

3) The basis of the attached element, taking into account the specificity of the fixation (bolted connection, welding, etc.)

At the moment, an extended classification of the correspondence of the attachment surfaces of the set of bases and the applied assembly devices is being developed.

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THE STRUCTURE AND PROPERTIES OF ARTIFICIAL LEATHER СТРУКТУРА И СВОЙСТВА ИСКУССТВЕННОЙ КОЖИ

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Key words: artificial leather, natural leather, footwear, physical–mechanical properties, quality.

Ключевые слова: искусственная кожа, натуральная кожа, физико-механические свойства, качество.

Abstract. Nowadays, artificial leather is often used in footwear manufacture. The article presents the results of the study of physical and mechanical properties of the artificial leather in comparison with natural leather.

Аннотация. В настоящее время искусственную кожу часто применяют в производстве обуви. В статье представлены результаты исследования физико-механических свойств искусственной кожи в сравнении с натуральной кожей.

Artificial leathers are becoming popular as an alternative material owing to limited availability of natural leathers. This material is multilayered and composite. Artificial leathers are generally produced by coating PU over a base fabric, which generally comprises woven or knitted fabric made of synthetic fibers and forming open cells to maintain air permeability. PU is a polymer compound that has a urethane bond (-

NHCOO-) and a chemical structure in which soft segment, which is formed by the reaction of diisocyanate and polymeric polyol, and hard segment, which is formed by the reaction of diisocyanate and chain extender, exist simultaneously in a molecule. Due to this molecular structure PU has both tenacity and elasticity, which is a very unique property [1].

The subject of the research in this paper has been artificial leather and natural leather for the footwear. Its materials are used at JSC “Krasny Oktyabr” in the shoe model №833018 and others models. This material has three layers: finishing layer, nanopur layer, woven fabric or knitted fabric. Microscopic images of artificial leather are presented at the figures 1-3.

This article describes the research of the basic physical-mechanical properties: breaking load, tensile strength, breaking elongation, coefficient of non-uniformity in elongation.

Physical–mechanical properties were tested according to GOST 17316-71 “Artificial soft leather. Measuring method of tearing load and elongation break” and GOST 938.11-69 “Leather. Tensile strength test” on a tensile machine IP 5158-5 [2,3]. All tests were carried out according to standard test methods in conditioned atmosphere of $(20 \pm 2) ^\circ\text{C}$ and $(65 \pm 2) \% \text{RH}$. In the GOST 939-94 “Upper leather. Specifications” are written standardized values of physical–mechanical properties for natural leather [4].

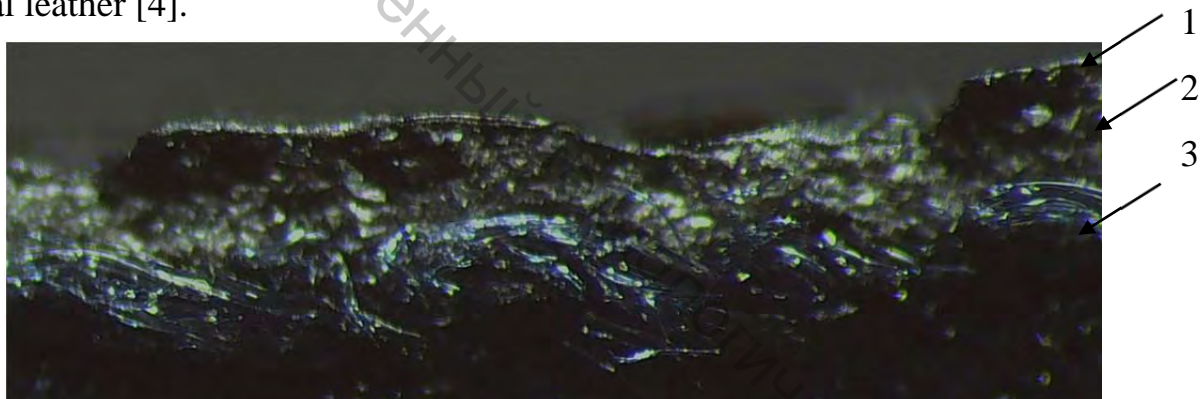


Figure 1 – Microscopic image of artificial leather №1:
1 – finishing layer, 2 – nanopur layer, 3 – knitted fabric

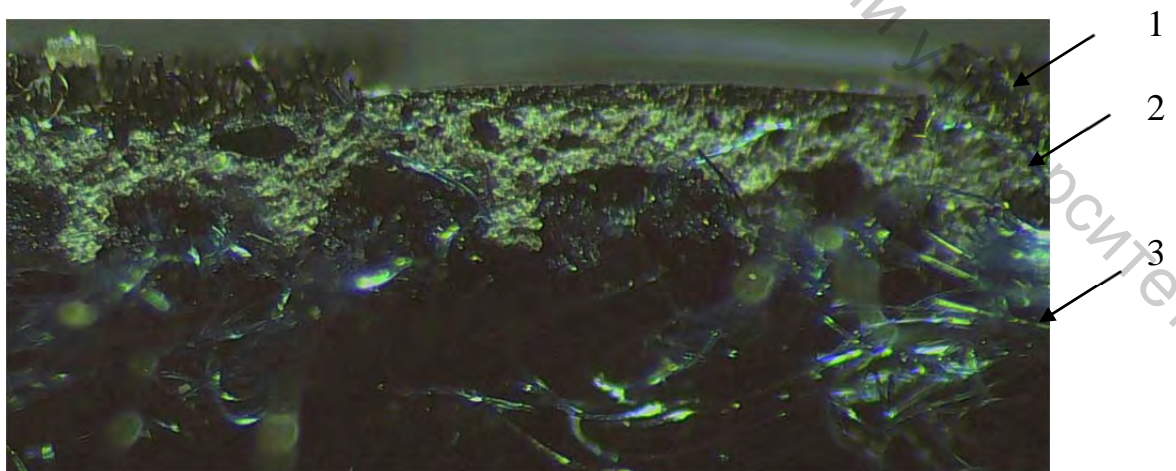


Figure 2– Microscopic image of artificial leather №2:
1- finishing layer, 2 – nanopur layer, 3 – knitted fabric

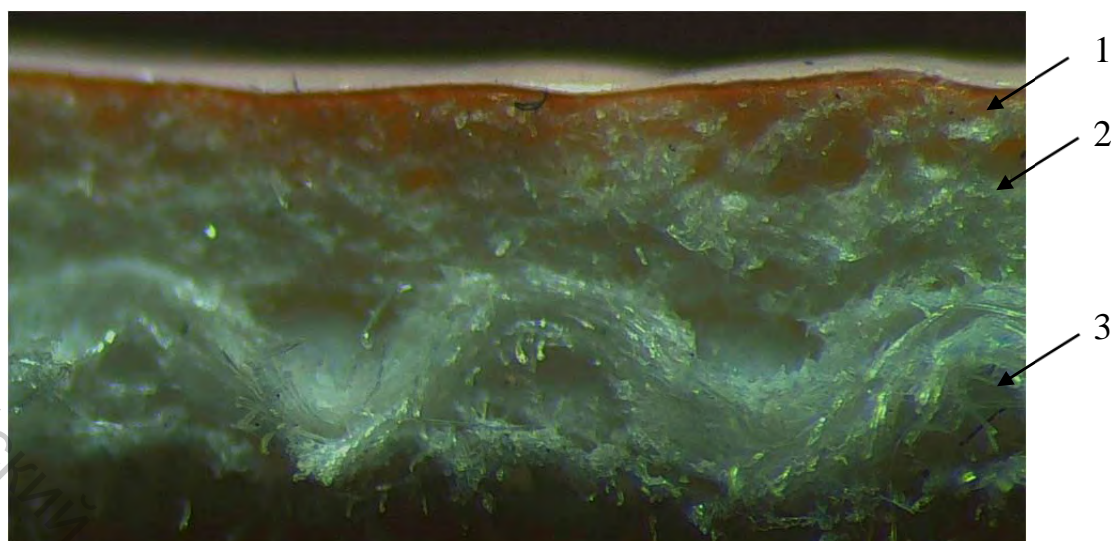


Figure 3– Microscopic image of artificial leather №3:
1 – finishing layer, 2 – nanopur layer, 3 – woven fabric

The table displays the physical–mechanical properties of tested artificial and natural leather.

Table – Physical–mechanical properties of artificial leather and natural leather

Materials	Thickness, mm	Surface density, g/m ²		Breaking load, N		Tensile strength, MPa		Breaking elongation, %		The coefficient of non-uniformity in elongation, %
		Warp	Weft	Warp	Weft	Warp	Weft	Warp	Weft	
Artificial leather №1	0.97	398	394	224	162	11.8	8.2	49	125	0.72
Artificial leather №2	0.85	439	460	288	178	16.9	10.5	53	117	0.62
Artificial leather №3	1.15	599	644	404	308	17.6	13.4	26	40	0.76
Natural leather № 1	1.50	1003	923	368	318	12.3	10.6	72	48	0.86
Natural leather № 2	1.50	1088	957	430	314	14.3	10.5	59	70	0.73
Natural leather № 3	1.30	947	905	512	384	17.1	12.8	52	49	0.75
Standardized values by GOST 939-94	0.90 – 1.63 mm	555–638 g/m ²		–		not less than 13–18 MPa		–		not less than 70 %

As the table shows values by thickness and surface density of artificial leather and natural leather correspond to GOST 939-94. The property “breaking load” is not standardized in the standard. Natural leather has higher breaking load than the artificial leather. Tensile strength is the ability of a material to withstand a longitudinal pulling force. In the standard this property should be within not less than 13–18 MPa. The table indicates that artificial leather and natural leather has lower

tensile strength along weft. The artificial leather №1 and natural leather № 1 are not correspond values of the property “tensile strength” along warp. The coefficient of non-uniformity in elongation characterizes the anisotropy of the material. Artificial leather №1 and №2 has fine anisotropic properties as natural leather. As a result of the analysis we can conclude that artificial leather does not have sufficient physical and mechanical properties. The use of artificial leather in footwear manufacture does not allow to create high-quality footwear.

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TECHNOLOGY FOR PRODUCING LATEX BRAIDED THREADS

ТЕХНОЛОГИЯ ПОЛУЧЕНИЯ ЛАТЕКСНЫХ ОПЛЕТЕННЫХ НИТЕЙ

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Key words: *thread, technology, equipment, formula, tension.*

Ключевые слова: *нить, технология, оборудование, формула, натяжение.*

Abstract. The offered technology and the created equipment allow to form latex braided threads of a wide range of linear densities. The optimization of the technological process and an analytical description of the main stages of the technology make it possible to obtain the required values of design and technological parameters. The work is implemented and used in real production conditions. Latex