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RESEARCH ON THE QUALITY INDICATORS OF SUIT FABRICS

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Abstract. This article examines the quality indicators of suiting fabrics. The research results show that an increase in the supporting surface of the fabric significantly improves its abrasion resistance. It is determined that fabric wear mainly occurs due to friction and depends on the surface structure of fibers. It is scientifically substantiated that fabrics with a larger supporting surface have higher durability. For twill weave 2/1 fabrics, the balanced structure (ha = ht) is considered the most effective. The experiments investigated the effect of warp and weft yarn tension on fabric properties. The best results were obtained at a warp tension of 30 cN and a weft tension of 15 cN. In this case, high values of abrasion resistance, air permeability, and supporting surface were observed. Additionally, a reduction in fabric shrinkage was identified. It is noted that blending natural and synthetic fibers improves hygienic properties. The obtained results can serve as a scientific basis for producing high-quality and competitive suiting fabrics.

Keywords: Suiting fabric, weft-faced, warp-faced, balanced surface, air permeability, abrasion resistance.

The results of the study show that increasing the surface area of a suit-type fabric increases its abrasion resistance, which is a quality indicator of the fabric. Fabric wear is mainly caused by friction. The abrasion resistance of fabrics depends on their fiber composition and surface structure. The ends of the fibers protruding from the surface of the fabric are first affected by friction. The fibers protruding from the folds of the threads in the fabric begin to wear.

Some areas of the fiber surface are damaged and the fibers break. The threads also break because individual fibers or fiber parts are released from the yarn. The bent areas of the threads that protrude from the surface of the fabrics are the first to wear out due to friction.

The larger the base surface of the fabric, the higher its resistance to abrasion. By strengthening the base surface of fabrics, it is possible to increase their resistance to abrasion. Considering that the method for determining the base surface of the fabric, based on and created by Prof. SAXamrayeva [1], gives a more convenient and accurate result than other methods, we used this method in our work to evaluate the base surface of fabrics. Indeed, when the warp tension was 30sN and the weft tension was 15sN, the fabric had the highest base surface index. In this case, the cross-sections of the warp and weft yarns of the twill 2/1 weave with a high base surface can be seen in Figure 3.13 [1].

In Figure 1, it is shown that in the cross section with a b -weft surface, the warp yarn has a higher bending height than the warp yarn $h_a > h_t$, in the v -even surface, the warp and weft yarns have the same height $h_a = h_t$, in the g-even surface, the warp yarn has a higher bending height than the warp yarn $h_a < h_t$. The equality of the warp and weft yarns on the equal surface is considered to have a higher resistance to friction compared to other options, in which the intersection of the warp and weft yarns forms a right angle, the exchange of air through the pores between them is easier than in fabrics with a weft surface and a weft surface, and reduces the fraying and wrinkling of the yarns during washing [2-3] .

Costume fabrics must be resistant to abrasion, have high physical, mechanical and hygienic properties. During operation, they are subjected to many mechanical stresses (stretching, bending,

etc.). Costume fabrics often use 100% synthetic fibers, which worsen the hygienic properties of the fabric, therefore, mixing natural fibers, taking into account the climatic conditions of the region, significantly improves hygienic properties and makes it possible to create products that can meet consumer demand, as well as increase export potential.

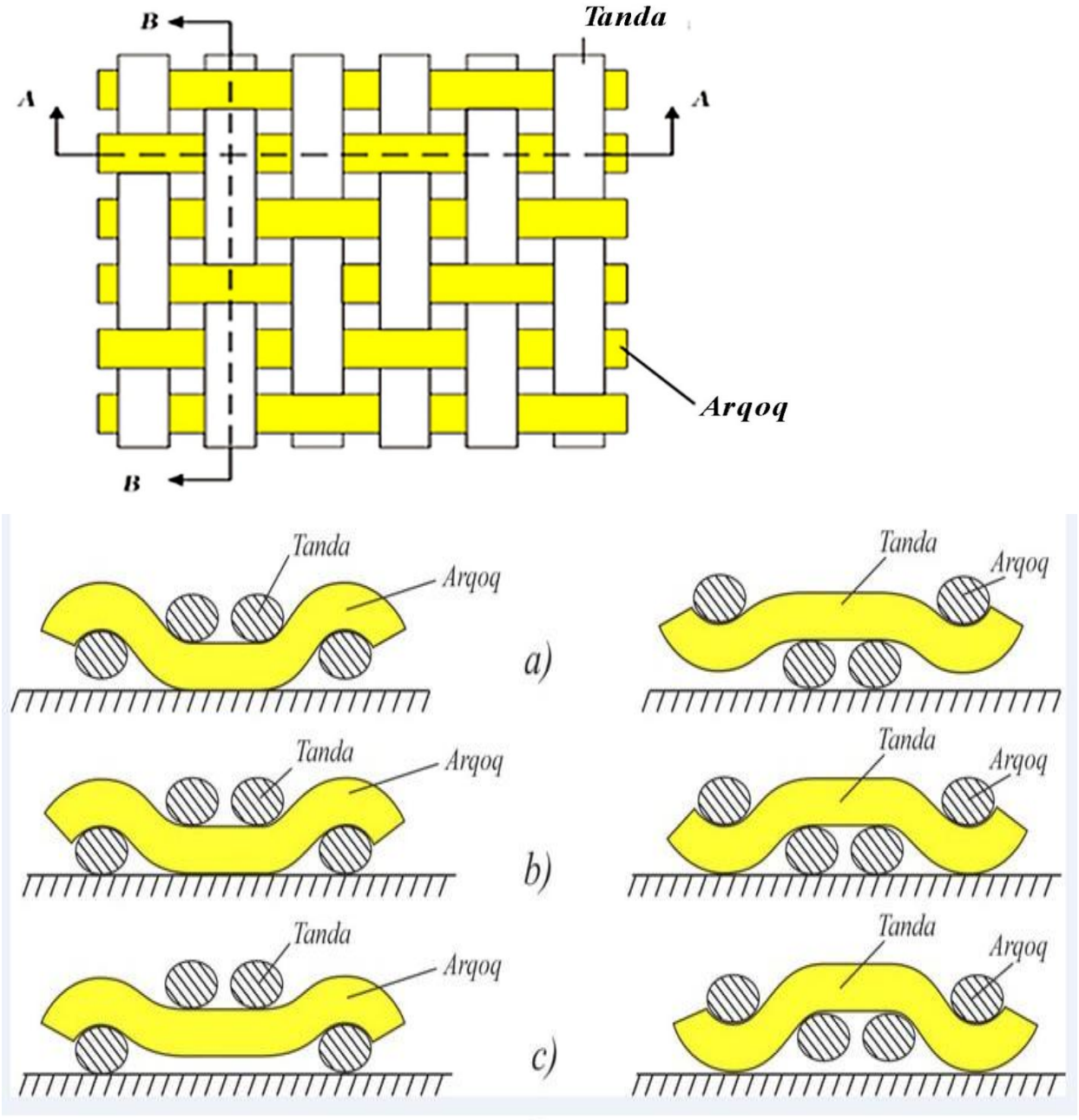


Figure 1. Cross-section of a twill weave fabric, warp and weft a) - weft surface; b) - even surface; c) - warp surface.

The produced fabric samples (ten samples) were tested on modern equipment of the "SentexUz" laboratory at the TTESI to determine the physical-mechanical (elongation, elongation, friction) and hygienic (air permeability) properties of the fabric according to laboratory research methods [4-5] .

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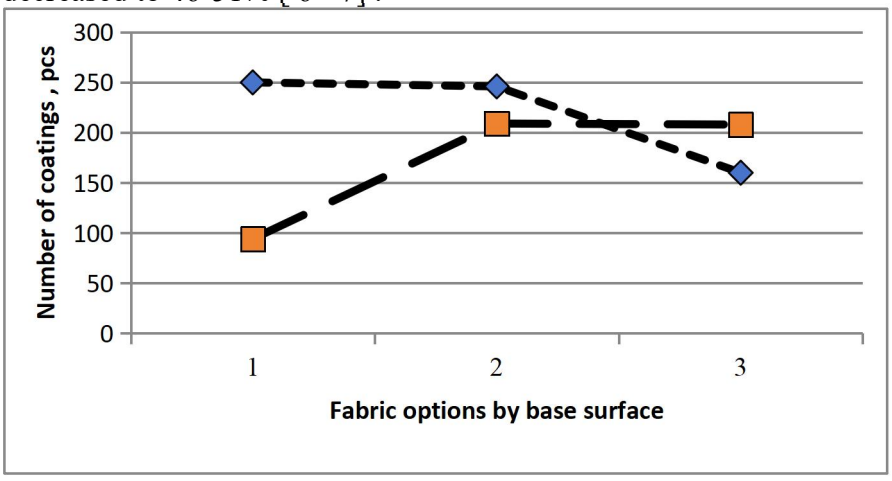
In Table 1, in order to improve the surface and properties of suiting fabrics with a 2/1 weave, the tension of the warp and weft yarns was changed in a set manner, and as a result, the tensile strength (R_t) and the weft yarns (R_a) of the suiting fabric samples, the surface area of the warp and weft, the abrasion resistance, and the air permeability and penetration were changed.

Table 1

Changes in the structure and properties of suit fabrics made of 100% cotton warp yarn and 20% wool, 30% cotton, 50% polyester fiber, blended yarn under the influence of warp and weft yarn tensions

t/r	Fabric density, thread/10cm		Base surface, coating protrusion		The abrasion resistance of the fabric , Period	Air permeability of the fabric, $dm^3/cm^2 \cdot s$	Shrinkage of fabric after washing, %	
	R_t	**P_a**	**Tt**	**T_a**	**S**	**V**	**It_{is}**	**$He\ is_a$**
Ft= 22s H, Fa =18cH, $h_a < h_t$								
1	250	210	250	94	18132	29.9	-1.3	1.2
Ft= 30 cH , Fa =15cH, $h_a = h_t$								
2	250	210	246	209	24297	49.8	-1.2	1.0
Ft=26cH, Fa =21cH, $h_a > h_t$								
3	250	210	160	208	19773	37.5	-1.0	1.0

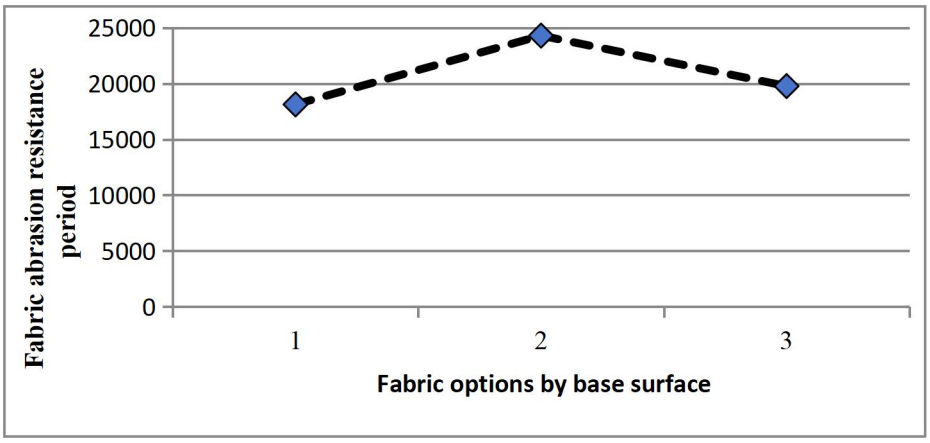
According to the results of the full factorial experiment presented in Table 1 , in order 2 The results of the experiment conducted with Ft=30cH, Fa=15cH, $h_a = h_t$ showed that in the 1st order, compared to Ft=22cH, Fa=18cH, $h_a < h_t$ and 3rd order, the base surface of the fabric increased by 33%, the abrasion resistance by 25-30%, the air permeability of the fabric increased by 30-40%, the penetration along the body decreased to 10-28%, and the penetration along the weft decreased to 46-51% [6 - 7] .



1-smooth surface; 2-smooth surface; 3-textile surface fabric

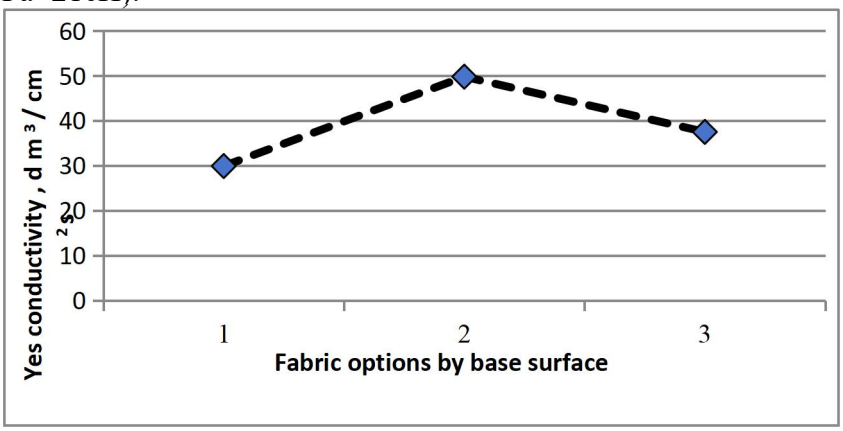
Figure 1. Change in the number of layers under the influence of the fabric base surface (in option 1, Ft=22sH, Fa=18cH, in option 2, Ft=30cH, Fa=15cH, in option 3, Ft=26cH, Fa=21cH).

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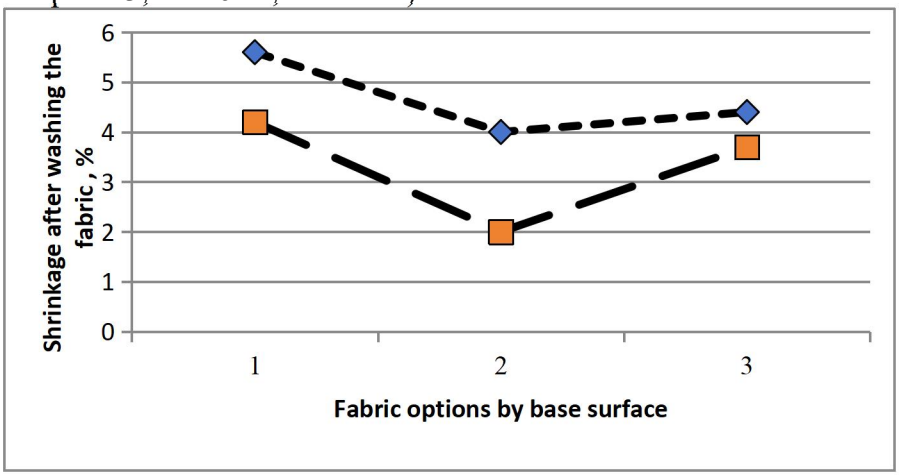
1-smooth surface; 2-smooth surface; 3-textile surface

Figure 2. Change in the friction resistance of the fabric under the influence of the supporting surface (in option 1 Ft=22sH, Fa=18cH, in option 2 Ft=30cH, Fa=15cH, In option 3, Ft=26cH, Fa=21cH).



1-smooth surface; 2-smooth surface; 3-textile surface

Figure 3. Change in air permeability under the influence of the fabric support surface (in option 1, Ft=22cH, Fa=18cH, in option 2, Ft=30cH, Fa=15cH,
in option 3, Ft=26cH, Fa=21cH).



1-smooth surface; 2-smooth surface; 3-textile surface

Figure 4. Change in the penetration of the fabric in the warp and weft under the influence of the supporting surface (in option 1, Ft=22sH, Fa=18cH, in option 2, Ft=30cH, Fa=15cH, in option 3, Ft=26cH, Fa=21cH).

As a result of a full factorial experiment, under the influence of input parameters, the breaking strength of the fabric in the warp and weft increased from 7.1% to 19.3% and the breaking strength in the weft increased from 13.2% to 22% when the warp yarn tension was set to 30sN and the weft tension was set to 15sN on the loom compared to other values [8].

Under the influence of input factors, i.e., when the warp tension was set to 30sN and the weft tension to 15sN, the wrinkle resistance and water absorption properties of the fabric showed the highest results. In this case, compared to the base version with a warp tension of 23sN and a weft tension of 17sN, the tensile strength of the fabric in the warp increased by 23.7%, in the weft by 21.4%, the abrasion resistance by 33.2%, the air permeability by 39.1%, and the shrinkage after washing decreased by 27.3% [9-10].

These indicators indicate that for weaving a suit-type fabric from 50 tex warp and weft yarns with a warp density of 250 ip/10cm and a warp density of 253 ip/10cm, setting the warp yarn tension to 30sN and the warp yarn tension to 15sN allows for good results in all quality indicators.

The mathematical statistical processing allows us to obtain accuracy in assessing the uniformity of the results of the production of suit fabrics with a 2/1 weave of 100% cotton and 30% cotton, 20% wool, 50% polyester, twill weave suit fabrics. For this , the results of the experimental research were processed in the next chapter and positive results were obtained.

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