Topic № 2
TEXTILE TECHNOLOGIES: SPINNING, WEAVING AND KNITTING

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Textile Industry.
Technology of textile materials.

IMPACT OF THE COEFFICIENT OF FRICTION ON THE SEAM QUALITY OF DENIM JEANS

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Introduction

The so called "blue jeans" were invented in the far 1873 and remain modern nowadays. Their quality is determined by the properties of the fabric and that of the seams. The quality of the seam depends on many factors, one of which is the coefficient of friction between the fabrics that influences the slippage of the layers each to other during the sewing process. The value of the friction coefficient depends on the material used, the linear density and the twist of the warp and weft threads, the weave, the density of the threads in the weave, and the finishing treatment. In order to increase the friction forces between the fabric layers during sewing, a pressure by means of a presser foot is exerted on them.

Experimental part

The study is carried out for 6 denim fabrics made of 100% cotton in twill 3/1 weave.

The static and dynamic coefficients of friction before and after finishing at different pressure levels are determined. The experiments were performed using the μ-meter MXD-02 of Labthink, China.

For each test two samples were cut. The first one was positioned so that the longer side to be in the direction of the warp threads. It was placed and fastened on the movable platform. The second sample was placed on the sliding block. It was cut and positioned so that the friction to be carried out in the following directions: warp, bias (45°) or weft direction.

Measurements under pressure of 200 g (sliding block dead load), 300 g (+100 g) and 400 g (+200 g) were performed.

Results

The mean values of the static and dynamic friction coefficients by changing pressure and direction of friction were calculated and summarized in tabular form.

Discussion

The pressure increase leads to a growth in the friction coefficients, as a result of the bigger contact surface. The finishing processes have no statistically proven effect on friction coefficients. Dynamic coefficients of friction are more strongly influenced by the direction of friction than static ones.

Conclusion

The study clearly showed that the static and dynamic friction coefficients of the denim fabrics are high (between 0.54 and 1.19), and they are influenced by the pressure and direction of friction.

Keywords: Static and dynamic coefficients of friction, Denim fabrics, Finishing, Seam quality.

IMPLEMENTATION OF INCOMING QUALITY CONTROL OF FABRICS IN THE CONDITIONS OF QMS ACCORDING TO ISO 9001

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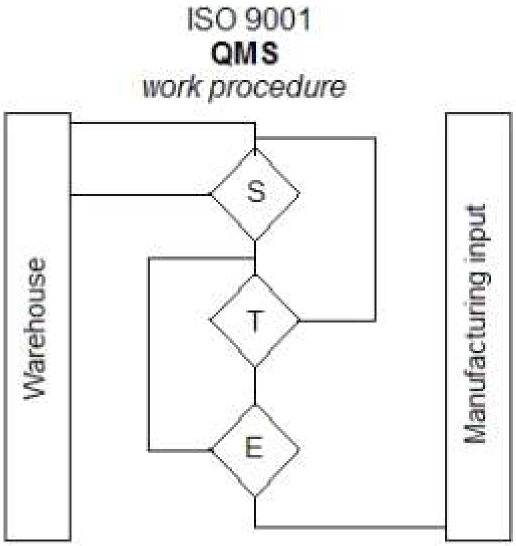
The incoming control of fabrics is carried out upon their receipt in three production cycles.

In the most general case, it is the cycle when the finished fabric enters the tailoring department of the sewing enterprise.

In the second cycle, the raw fabric enters a finishing workshop and after processing is sent to the sewing plant.

At the beginning of the third cycle, the raw fabric enters a dyeing shop, after dyeing it is directed to the finishing and finally to the sewing plant.



In all three cases it is necessary to apply observations, measurements and tests, which for the most part are the same and prescribed in detail in the relevant industry standards.

The greater variety is found in the types of fabric.

According to the basic construction, the fabrics are woven or knitted, which leads to significant differences in test methods.

The fibrous composition;wool, cotton and man-made fibers also provoke a different approach in assessing quality compliance.

Each cycle is characterized by the logical sequence of sampling - S, laboratory testing - T and quality assessment - E.

Depending on the variants and the specificity of the cycle, the samples may be representative samples of the entire batch of fabric, pieces of fabric from the beginning of each roll or observations of the entire length of the fabric.

Also, laboratory tests can be performed as measurement of geometric parameters and area mass, physico-mechanical tests and visual inspection of the entire length of the fabric. For this reason, the cycles are spirally interconnected and the tests tend to expand in detailed analysis.

The subject of this article is the working procedure for the implementation of incoming quality control of fabrics in organizations with implemented quality management system (QMS) according to ISO 9001. The aim of the work is to differentiate the individual elements of the procedure and to ensure the quality compliance by minimal resources.

Keywords: fabrics, sewing production, input quality control.

References:

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COMPATIBILITY OF TESTING WATER RESISTANCE AND WETTING CONTACT ANGLE OF FABRICS WITH WATER-REPELLENT TREATMENT

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Filtration capability of textile media or the resistance towards the fluid penetration through different fabrics is depending on their surface repellency.

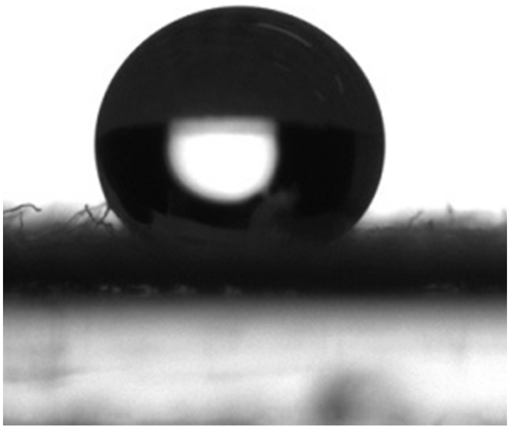
The emission of condensed exhaled air on the outer layer of the half face mask from the FFP2 (EN 149) category indicates the termination of its protective properties.

The overcoming by the fluid of the textile environment of the mask in its role of an artificial barrier goes through two stages.

Initially, the aerosols in the exhaled air condense and meet the repulsion from the inner fabric.

Later, due to the hydrodynamic pressure, the condensed droplets pass through the textile medium, overcoming the friction among the fibrous layers.

Finally, the droplets irrigate the outer, front layer of the mask and are released into the environment with all the consequences.



Closest to this physiological process is the hydrostatic pressure test method.

The test of resistance to fluid penetration gives a final assessment of the property of the textile environment without clarifying the elements of the process.

Experimental studies have shown similarities in the results of the penetration of the fluid through the textile medium and the initial repulsion of aerosols from the surface of the fibrous layer. The repulsion of water droplets is of predominant importance in relation to the general barrier capacity of the textile media.

The main indicator of water repellency is the contact angle of the free drop on the fabric.

The subject of this article is the comparison between the contact angle of wetting and the penetration of the fluid by means of standard test methods. The aim of the work is to explain and model the process of fluid penetration through protective masks, as well as to optimize the properties of repulsion and resistance.

Keywords: FFP2 masks, COVID-19, fluid filtration, contact angle.

References:

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EXPERIMENTAL DETERMINATION OF THE FRICTIONAL CHARACTERISTICS OF FABRICS MADE OF NATURAL SILK

10.53230/tgm.1310-912X.2020.0010.15

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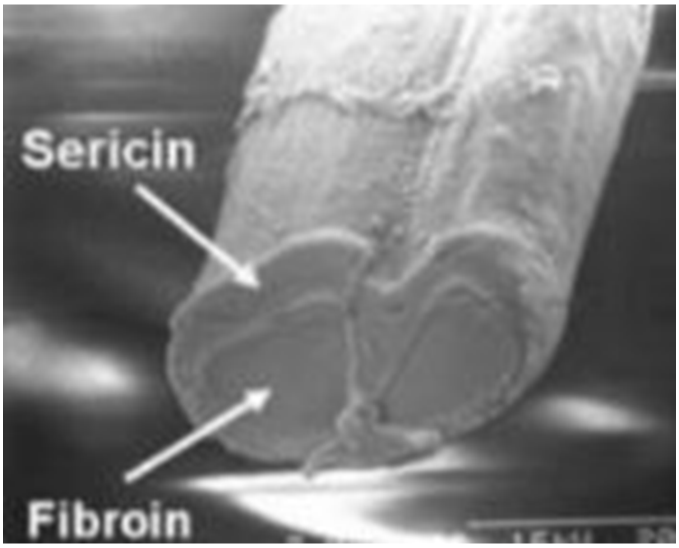
Introduction

Natural silk fabric is directly derived from insect produced cocoons containing large volumes of fibroin protein. The fibroin fibres secreted by the two silk glands of Bombyx mori are smooth and soft and form the structural center of silk. Sericin is a coating with an amorphous structure that bonds the two strands. It is the component hardening the raw thread. The fabric as we know it with low mass per unit area. The level of friction of textile materials depends on a number of test factors - normal load, contact surface area, friction speed, as well as the nature of the textile surface and the direction of friction - warp - warp, warp - weft.

Experimental part



In this study, four types of fabric made of 100% natural silk have been examined. They all have different characteristics for mass per unit area, weave, density and linear density of the warp and weft threads. The study makes use of appliance tribometer MXD -02, from Labthink, China to determine the values of static and dynamic friction coefficients. Friction is conducted in different directions and under different pressure. Three tests are performed for each studied fabric; all of them are conducted with low sliding speed and different directions and pressure levels are applied (pressure level is regulated by adding additional weights to the sled's own weight). First, normal compressive forces Ni and friction forces Fi are calculated; next friction factor and friction index are determined and lastly, Log (Fi / B) and log (Ni / B) are calculated. The following expression applies: $y = a + x.b$ (where $x = lg(Ni/B)$; $y=lg(Fi/B)$; $a = lgC$; $b=n$)

Results

Frictional characteristics at rest and at sliding, namely friction index for friction at rest and at sliding, friction parameter, and friction coefficient, are determined and are displayed in a tabular form.

Discussion

This experimental study has clearly showed that silk fabrics with higher surface mass - display friction coefficient values (at rest and in sliding) greater than 1. Friction index and friction coefficient are influenced by the test direction where friction index in warp direction of one fabric with parallel arrangement of the threads is higher compared to threads in weft direction of another fabric.

Conclusion

Direction of friction which has been confirmed to have influence over frictional characteristics with other fabrics (fabrics with different composition and structure) has proven to have the same influence with silk.

Keywords: Natiral Silk fabric, dynamic and static friction coefficient, friction index, surface textiles.

DIRECTIONS, LEVELS AND INDICATORS FOR CERTIFICATION OF PROTECTIVE FILTER MASKS AGAINST COVID 19

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The pandemic crisis has raised many societal issues, but three constitute the civilizational - expectation responsible behaviour, immunization, and personal protective equipment. The common belief is the use of personal protective equipment to protect the individual from the environment and other people. In the current situation, the mask serves to isolate the individual and protect society from a potential carrier of the infection. Prior to the onset and spread of COVID-19, the use of half-face masks was restricted in the work environment of medical and industrial facilities.

In these conditions, the masks become essential and cover the daily life of the whole society with a long-term perspective. From a seemingly simple and small sewing product, the mask turned out to be a complex and difficult tool for individual use and mass distribution.

The most specialized mask is for medical purposes and is known as a surgical mask. One of the requirements for these masks is sterility, which is achieved only in closed production facilities - "clean room".

The main standard that surgical masks meet is EN 14683 + AC, in which antibacterial properties are mandatory.

The professional mask, known as a personal protective equipment from categories FFP1, 2 and 3, is the most common functional mask. It is produced in conventional industrial conditions and after the consumer requirements are met, it is subject to commercial distribution and official use. These masks for official use comply with the standard EN 149: 2001 + A1 and with the NaCl filtration relief - PPE-R / 02.075 Version 2 are subject to certification in accordance with EU Regulation 2016/425.

The household mask is the most popular mask in society. It is usually made of available fabrics in home or craft conditions. The essential characteristic of this mask consists in the variety at the expense of the symbolic protective properties.

The essential issue in the design and certification of masks concerns their action. The barrier mask prevents the penetration of particles into the interior of the textile media and acts as a protective screen. These properties are achieved by imparting water and oil repellent properties on the surface of the canvas. The mask acts as a shield, close to the face and holding the aerosols of human respiration in the small volume between the face and the mask. The filtering mask absorbs and retains moisture and particles in the exhaled air aerosol inside the textile medium.

The subject of the article is the normative base for industrial production and legal trade in masks. The purpose of the present development is to clarify the process from conception, through production to the certification of masks with successful trade.

Keywords: COVID 19, masks, protective equipment, certification.