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QUALITY ASSESSMENT OF TEXTILE MATERIALS AND SELECTION OF QUALITY INDICATORS

Umida Norboyeva Urazali qizi
Student, Jizzakh Polytechnic Institute, Jizzakh, Uzbekistan

Kushimov Azamat Abdurazzakovich
PhD, Jizzakh Polytechnic Institute, Jizzakh, Uzbekistan

Yasir Nawab
Associate Professor National Textile University, 37610 Faisalabad, Pakistan

Abstract:
Evaluation of the quality of textile materials and other types of products is based on the results obtained on the determination and measurement of quality indicators, as well as the comparison of standard and regulatory documents. Because the methods of determining product properties are mainly detailed in standards and other regulatory documents. This article deals with the evaluation of the quality of textile materials and the selection of quality indicators and their classification.

Keywords: Quality, material, textile, selection, analysis, assessment, indicators.

Introduction

There are several methods of assessing the quality of textile materials, including experimental, organoleptic, expert, sociological, calculated, differential, complex and mixed.

Experimental method is obtained by measuring the properties of textile materials (instrumental method) or by counting and counting the number of defects.

Organoleptic method - the quality indicators are determined based on the senses and sensitivity of the human body, and by comparing the tested textile materials to the standard. Using this method, the quality of textile materials must be correctly assessed, and it depends more on the skills and knowledge of specialists. Because the quality indicator of the product is determined based on the conclusion of experts.

Expert method - the quality indicators of textile materials and articles are determined based on the evaluations of 7 to 12 specialists-experts, who form small groups, and experimental and organoleptic methods are also used in the assessment. Experts will reduce the price of the subject of demand in the following order. At the beginning, the experts note the quality of the product independently, and then they discuss together,

and each expert expresses his conclusion, and after the conclusions of the general experts-specialists, he gives a new assessment of the quality of the product.

The received specific result indicators are evaluated based on the voting results of at least three experts. In addition, there may be more than three voting results. It depends on the level of knowledge and skills of specialists. Textile materials are certified according to the quality level and a conclusion is drawn according to the procedure of mutual voting of specialists-experts. If the product is found to be of good quality, then this product will be given a quality mark.

Sociological method - the quality indicator of the product is evaluated based on the suggestions and opinions of consumers. Here, the main focus is on collecting correct and accurate data, and it is necessary to have a sufficient level of conclusion on the assessment of quality indicators. Otherwise, it may cause a negative perception of the quality of the product.

The method of calculation is that the quality indicators and structure of textile materials depend on many factors, for example, the influence of technological processes and, together with this, the properties of the initial material. This method is widely used in designing the quality of textile materials and technological processes.

Different final conclusions are drawn from all the methods used in the assessment of the quality indicators of textile materials, therefore differential, complex and mixed methods are used in the assessment of the quality indicators of the product.

Differential quality assessment method - quality assessment works are carried out according to the individual properties of the product, as well as non-dimensional indicators of the defective parts of the products, and at the same time, complex and mixed quality assessment methods should also be used independently. . In the first case, it provides a dimensional or non-dimensional assessment of the product, which is very specific to some quality indicators. In the second case, the variety, class, group and range of results of other quality indicators are determined according to the quality indicators of the total product, and the total cumulative index, coefficients or indicators are calculated.

The method of complex quality assessment - joint assessment of the material by separate indicators of quality sometimes leads to the need for a general assessment of several complex main properties of the material in one indicator. As a result, it is called a general assessment of the quality of textile materials, for example, the number of raw materials of flax fiber, the quality of homogeneous wool, etc.

Product quality indicators are divided into real and approximate comprehensive evaluation, depending on the essence of comprehensive evaluation.

A true complex evaluation has a defined physical objective, which often represents the

fiber's tensile strength, as well as the product's service life.

A true composite estimate is better than any constant approximation. For example, the amount of defects and waste in cotton fiber is called a true complex property.

The advantage of a comprehensive assessment is that it concludes with a number of final assessments. In addition to advantages, this evaluation is not without disadvantages, that is, we will not have complete information about its individual properties. In order to choose raw materials correctly, it is necessary to know how to control the technological process and rational use of the material during its use. It should be noted that the initial properties of one or another material can have a positive effect on the quality of the manufactured product and a negative effect on the technological process. The finer the fiber, the higher the relative strength and less unevenness of the resulting yarn, and the smoother the appearance. It should not be forgotten that a comprehensive assessment of one or another quality can be obtained from different calculations of individual quality indicators. The average complex assessment may not change according to the level of several quality indicators, some of them may have a lower level, and some may have a higher level.

Thus, it is possible to complete a comprehensive assessment without changing the individual quality indicators of the material.

Mixed quality assessment method - the mixed quality assessment method is used only when the total quality indicators are very high, and one comprehensive quality indicator does not allow to fully characterize all the capabilities of the product.

In the method of mixed evaluation, a number of complex evaluations or a complex evaluation with a separate differential are used together, and it makes it possible to obtain the quality stage, variety, etc. of the product. For textile materials, it is sometimes evaluated according to the worst of the complex quality indicators, and then this evaluation is clarified according to the values of other indicators.

The quality indicator is the indicators and properties of the material that meet the regulatory requirements in quality assessment. In standard and technical terms, quality indicators are measured by the structure index and fiber composition when assessing the quality of the material. Structure index and composition affect the quality index level.

All the listed indicators together are called "standard indicator".

In order to fully assess the quality of textile materials, it is necessary to correctly select complex quality indicators. For him, one should not leave out any important indicators, and at the same time, one should not load and strengthen less important complex indicators.

In a number of standards, the order of quality indicators is presented, and it offers

standardization in the creation of technical conditions for various textile materials.

The nomenclature and classification of quality indicators are detailed in the GOST 22851-77 standard, which specifies the product's application, strength, durability, use, storage, adaptability, environmental friendliness, and safety for human health.

The following indicators are given in the nomenclature and classification of quality indicators:

— mandatory for all types of products;

— specialized, general for several categories of products;

— customized, but not mandatory, especially within the scope of product use.

When it is indicated in the nomenclature table of the standard and it is indicated by the certification of the quality of the product in a large group, it makes it somewhat difficult to choose the minimum amount of the quality indicator. Therefore, to reduce the number of groups, a classification of quality indicators is presented (Fig. 1).

Quality indicators are divided into five main groups.

1. An important indicator. They correctly and rationally determine the importance of textile materials and their use. This is a very important group of indicators, which for the first time provides a comprehensive analysis in the selection of complex normative properties. In turn, the important indicator is divided into four groups: a) aesthetic indicator (picture, flower, color rendering, whiteness, shine, shape of cutting, etc.); b) hygienic indicator (hygroscopicity, water permeability, air permeability, vapor permeability, heat resistance, water resistance, etc.); d) dimensional indicator (width of the canvas, size of the product line, thickness, etc.); e) technical indicator (strength, elasticity, elasticity, sound absorption, electrical resistance, electrification, etc.).

2. Reliability indicator. In the specified interval, the material retains its properties over time and ensures its normal use. The indicators of this group are divided into four groups, like the first group: a) aesthetic indicator (durability of color and whiteness, non-creasing, etc.); b) hygienic indicator (permeability, change in thermal conductivity, etc.); d) dimensional indicator (form stability, exposure to various influences, etc.); e) technical indicator (normal service life, durability, resistance to repeated deformation, resistance to various eroding factors, change in strength, elasticity, seam strength, etc.).

3. Defective indicator. It is a negative indicator of quality and characterizes the formation of new defects in unused materials. The negative quality indicator is widely used in evaluating the quality of textile materials.

4. Technological indicator. Determines the suitability of textile materials for processing. This is the thickness, width, thickness, folds, friction properties, stretchability, elasticity, etc. of the canvas.

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5. Technical and economic index. The indicator in this group is determined by the price of textile materials (material capacity, canvas width, etc.).

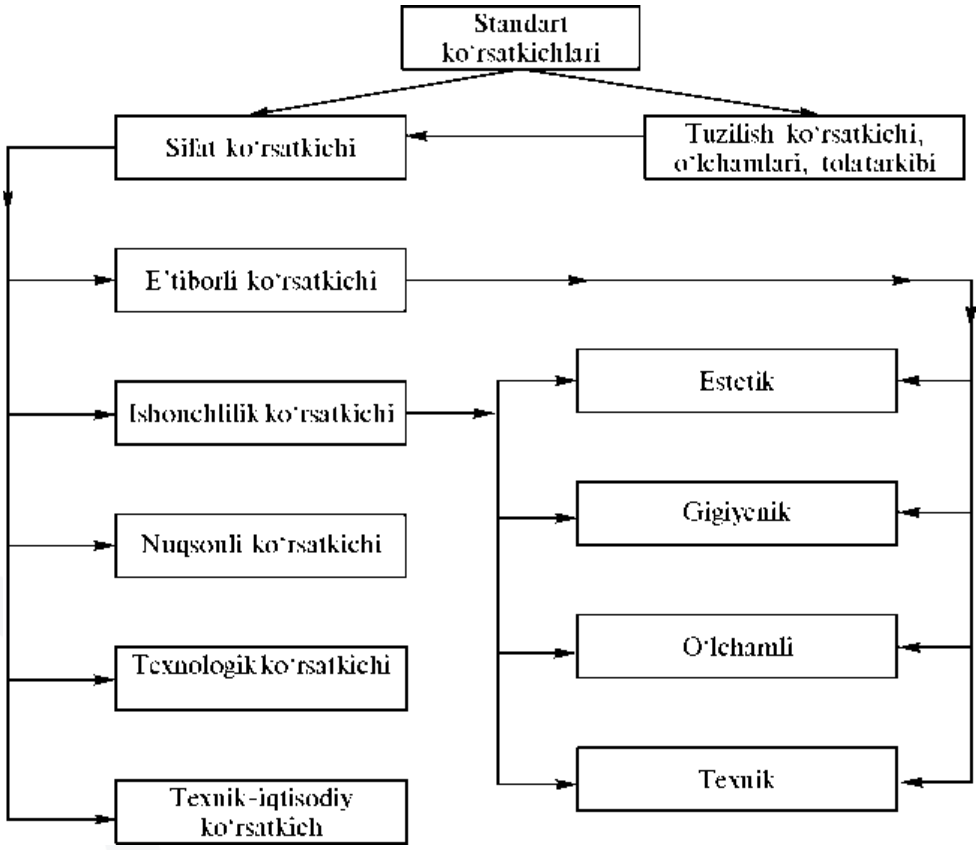

Figure 1. Classification scheme of quality indicators.

In some classifications, a group of ergonomic quality indicators is specially distinguished. According to the GOST 16035-70 standard, this group combines the product's hygienic, anthropometric, physiological, psychological and psychophysiological quality indicators. All this is the result of interaction with other objects in human activity, for example, it determines the efficiency, reliability and comfort of production in the "human-object-environment" system.

Sometimes the reliability indicator is considered separately without adding quality indicators. As a result, all these indicators show the curve of the decay kinetics of the material with clear illustrations (Fig. 2).

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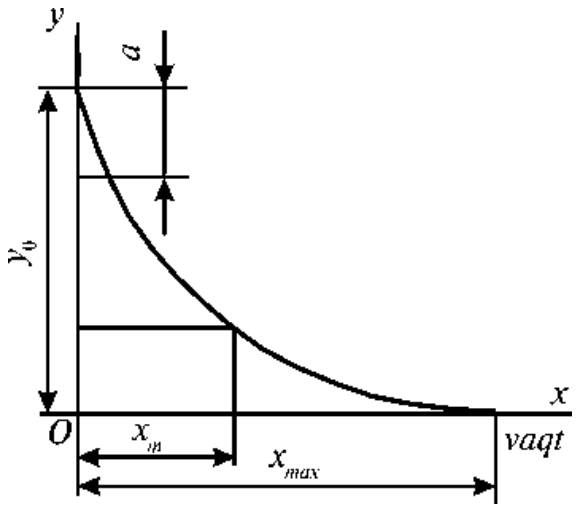

Figure 2. Curvature kinetics in material degradation.

For most materials, this curve is written as an empirical formula:

$$y = y_0 - ax^b, \quad (1)$$

here:

y – positive quality indicator after use in x hours;

y_o – is the initial quality indicator level of unused material;

a – initial unreliability of the material;

b – unreliability indicator.

The complex indicator of unreliability is the normal life of the material, which is derived from the formula (1):

$$x_m = \left(\frac{y_0 - y_{\min}}{a}\right)^{1/b}, \quad (2)$$

here: $y_{min.}$ – the value of the minimum permissible indicator of the positive quality indicator when the material is used under normal conditions.

As can be seen from the formula (2), the complex indicator of reliability is $\mathbf{x_{min.}}$ the quality indicator is $\mathbf{y_{min.}}$ and $\boldsymbol{a}$, $\boldsymbol{b}$ and $\boldsymbol{y_{min.}}$ depends on the material's reliability characteristics. All indicators of these measurements are D.F. Cited in the case of Simonenko.

Complex quality indicators are determined primarily on the basis of the nomenclature table, together with the classification of these indicators. In the last case, by choosing complex indicators, significant group indicators are arranged, and the same significant indicators are written in parentheses. For example, fabrics used for everyday men's suits are divided into the following groups and subgroups: 2g – (1a, 3, 2a, 2v) – (1b, 2b) – 5. These groups and subgroups can be divided into the following indicators: normal service life, seam strength - shear form, paint durability, wrinkle

resistance, dimensional stability, penetration-hygroscopicity, air permeability and reliability during use - material capacity and width.

After additional selection of quality indicators, their importance is assessed using expert method.

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