

DETERMINATION OF RELIABILITY INDICATORS OF TEXTILE MATERIALS FOR THE MANUFACTURE OF PROTECTIVE EQUIPMENT

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ABSTRACT: Based on the analysis of the range of existing types of military equipment, the expediency of using textile materials with increased reliability indicators as a component of multilayer packages in combination with composite materials has been proven. On the basis of the requirements developed for military equipment, a negative impact as a result of operation on the textile materials from which the products are made has been established. Various types of systems for attaching equipment to the product have been analyzed. Based on the analysis of the range of modern textile wear-resistant materials presented on the market of Ukraine, samples were selected for further research. The expediency of conducting experimental studies to determine the predicted quality indicators is substantiated. The results of experimental studies conducted in an accredited analytical and research testing laboratory to determine the dependence of linear elongation on the breaking load of wear-resistant textile materials based on polyester and polyamide fibers for the manufacture of military equipment are presented.

Keywords: *breaking load, multi-layered packages, high-strength materials.*

The lack of data on changes in the reliability indicators of protective materials with increased reliability indicators during the operation of military equipment substantiates the necessity of conducting our research. It has been established that textile materials are affected by a number of factors during their operation, including stretching, contamination, repeated bending, abrasion, tearing, the effect of sweat, light and weather, etc., as a result of which the materials gradually lose their characteristics. It is known that during operation the structure of textile materials changes, their characteristics gradually deteriorate and products made from them are destroyed. The degree of influence of various types of hazards on materials is not the same and can be determined experimentally. Improvement of modern military equipment is carried out, including by introducing high-tech materials, combining them into packages and zonal placement [1].

Therefore, it is relevant to carry out research to determine the reliability indicators of materials for the manufacture of military equipment, in particular, multilayer packages, which include composite materials, primarily regulated by relevant regulatory documents, in particular, linear

elongation and breaking load before and after exposure to acid and alkaline solutions, as well as with multi-cycle loading.

Values of reliability indicators, which can be used to predict the behaviour of materials during operation, are simulated in laboratory conditions using the load to which they are subjected during operation. The test to determine the linear elongation was carried out according to the known methodology in accordance with the current regulatory documents [2-3]. Preparation of samples of all selected for further analysis of materials and determination of their geometric dimensions was carried out in accordance with DSTU EN ISO 13934-1:2018. The chemical composition of the components and the concentration of acid and alkaline solutions correspond to DSTU ISO 105-E04:2009. The selection of experimental samples of upper materials is based on the analysis of the range of military equipment and existing types of wear-resistant textile materials presented on the Ukrainian market by foreign manufacturing companies.

In the process of conducting experimental studies, material samples were subjected to uniaxial stretching, during which the linear elongation and the value of the breaking load were determined. The value of the maximum linear elongation under the corresponding load was determined at the moment of destruction of the material sample, after which the experiment was stopped. The obtained data were processed by methods of mathematical statistics; graphs of the dependence of linear elongation on the load of textile samples of materials were constructed.

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