



Comparative Analysis Of Elongation Deformations Of Mixed Yarns In The New Range

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ABSTRACT

This article explores the mechanical properties of yarns made from a mixture of synthetic and cotton yarns. The yarn test results were analyzed and it was found that the mechanical properties of the blended fibers, including Lycra and polyester yarns, were better. Therefore, it is advisable to use these yarns for the production of highly elastic knitted fabrics. The materials and knitted fabrics were analyzed to have high elasticity, softness and high mechanical properties compared to other yarns.

KEYWORDS

Technique and technology, stretch yarns, FADIS, LYCRA®, fiber yarns.

INTRODUCTION

Most of the spinning mills in the country, equipped with advanced equipment and technology, produce yarns for knitwear, which are in high demand. In recent years, there has been an increasing demand for composite yarn used for knitted fabrics. Due to

the fact that the production of yarn from blended fibers is somewhat difficult both economically and organizationally, there are few such enterprises for the production of yarn in the country. Products made from mixed fibers are distinguished by good color

retention. Therefore, leading knitwear companies prefer to use blended yarns, even if they are expensive, to maintain the quality of their products. Chelsea's leading companies are sharply increasing orders for blended yarns. At the same time, the demand for products that are convenient for consumers, hygienic and aesthetically high quality is growing significantly. Currently, the demand for sports and medical clothing is growing. In the production of these garments, knitted fabrics of composite fibers with a high degree of elongation are used. When preparing them, it is desirable to use a mixture of natural and synthetic fibers. While natural fibers are considered beneficial to human health, elastic synthetic fibers provide comfort for sports and medical wear.

It is known that elastic materials compress human muscles, and can achieve good results in reducing muscle fatigue and increasing muscle temperature. This garment is used to prevent musculoskeletal injuries during the training of athletes [1].

Polyester and lycra fiber yarns were used to produce such high elongation yarns. Polyester yarns are formed from a solution of polyethylene terephthalate. Polyester yarns are resistant to solvents, microorganisms, moths, molds, carpet beetles. Clothes made of polyester yarn can serve for a long time in the process of wearing, do not wrinkle, can be easily washed and ironed, and dries very

quickly. All this is due to the low hygroscopic properties of polyester. Polyester yarn is resistant to air and sunlight [2].

The purpose of the blending of lycra yarns is that the fibers are fine, very pliable and elastic, with very high elasticity. LYCRA® yarns are available in various thicknesses. Used for all types of garments, from very thin fabrics to thick heavy fabrics. LYCRA® fiber can stretch seven times its length and return to its original position like a spring [3].

MAIN PART

The research was carried out using equipment installed in the educational and scientific laboratory of the Tashkent Institute of Textile and Light Industry at the Department of "Spinning Technology" and laboratory equipment of the test certification center "CentexUz" to determine the physical and mechanical properties of yarn. In obtaining two different variants of yarn, the Italian FADIS wrapping machine was wrapped with polyester and lycra yarns of the same tension. To obtain variant 1 yarn, a polyester yarn with a texture of 17X3 4 was obtained, and a polyester yarn with a texture of 4.5X3 was added to a polyester yarn with a text of 17X2 to obtain a variant yarn. The principle of operation of the FADIS spinning machine for yarn sampling is shown in Figure 1. 55.6 tex mixed fiber yarn was obtained by adding 5X2 text lycra yarn. 2-

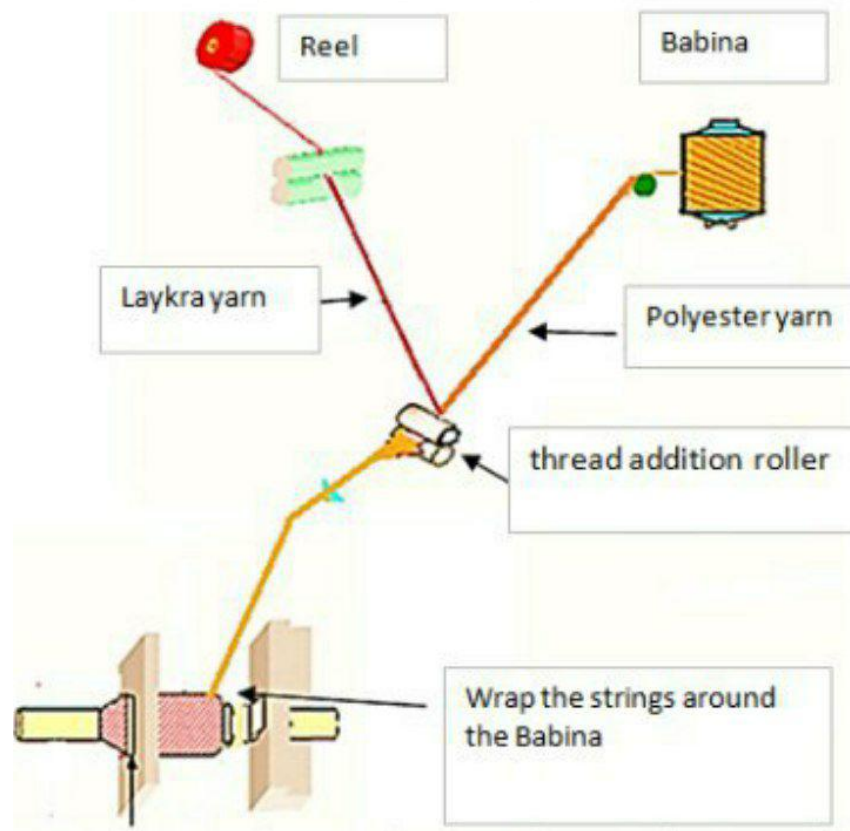


Figure 1. The principle of operation of the FADIS yarn wrapping machine

The percentage of fiber content in the yarn samples is given in Table 1.

Table 1

No	The name of the threads	Polyester fiber (%)	Lycra fiber (%)
1	First option yarn	95	5
2	Second option yarn	92	8

The elongation of these yarns was carried out experimentally in the laboratory “CentexUz” under the standard conditions of the laboratory room temperature on the instrument “STATMAT-S”, which determines the elongation of the yarn, the

tensile strength. The results of the research obtained by this method revealed the following mechanical parameters. Linear density, dispersion, coefficients of variation and deformation values of the yarn was recorded. The results are summarized in Table 2.

Table 2

Physical and mechanical properties of yarn samples

No	Name of indicators	Unit of measurement	Average values		Dispersion	Coefficient of variation
Option 1 thread values						
1	Linear density	Tex	17X3	55,6	-	-
			4,5X2			
2	Breaking force	cH	1825,40		62,45	3,42
3	Relative breaking strength	cH/ Tex	32,83		1,12	3,42
4	Elongation	%	23,27		1,99	8,56
Option 2 thread values						
1	Linear density	Tex	17X2	42,2	-	-
			4,5X3			
2	Breaking force	cH	896,97		79,47	8,86
3	Relative breaking strength	cH/ Tex	21,26		1,88	8,86
4	Elongation	%	14,51		1,30	8,94

Appropriate graphs were constructed based on the values obtained from the experimental results (Figures 2, 3).

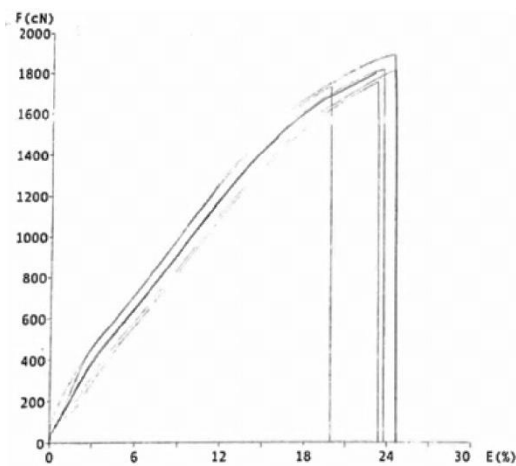


Figure 2. Option 1 indicator chart.

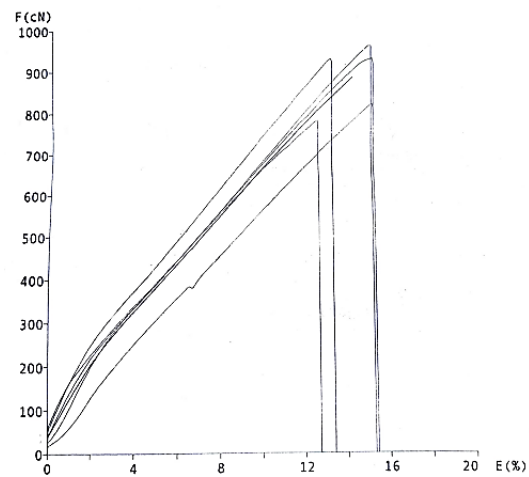


Figure 3. Option 2 indicator chart

Option 1 elongation graphs on the deformation of the sample with a tensile strength of 1914.06 cN were constructed. The tensile strength of the variant 2

yarns was noted to be 914.93 cN and the corresponding elongation graphs were constructed. (Figure 4).

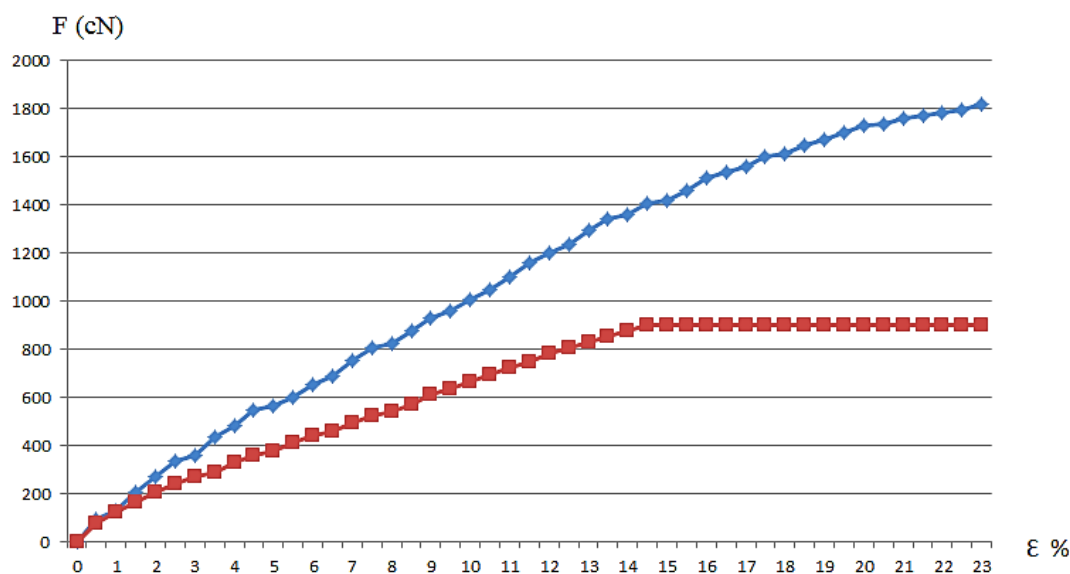


Figure 4. Graph of elongation of yarn samples

CONCLUSION

Analysis of the test results of the yarn samples shows that the mechanical properties of the blended yarns with the addition of polyester and lycra yarns give better performance than usual. Therefore, it is recommended to use this yarn to obtain knitted fabrics of high elasticity. Compared to other types of yarn, the materials and knitwear obtained from these yarns are characterized by high elongation, softness and high mechanical properties.

In this research, it was shown that the quality characteristics of the blended yarns are competitive with other yarns.

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