Physical Properties of Textile Fabrics

Jurabayev Nozimjon
PhD student, Namangan institute of textile industry

Meliboyev Umarjon
Professor, Namangan institute of engineering and technology

Xoliqov Qurbonali
Professor, Namangan institute of textile industry

Abstract: In this article, one of the physical properties of textile fabrics, water wicking property and its types are studied.

Keywords: Hygroscopicity, water absorption (capillarity), humidity.

Introduction

The group of physical properties includes hygroscopicity, air and vapor permeability, dust absorption, electrification, optical and heat preservation properties of fabrics.

Physical characteristics can be divided into the following groups:

1. Features related to the ability of fabrics to absorb water.

2. Properties related to the ability of fabrics to pass air, water, steam, etc.

3. Features that describe the relationship of fabrics to the influence of different temperatures.

4. Optical properties of fabrics.

5. Electrification of fabrics.

Textile fabrics have the ability to absorb various substances in liquid, gas or vapor state. In this case, the mass, dimensions, strength, uniformity and other properties of fabrics change. During the production and use of textile products, they are always exposed to water or steam. Fabrics have several properties that describe their ability to absorb water or steam. These include moisture, hygroscopicity, water absorption (capillarity), water absorption, etc. of fabrics.

Humidity W (percentage) — indicates the amount of moisture in the moisture cells under the conditions of real air humidity and is calculated using the following formula:

$$W_h = m_h - m_q / m_q * 100$$

where:

m_h - is the mass of the sample at the actual air humidity, g;

m_q — absolute dry sample mass, g.

Hygroscopicity W_g (percentage) is the humidity of the sample at a relative humidity of 98-100% and a temperature of $20 \pm 2°C$:

$W_g = m_{ck} - m_q / m_q * 100$

where:

m_{ck} - is the mass of wet flour kept for 4 hours in a desiccator with air humidity of 98% before the test, g;

m_q - absolute dry sample mass, g;

Water absorption (capillarity) is estimated by the height of water rising from a sample immersed in water at one end for one hour.

Water absorption P% (percent) - indicates the amount of water absorbed by the sample in the state of complete immersion in water:

$P_s = m_s - m_0 / m_0 * 100$

where:

m_s - is the mass of the sample after immersion in water, g;

m_0 - initial mass of sample, g;

The above properties can be determined using direct methods. These methods are based on drying fabrics and determining their wet and dry mass. Indirect methods are based on changes in electrical resistance or capacitance of fabrics with changes in moisture content.

Summary

Based on this study, it should be said that the water wicking index of summer and underwear fabrics should be high. This index is the highest in pure linen fabrics. Such fabrics are mainly knitted fabrics, because underwear should have stretchability. Knitted fabrics have this feature because they are made of loops.

REFERENCES

1. Jurabayev.N.N, Shogofurov.Sh.Sh, Kholikov.K.M, Meliboev.U.X (2021). Study of the fabric structure influence on the physical-mechanical and technological properties of knitted products. In E3S Web of Conferences (Vol.304, p. 03030). EDP Sciences.

2. Shogofurov.Sh.Sh. Kamalova.I.I, Xolikov.K.M, (2021). Study of the Effect of Changes on the Technological and Physical-Mechanical Properties of Knitting in a New Structure. Engineering, 13(6), 287-299.

3. Nozimjon Jurabayev Nizomiddin ugli, Bokirboev Foziljon Rasuljon ugli, Shogofurov Shahbozjon Shokirjon ugli, Kholikov Kurbonali Madaminovich. Analysis of the properties of sock products made of different yarns. American journal of social and humanitarian research, 2022, ISSN: 2690-9626 Vol.3, No 5. 2022.

4. Ne'matjon Yoqubjanova), Nozimjon Jo'rabayev, Umarjon Meliboyev, Kurbonali Kholikov. Analysis of Automated Control System of Flat Needle Knitting Machines. *AIP Conf. Proc.* 3045, 050002 (2024) https://doi.org/10.1063/5.0197321

5. Ochilov T.A., Matmusayev U.M.,Qulmatov M.Q. Testing textile materials, Textbook, 2004