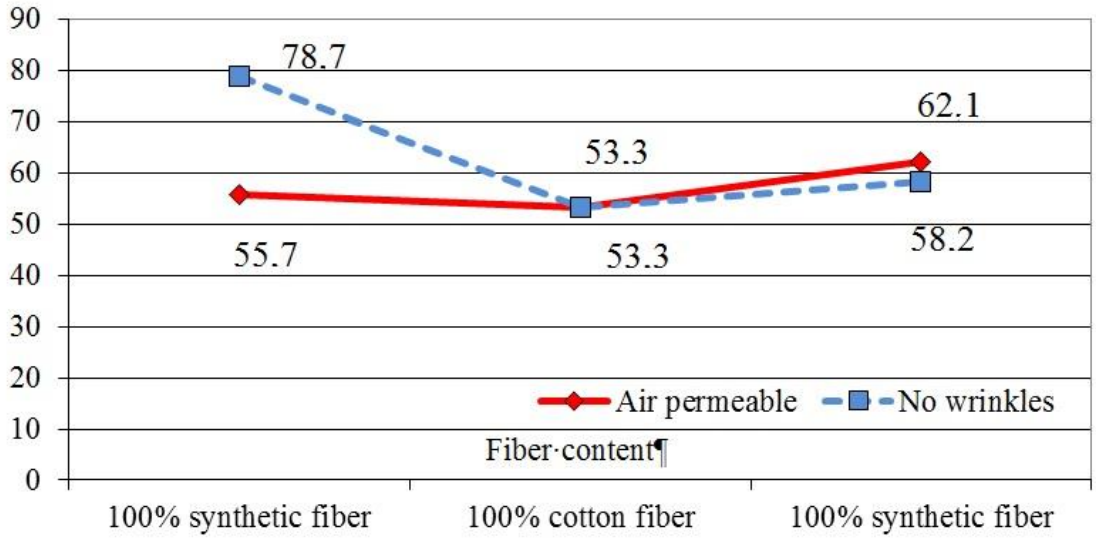

Figure 1. Changes in air permeability and non-shrinkage of shirt fabrics.

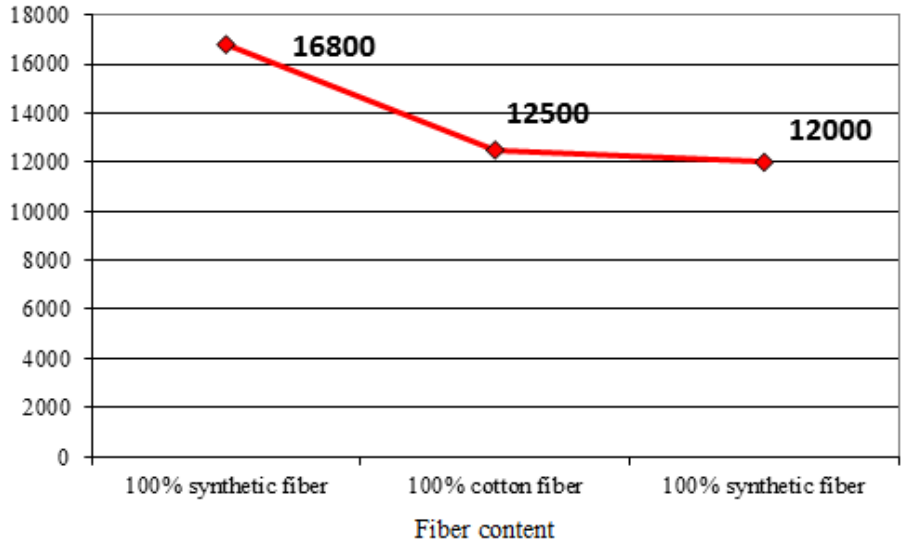

Figure 2. Changes in the abrasion resistance of shirt fabrics.

4. Conclusion

Analyzing the results of the research, we can compare the performance of 100% polyester fiber with a surface density of 136.5 g / m^2. 4.4%, non-shrinkage decreased by 32.4%, abrasion resistance decreased by 25.7%, 100% cotton fiber with a surface density of 142.6 g / m^2 increased air permeability by 10.3%, non-shrinkage 26.2%, friction resistance decreased by 28.7%.

The results of the study showed that the abrasion resistance of non-shrink fabrics is higher than that of other shirts, with a surface density of 136.5 g / m^2 made of 100% polyester fiber [8].

As the amount of synthetic fibers in the fabric increases, the degree of toughness and performance of the fabric increases.

Research has shown that polyester fiber is used in the fabric of shirts, which is higher than the fabric of shirts made of cotton fiber.

In summary, 100% polyester fiber has a surface density of 136.5 g / m^2. It was found that the air permeability increased from 4.4% to 10.3%, the friction resistance increased from 25.7% to 28.7%, and the non-shrinkage increased from 26.2% to 32.4%.

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