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ОЦЕНЯВАНЕ НА КОМФОРТНИ ТЕКСТИЛНИ МАТЕРИАЛИ ЗА ДЕТСКО ОБЛЕКЛО

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EVALUATION OF COMFORT TEXTILE MATERIALS FOR CHILDREN'S CLOTHING

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Abstract:

Evaluating the quality of materials on the standard indicators of regulatory documents is important to determine the dependence of the standardized indicators on the actual.

The article observes the issues of assess the quality of garments for children. It is proposed to use the desirability function for calculating the integrated assessment of the level of quality garments. Designed a comprehensive assessment of the quality of textile materials for the manufacture of garments child assoritments enhanced comfort.

Keywords: comfort, children's clothing, quality, comprehensive evaluation, textile materials.

INTRODUCTION

The creation of children's clothing is a complex and interesting creative process that requires a whole range of specialist knowledge not only in the field of designing and modeling apparel, but also in the field of physical development of children, psychology, pedagogy, physiology, and others.

Children's clothing is intended to promote the curiosity and activity that is natural to the child, to help in the first confident steps in social adaptation among peers and adults. To open up a personality, to keep pace with time.

In addition, childhood provides great opportunities for the creative realization of the ideas of designers, technologists and designers who create clothes for children, since this age includes several stages (from childhood to youth), which differ significantly from one another in form, silhouette, cut , trim, clothing style, etc.

Recently, the question of the quality of textile products and their safety has become increasingly common. This is especially true for children's clothing, which is much more demanding than an adult. It's in first of all, high requirements in terms of convenience, practicality, quality and safety of fabrics, of which it is made. When creating clothes for children, specialists take into account the physical norms of the child's development, her psychological and inherent state in relation to fashion, understanding of practicality and convenience. It due to the high sensitivity of the child's perception of external actions and specific conditions the exploitation of products related to the dynamism of the way of life of children.

EXPOSITION

Regardless of the imaginative outfit of clothing, contemporary children value it with all the convenience and functionality. This is required by the style of their lives: dancing, which is closer to physical education and exercise; sport of extreme forms; ways of communicating with peers; aggressive environment; huge information load and so on.

To date, many researchers study the requirements for children's clothing, the nomenclature of their quality indicators, and develop a new scheme of these indicators. But modern sewing and textiles and activities for expertise and quality assessment should be based on the current legislative and normative and technical basis.

From the point of view of production, quality products are those that meet the requirements of regulatory documents.

Children's clothes are made of various materials: fabrics, knitwear, artificial and natural fur, film materials, artificial and natural suede and leather. The general requirements to them are as follows: minimal weight, pleasant sensation of touch, light soft or joyful color, absence of harmful influence on an organism.

Fabrics and knitwear are leading materials and are equally successfully used in the manufacture of all kinds of children's clothing.

The main requirements for materials in the design of children's clothing are: hygienic, aesthetic and physical and mechanical. Depending on the specific purpose (type of product) and climatic conditions, the requirements for materials are different.

Assessing the quality of materials according to standard indicators of regulatory documents it is important to determine the dependence of normalized indicators on actual ones. To calculate the level of quality of fabrics or determine their grade using various methods of quality assessment [1,2].

At present, the industry produces a large number of new textile materials, therefore, to select the optimal variant of fabrics, their comparative assessment is made in order to simultaneously take into account various indicators of the quality of materials they need to be combined into one complex indicator, that is, to use a comprehensive assessment of the quality of the object.

There are several methods for determining the assessment of the level of quality, depending on the methods of comparing product quality indicators with basic ones: the differential method, the complex method and the mixed method. The most common is a comprehensive method of assessing the level of quality, which is proposed to be used in this work in determining the quality level of textile materials for garments of various assortments.

The weighted average integrated quality indicator can be calculated as:

1. Arithmetic average:

$$K_j = \sum_{i=1}^{n} Q_j \, j_i \quad . \qquad (1)$$

where is: Q_{ji} - the dimensionless value of the quality indicator;

J_i - the weighting factor of the quality indicator;

$\sum j_i = 1$; n - the number of quality indicator;

2. Mean Geometry:

$$G_j = \prod_{i=1}^{n} Q_j^j \; ; \qquad (2)$$

3. Medium Harmonic:

$$H_j = \left[\sum_{i=1}^{n} (j_i / Q_j) \right]^{-1} . \qquad (3)$$

In further calculations, a desirability function is used, which is a function that is a dimensionless, continuous quality characteristic and varies from 0 to 1 even with a very large and unlimited range for determining dimensional quality indicators. Calculate the desirability function *d* with the help of auxiliary dimensionless indicators y by the following formula:

$$d = \exp[-\exp- y] = \frac{1}{e^{1/e^y}} , \qquad (4)$$

where is: $-\infty < y < \infty$.

The limiting values of the desirability indices d and dimensionless indices y for the studied properties is given in Table 1. At the same time, the relationship between the dimensionless indices of the investigated properties y and the natural indices of properties x is linear:

$$y = f(x) = A_0 + A_1 x \qquad (5)$$

where is: A0, A1 - constant values;

x - dimensional values of natural quality indicators.

When choosing threshold values for different indicators of the properties of textile materials, objective indicators are used. They are obtained from the analysis of regulatory documents and expert way. In this case, the requirements for ensuring the storage of the uniformity of the scale of natural indicators *x* should be met. Such excellent indicators, which reflected the latest achievements of science and technology in this area, were included in the gradation "excellent", the standards "bad" - standards, below which the output of products and materials is considered expedient and economically unjustified.

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Table 1 - Levels of indicators of properties by quality gradations

Research characteristics	Gradation of quality indicators			
	Bad	Satisfactory	Good	Excellent
Desire rate *d*	<0,37	0,37-0,62	0,63-0,79	≥0,80
Dimensionless indicator *y*	<0	0,00-0,76	0,77-1,49	≥1,50
Hygroscopicity W, %	<4	4,0-6,99	7,0-9,99	≥10
Air permeability B_p, $дм^3/м^2 \cdot сек$	<70	70,0-84,99	85,0-99,9	≥100
Surface Electrical Resistance ρ, $Ом \cdot м$	$>10^{11}$	10^{10}	10^9	$\leq 10^8$
Moisture permeability $B_{пр}$, $г/м^2 \cdot год$	<30	30-44,9	45-59,9	≥60
Breaking load P_p, *H*	<200	200-449,9	450-699,9	≥700
Resistance to friction K_c, The number of cycles	<4000	4000-8999,9	9000-13999,9	≥14000
Rigidity B_y, $мкН*см^2$	<2000	2000-3499,9	3500-4999,9	≥5000

The results of the calculations allow to obtain objective data on the choice of textile materials for children's clothes of high comfort. The calculation of a comprehensive quality assessment is performed using the desirability function.

The increased comfort of children's clothing is determined by the indicators of the optimal under-dress microclimate, the formation of which takes into account the indicators: hygroscopicity, vapor permeability, electrifiedness, air permeability of textile materials [3].

In addition, fabrics for this range must meet the requirements of reliability, that is, to be resistant to abrasion, stretching and tearing.

A comprehensive quality score for each material studied is calculated using a method based on the use of the desirability function.

To establish the gradation of «excellent» and «bad» (Table 1.) for the indicator of air permeability, the values presented in the regulatory documents and the values obtained as a result of the conducted research were used. Thus, for the studied materials, the values of air permeability for the gradation «excellent» are taken as 100 $дм^3/м^2.сек$, and for the gradation "bad» - < 70 $м^3/м^2.сек$.

When choosing the level of hygroscopicity indicators, the data of the regulatory documents and the results of the conducted research were taken into account. Therefore, for the gradation of «bad» was adopted the value of hygroscopicity <4%, for the gradation of «excellent» ≥ 10%.

The levels of indicators of specific surface electrical resistance according to the gradations of quality were chosen taking into account the requirements of regulatory documents, as well as taking into account the results of the research. Therefore, for the gradation «excellent», the indicator of specific surface electrical resistance < 10^8 $Ом.м$ and for the gradation «bad» - ≥60 $г/м^2.год$. When choosing values for gradations, we used the values that were obtained as a result of research.

When choosing the level of the indicator of breaking load based on the results of research. For the «excellent» gradation, the value of 200 N was taken, and for the «bad» gradation <700 N.

The levels of indicators of the resistance of materials to friction according to the gradations of quality are selected based on the results of research. For the «excellent» gradation, the value <4000 cycles was assumed, and for the «bad» gradation - 14000 cycles.

The level of stiffness is estimated based on the results of the research. For the «excellent» gradation, a value of < 9000 μN*$см^2$ was assumed, and for the gradation of „poor" 4000 μN*$см^2$.

In order to obtain a linear scale of indicators of the studied properties for the gradation of «satisfactory» and «good» selected values of indicators in the middle of the corresponding intervals.

Comprehensive indicator of the level of quality was calculated by the formula (6):

$$\lg G_i = \sum_{i=1}^{7} \gamma_i \lg d_i \qquad (6)$$

Analysis of the data obtained shows that samples: No. 2, No. 3, No. 4 and No. 5 have a high value of the complex indicator of the quality level. Sample No. 2 has a fiber composition of wool and nylon is made with a twill weave, a comprehensive assessment of 0.83. Sample number 3 - wool and nitron, twill weave, a comprehensive assessment - 0.87, sample number 4 - wool, nitron and nylon, plain weave, a comprehensive assessment - 0.79 and sample number 5 - wool and nitron, twill weave - 0 , 89. The smallest value of the comprehensive quality assessment was obtained by sample No. 6 - nitron, twill weave, whose integrated assessment is 0.37 and sample No. 1 is the fibrous composition of which is nitron and polyurethane, twill weave is 0.39.

CONCLUSION

Thus, a comprehensive assessment of samples of textile materials under the numbers 2, 3, 4, 5 is approximated by the numerical values of the complex indicator of the level of quality in the gradation "excellent." The fibrous composition of these materials has a large percentage of natural fibers - wool, all physical and hygienic indicators are within acceptable limits, therefore these materials can be recommended for the manufacture of children's products of the upper range.

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