



## METHODS OF USING SEWING KNITWEAR IN SPORTSWEAR

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### Annotation

The second chapter, "Theoretical and experimental studies of the compressive strength of knitted fabrics for sportswear", the results of the assessment of the compressive strength of knitted fabrics for sportswear and the theoretical basis for calculating and predicting the pressure in compression products according to the momentless theory of thin anisotropic shells. listed. Based on the results of the study of the deformation properties of elastic knitted fabrics, an assessment of their compressive strength was made.

**Keywords:** compression fittings; knitted goods; sportswear, elastic materials

### Introduction

The first chapter, entitled "Modern state and design features of sports compression products" provides an analytical analysis of the literature on the results of research work of scientists involved in improving the theory and practice of compression sports equipment design. An analysis of the modern range of compression sports items was conducted, and an improved classification of compression sports items was developed based on their grouping according to their anthropometric location in the body. As a result of analytical and marketing research conducted among athletes, the functional requirements for compression products were identified. Based on the analysis of scientific sources, the goals and objectives of the research were identified.

The second chapter, entitled "Theoretical and experimental studies of the compressive strength of knitted fabrics for sportswear", presents the results of the evaluation of the compressive strength of knitted fabrics for sportswear and the theoretical basis for calculating and predicting the pressure in compression products according to the momentless theory of thin anisotropic shells. Deformation of elastic knitted fabrics is produced on the basis of the results of the assembly and the evaluation of the compressive strength according to the results. The study found that





the values of knitted fabrics varied by 25-113%, while the elasticity of knitted fabrics averaged 90.5-91.8% and the hand deformation did not exceed 4%. This has shown that experimental knitted fabrics designed for sportswear have a good ability to restore shape after stretching. Elastic knitted fabrics (more than 20 types) are grouped on the basis of elongation parameters, the basic limits of narrowing of the details of clothing that adhere tightly to the body and the coefficient of relative elongation are determined. Baseline values of the narrowing limit of knitted fabrics from 25.0% to 53.0%; the elongation limits proved to vary from 1.2% to 30.5%. Determined indicators of the deformation properties of elastic fabrics serve as a starting point in the calculation of the main dimension of compression sportswear - the width of the piece.

The third chapter, entitled "Development of technology for the manufacture of sportswear from new types of elastic materials with compression effect" presents the results of research on the impact of lower body morphology on the structure of knitted fabrics, design and technology of production of compression sports knee pads, evaluation of its hygienic properties. .

Different mixed fibers (cotton -50%, spandeks -25%, latex -25%; nylon-70%, latex-30%) are single-layer ash with surface densities of 461.6 g / m<sup>2</sup> and 551.3 g / m<sup>2</sup>, respectively elastic knitwear was offered. Boarding parameters for elastic knitted knitting with compression effect were based on the technological transition typical of the production of sports goods in the Italian company Mates, 9th grade circular needle knitting machine. The study of relaxation graphs obtained on the basis of half- and single-cycle deformation indices of knitted fabric samples made it possible to obtain a canvas with a tensile strength of 365 and 450 N, respectively, in width and height. From the relaxation curve of the deformation, the proportion of the return part of the full elongation deformation (sum of elastic and elastic deformation) was found to be 88 ... 98%, however, the elastic component yielded many times higher than the elastic. The analysis of the deformation parts (Fig. 6) shows that the residual deformation value in both cases does not exceed 3% when the load is applied to the fabric samples along the hoop row and the hoop column, which indicates good recovery ability of experimental knitted fabrics for sportswear. Sweating, which is an important mechanism of human thermoregulation, is of great importance in heavy physical labor, sports, and high ambient temperatures. Sweat swelling kinetics of experimental knitted fabrics with different fiber content (cotton, spandex, nylon, polyester, lycra, latex), surface density and thickness, and its maximum (limit) values were determined experimentally by the contact method. The fourth chapter, entitled "Improvement of the methodology of construction of rational construction of compression sportswear",



is devoted to the methods of construction of compression sportswear and the approbation of narrowing coefficients. An algorithm for constructing a rational design of compression products from elastic materials and a method of its modification was developed, which consists of calculating the geometric and deformation properties of knitted fabrics, the effect of pressure on the athlete's body, the dynamic growth of body size, the basic limit of narrowing and relative elongation.

The basic design of the compression sports T-shirt (BS) is made of Group 2 stretch knitted fabrics, the details of which are 34% narrower. It was found that the width of the details of the product can vary from 2 to 10 cm from the dimensions of the BC after modification. Implementation of the algorithm for the step-by-step construction of BK and MK drawings of the product from elastic fabrics belonging to the group of various stretches was performed in the Jemini CAD system. Taking into account the recommendations developed in Chapter 2, methods for designing compression sports pants from elastic fabrics that correct the plasticity of the lower part of the waist and increase the comfort of the pants in statics and dynamics were tested. The principle of calculation and construction of two types: push-up you and push-up effect compression pants is described. The produced compression sports equipment was tested on ergonomic quality indicators in high jump exercises in athletes and it was proved that their quality level is not less than imported samples.

Introduced at SINTEZ GROUP LLC and ZARAFSHON TEXTILE LLC. As a result of the introduction of a new range of elastic knitted fabrics woven from local raw materials into the production of compression sportswear, the quality of the finished product has improved and the cost has been reduced. As a result, the 3-month economic efficiency amounted to 192270589 soums for knee knitting and 66798793 soums for elbow knitting.

The results of theoretical and practical research on "Development of technology for the development of compression sports equipment with improved hygienic and deformation properties" are as follows:

1. A multifaceted analysis of the range of compression items has shown that almost every basic element can be supplemented with special corrective, therapeutic, and supportive items, such as sports items, and especially bandage items, based on the proposed anthropomorphic classification.
2. Analysis of the modern range of materials with compression properties (body compression) showed the need to improve the processes and methods of creating compression products, taking into account the following important factors: improving the quality of compression products based on the use of natural fibers with unique natural properties; creation of new types of elastic fabrics from local raw materials,







taking into account the needs of athletes and the demand of consumers of compression products identified through sociological research.

3. Has a different fiber composition (cotton -50%, spandeks -25%, latex -25%, nylon -70%, latex -30%), surface densities of 461.6 g / m<sup>2</sup> and 551.3 g / m<sup>2</sup>, respectively. a layer of gray elastic knit was developed. Boarding parameters for elastic knitted knitting with compression effect were based, and technological transitions specific to the production of sports goods were used in the Italian company Mates, 9th grade circular needle sock knitting machine.

4. The study of relaxation graphs obtained on the basis of semi-circular and single-cycle deformation indices of experimental knitted fabrics allowed to obtain a fabric with a tensile strength of 365 and 450 N, respectively, in width and height. From the relaxation curve of the deformation, the proportion of the return part of the full elongation deformation (sum of elastic and elastic deformation) was found to be 88 ... 98%, while the elastic component yielded many times higher than the elastic.

5. Based on the elongation parameters of elastic fabrics of different groups, the basic limits of narrowing and the coefficient of relative elongation of the details of clothing that adhere tightly to the body were determined. Baseline values of the narrowing limit of knitted goods from 25.0% to 53.0%; elongation limits have been shown to vary from 1.2% to 30.5%. The results of the deformation properties of elastic fabrics obtained on the basis of experiments can be used as a starting point for determining the design value added in the calculation of the main dimension-piece width of compression sportswear.

6. An algorithm for calculating the circumference of the compression knee joint was developed based on the maximum allowable pressure for different parts of the knee joint (shin, knee, lower thigh) and the axial elongation diagram of the experimental knitted fabric. In this case, the assessment of the state of tension generated by the knee joint was carried out using the Laplace formula based on the momentless theory of the thin shell.

7. Sweat kinetics of experimental knitted fabrics with different fiber content (cotton, spandex, nylon, polyester, lycra, latex), surface density and thickness and its maximum (limit) values were determined experimentally by contact method. In the evaluation of the hygienic properties of fabrics and products, relative PVo, and specific sweat swelling coefficients were proposed for a comparative assessment of the sweat swelling characteristic characterizing the hygroscopic properties. These coefficients make it easy to compare the sweating (absorption) ability of samples of the same size but different surface density and thickness.



8. The basic design of the compression sports T-shirt (BS) is made of stretch knitted fabrics of group 2, the details of which have a shrinkage of 34%. It was found that the width of the details of the product can vary from 2 to 10 cm from the dimensions of the BC after modification. Implementation of the algorithm for the step-by-step construction of BK and MK drawings of the product from elastic fabrics belonging to different elongation groups was performed in the Jemini CAD system.

9. The results of the dissertation were introduced at the enterprises "SINTEZ GROUP" LLC and "ZARAFSHON TEKSTIL" LLC. The introduction of a new range of elastic knitted fabrics from local raw materials into the production of compression sportswear has proven to improve the quality and reduce the cost of the finished product. The total economic efficiency for 3 months was 192270589 soums for knee knitting and 66798793 soums for elbow knitting.

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