

STUDY OF PHYSICAL AND MECHANICAL PROPERTIES OF HOSIERY PRODUCTS OBTAINED ON A SOCK WEAVING MACHINE

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Abstract: *In this article, 2 different samples were taken by adding cotton and polyester yarns to the spandex yarn used to preserve the shape and appearance of socks. Physical-mechanical and hygienic properties of hosiery products were determined in the testing laboratory of textile products of Namangan Institute of Engineering Technology. The sock product was manufactured on Kejun (China) KJ6F606 156 needle sock knitting machine.*

Key words: *knitwear, socks, tensile strength, elongation at break, air permeability, yarn, cotton, polyester, rubber, density, futer, ring, thickness.*

Introduction. The knitwear industry is one of the youngest emerging industries in the light industry. The main reasons for this are the large number of types of knitted products and their uniqueness. There are many types of products - the reason is that any men's suit can be made of leather, fabric or knitwear, but socks and gloves are made only by knitting. Some types of sports knitwear are made by knitting, because the movement is not limited, the product is elongated, does not change shape due to its elasticity. Knitted fabrics are used as a raw material in the production of children's underwear and outerwear due to their softness, softness and high thermal insulation properties.

Today, along with other industries of knitwear, the production of socks is developing on a large scale. One of the most important aspects of a sock is its comfort. Properties such as heat resistance, air permeability, or water vapor permeability are important for the thermal comfort of clothing. The comfort of the sock plays a key role in choosing it. It is believed that the product is evaluated on the basis of these qualities. The comfort of a sock depends on several factors, one of which is thermal comfort. Other factors that affect the comfort of clothing include softness, elasticity, moisture expansion, and more. It should be noted that the properties of yarn, such as heat resistance, thermal conductivity and heat retention, depend on the properties of the knitwear, such as structure, density, moisture, fiber type and properties, weaving method, finishing, compression, air conductivity and ambient temperature. Thus, the thermal comfort of knitwear, of course, depends on the type of yarns or fibers and their properties. The type of fiber, spinning technology, mass per unit length, number of twists, yarn fineness, knitting thickness and porosity and fineness are the main factors determining work productivity.

Methods. Different yarns are used in the manufacture of socks. Spandex yarn, which is specially processed from a mixture of polyester and lacquer yarns, is now used as the main raw material in improving the shape retention properties of sock products. Polyester yarn is a synthetic yarn, which is produced chemically by special laboratory conditions at the required linear density. Laca yarn is also obtained by special chemical treatment of rubber products. In this study, we studied the effect of sock products on the shape and appearance of sock products by adding cotton and polyester yarns as additional yarn, taking into account the fact that the spandex yarn fills the entire part of the sock. 110 D rubber, 35 tex cotton yarn, 100 D polyester and 75x15 D spandex yarn were used as raw materials. The sock product was produced on a 156-needle KEJUN sock knitting machine. Kejun sock knitting machines are single-cylinder and have 10, 14, 18 classes. These machines produce men's, women's, children's socks on the basis of glad, plush, press, jacquard, patchwork.

Table 1

Technical classification of Kejun single cylinder sock knitting machine

Class	10, 14, 18,
Cylinder diameter, inches	2.75, 3, 3.5, 3.75, 4
Number of needles	132, 144, 156, 168, 180
Number of systems	3
Number of weaving systems	
-board	3
-leg	3
-heel	1
-processing	1
Basic dimensions, mm:	
-length	1100
-width	1040
-height	2250
Mass of the machine, kg	350-390
Rotation speed, min ⁻¹	
- on board, underfoot, overhead	240
- when changing parts (during the transition)	120
-heel	120
Electric motor power, kW	0.5

Futer tissue classification. If it is used in the manufacture of cross-linked knitted socks. Sock Products Network. These knitwear products are resistant to abrasion, have high heat retention properties, elasticity, and good appearance. These products are made of a mixture of kapron or thin elastic (lycra) yarn. It is also elegant and beautiful, well-placed on the feet and less soluble. The use of natural fiber cotton yarns in the production of children's socks is advisable to place the color-changing part on the invisible side of the product. If the sock product is woven on single-needle sock knitting machines, then this product is formed on the basis of gladdening with a needle or a certain pattern effect. If a two-needle sock is knitted on a loom, it is usually made with a needle or a pattern. It is also common to wear socks on the

side of the tire and other parts on the basis of glad tidings. The size of all socks is expressed in centimeters, the distance from the bottom of the foot to the middle of the heel. There are regular, semi-regular and tailoring methods in the production of knitwear. Socks are usually finished in a regular way, that is, on a single sheet, and in a semi-regular way, that is, after weaving, with additional operations on some sewing or overlock machines. Taking into account the selection of 2 types of products for winter, spring and summer seasons, futer knitted fabric, one of the fabrics with high thermal insulation properties, was selected. This fabric is based on gladdle fabric, the fabric report is 1 + 1. Futer knitted fabrics are fabrics obtained by inserting an additional yarn into the base fabric without forming loops. The pieces of liner are placed on the back of the single-ply knitted fabric, with the loops of the main fabric hanging on platinum bows. During the weaving process, the futer yarn, unlike the back yarn, is placed on the needles along with the base yarns, but without inserting the needles under the loop, they are pulled over them or on the tongue on the needle needles and thrown over the new 14 loops along with the old loops. Futer knitwear can be woven horizontally and vertically. Tissues differ in the structure of the underlying tissue. The liner strip is located on the back of the fabric in the form of a protrusion in the fabric structure and hangs in the form of a nabroska on the platinum arcs of the base ring. The elasticity of the knitting loops of the knitted fabric depends on the level of knitting tension, the coefficient of friction between the yarns, the length of the loop yarn and the density of the knitting. In order to reduce the elasticity of the base fabric glad tissue, to reduce its elongation, as well as to increase the thermal retention properties, a futer strip is placed on the fabric. The torsion of supreme tissue is the torsion of its edges. The addition of the liner yarn to the fabric eliminates at least some of the above negative factors. The twist of the supreme fabric is also affected by how tight the yarn is. The more the thread is twisted, the stronger the twist. The denser the knit, the more it will twist, because the more the loop bends, the more it has 15 elastic forces.

Results. Weight and thickness. In the experiment, the weight of one sock was measured on an electronic scale ZK200C. The thickness was determined in the testing laboratory of the Namangan Institute of Engineering Technology on YG141D equipment. Initially, we weighed the weights of the samples on an electronic scale and obtained the following parameters. The weight of the socks with polyester was 42.5 grams, and the socks with cotton yarn were 43.5 grams. Showed 3.1 mm.

Air permeability. Air permeability is the amount of air that can pass through a given surface at a pressure of 100 kPa. This value of hosiery products was studied on the device for determining the air permeability of knitted products YG461E, installed at the Namangan Institute of Engineering Technology. The high air permeability of the sock product allows to improve its hygienic properties. Due to the fact that the composition was in different proportions, the device required a standard scale of different sizes.

Discussion. From the results of the laboratory we can say that the weight and thickness of socks with cotton thread is higher. Interruption strength and elongation to interruption. Another feature of sock products is its durability and resistance to various physical and mechanical movements.

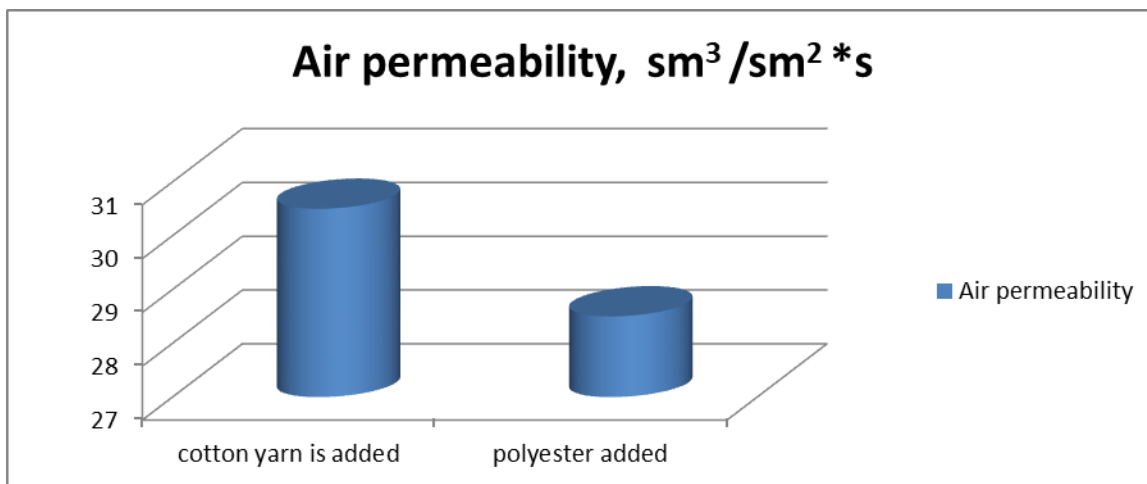


Figure 1. Air permeability diagram of hosiery products

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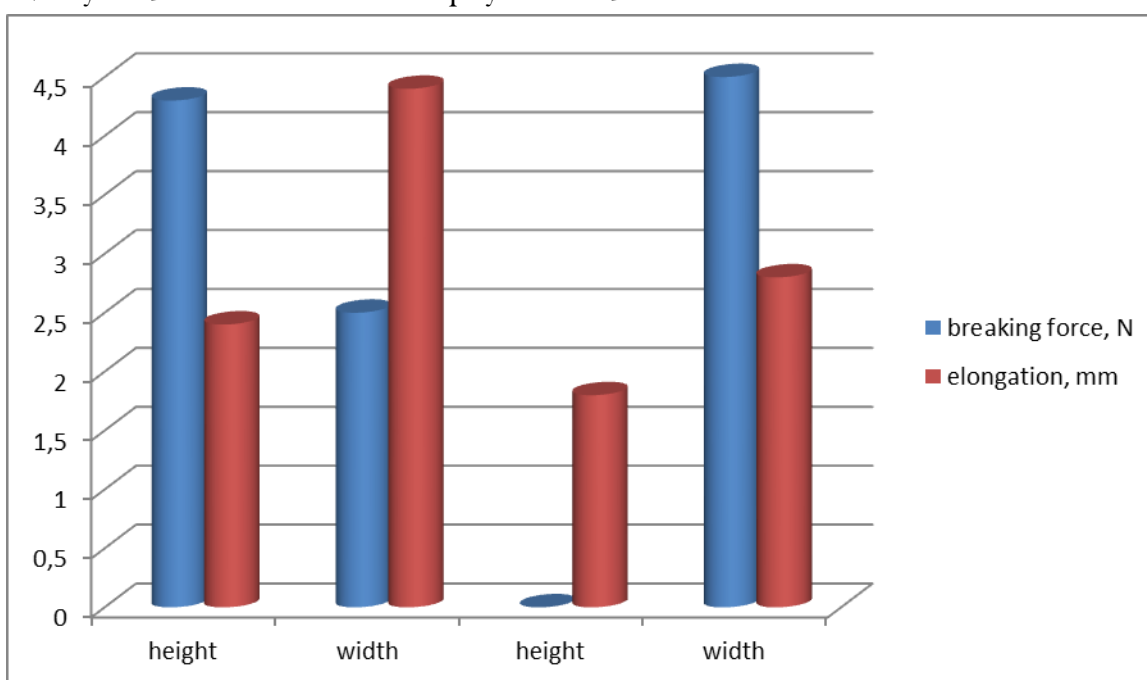


Figure 2. Tensile strength and elongation diagram of sock products

To study these parameters, it is necessary to determine its breaking strength and elongation at break. We learned this using the YG026T.

Conclusion. In this article, the technological capabilities of KEJUN (CHINA) 156 needle sock knitting machine were studied. In the production of socks, the futer is made on the basis of fabric. This fabric is mainly used to increase the heat retention properties. This machine uses GLORY software to insert textures and give a unique design. Two different types of samples were produced on this machine, and the main parameters were the breaking strength, elongation at break and air permeability, and weight.

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