



FABRICS FOR BEDDING: FEATURES AND SPECIFICATIONS

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Abstract

Fabrics for bed linen should create normal conditions for sleep, be harmless (fibers and preparations applied to the fabric should not emit harmful impurities). Therefore, close attention is paid to the properties of fabrics, which are indicators of the safety of textile and light industry products in accordance with the technical regulation "On the Safety of Light Industry Products". The article presents the results of studies of the influence of weaving and fibrous composition of fabrics on their hygienic and physical and mechanical properties.

Keywords: fabrics for bed linen, air permeability, hygroscopicity, breaking load, abrasion, surface density.

Introduction

Comfortable sleep depends on many factors: calm atmosphere, comfortable bed. The choice of material for bed linen is also important. The selection of a suitable option depends on the budget of the purchase, the practical characteristics of textiles and the personal preferences of the buyer. Sleep in decent conditions will be beneficial, will allow you to restore strength, improve your mood and relax.

The choice of fabrics on the modern market is very wide, the main factor is pleasant tactile sensations (smooth surface and softness). When the body contacts the surface, a person should feel comfortable. Practicality of use, protection against puffs, wrinkles and shrinkage, as well as wear resistance are important. Traditionally, simple light colors are chosen that look good on fabrics of any type. It can be both plain linen and stuffed, with miniature patterns. Bright plot images, geometric patterns and colorful 3D prints are popular. Let us consider in more detail the types of textiles from which bedding is made. Before deciding on a bedding fabric, you need to know the pros and cons of each material [1.11].



Chintz is an inexpensive and thin material for short-term use. It wears out quickly enough, fades, after a couple of years of constant operation it breaks at the slightest effort. The new chintz is quite pleasant to the touch, but after several washes it loses this property.

The advantages of cotton underwear are its low price and 100% naturalness. The fabric is made of cotton. Minus - wears out quickly. Coarse calico is an inexpensive cotton fabric from which bedding is made. Calico material is easy to wash and inexpensive. Coarse calico has the same disadvantages as chintz. The service life with regular use of the material is about 2-3 years, which is relatively short in contrast to other fabrics.

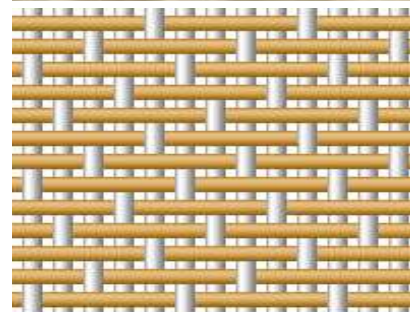


Fig.1 Different assortments of fabrics for bedding

Ranforce

Under the exotic word "ranfors" is actually an improved version of the usual calico. The material and the name were invented in Turkey by a textile company that produced high-quality bed linen. However, ranforce fell in love with customers and grew into an independent type of fabric. Sometimes ranforce is "diluted" with synthetic materials. For example, inexpensive models are often made with polyester. Like ordinary calico, ranfors is a soft and dense material. Thanks to this, ranfors is durable and pleasant to the touch. Ranforce does not wrinkle during sleep, and after washing it is easy to iron.

Another distinctive feature of fabric production is a special way of weaving threads. It is patented, therefore it is used exclusively for ranfors. Prepared twisted threads are combined into a fabric with a plain weave. In this case, the weft and warp threads are intertwined perpendicularly through one. The threads are very tightly pressed together, which becomes the main indicator of high density. There are approximately 60 threads per 1 cm (and only 40 in calico), the density reaches 124 g / m². From here it becomes clear, ranfors - what kind of fabric is it, bed linen from which will never shrink much.



Poplin

It is 100% cotton, which makes it look like calico and chintz. Poplin differs from other cotton materials in the thickness of the fiber. This difference in structure increases the service life of poplin fabric up to 7-8 years. The material is very pleasant to the touch, does not wrinkle after sleep.

Satin

Bed linen made of satin is strong and dense. High strength is achieved due to the interweaving of fabric threads. Thanks to this, the service life of satin reaches 10 years or more. Durability depends on how often the laundry is used and how often it was washed. (1)

Satin is cotton, which means it is a natural material. To the touch, satin is smooth, it is pleasant to touch it, it is pleasant to sleep on it and just lie on it. The material looks expensive, shines a little in the light. Over time, satin does not lose color as much as chintz or calico fabrics.

The downside is the relatively high cost of satin linen.

Linen

Natural material for bed linen. Linen has good heat transfer, so it is comfortable to sleep on it at any time of the year. Linen made from this fabric has a long service life - 8-10 years. Linen only gets softer over time. (eight)

Bamboo

Bamboo bedding is made from the stems and leaves of the plant. Additionally, the fabric may contain cotton or synthetic components. In this case, the bamboo product is no longer considered 100% natural. However, most of the material consists of plant fibers. Bamboo fabric does not cause allergies and does not promote the growth of microorganisms. Suitable for those who care about their health.

The terry material is mostly cotton. Additionally, it may include linen, bamboo or synthetic fabric. Terry bed linen retains heat due to good thermal conductivity and air exchange. The villi are obtained due to the loops of the main threads. The density of the terry depends on the twist of the thread and the height of the loop: the larger they are, the denser the fabric. The roughness of terry fabrics is pleasant to the body, although not everyone likes it. Terrycloth does not require special care. It practically does not wrinkle, it can even not be ironed after washing. Over time, the appearance of the material deteriorates. The terry fibers are stretched, which breaks the structure of the material [1].

Viscose

Produced from cellulose, the smoothness and softness of the fabric depends on the degree of processing. Some models of viscose bedding are similar in feel and appearance to linen products. Viscose is soft like linen. In addition, the material is natural and does not cause allergies.

Polycotton

Synthetic material mainly composed of polyester. Very similar to calico. Polycotton is soft, does not wrinkle and is easily ironed. The material has a long service life. Patterns on the fabric do not fade over



time. Bed linen is of good design. The quality of fabrics, like any other product, is regulated by state quality standards (GOST). GOST establishes indicators by which the product must comply with the norm: this is not only the appearance or quality of the fabric, but also the reaction of the fabric to certain influences (for example, dimensional changes during wet processing, color fastness, wear resistance, etc.). [7,11,12].

To study the effect of fabric weave and composition on their hygienic and physical-mechanical properties, the selected samples were determined structural and physical indicators using modern equipment of the accredited Centeuz Training and Testing Laboratory at TITLP (Tashkent Institute of Textile and Light Industry), regulated in General technical regulation "On the safety of light industry products". The values of certain indicators are given in table 1.

Table 1. The values of certain indicators

№	The name of indicators	Units	№1 chintz 100% cotton	№2 coarse calico 100% Cotton	№ 3 satin 100% Cotton	№4 linen 100%	№5 viscose 100%	№6 bamboo 100%	№7 polycotton 100% Synthetic fiber
1	Surface density of fabric	g/m ²	123,5	146,1	119,6	158,3	125,0	124,5	121,5
2	Breaking load of a strip of fabric 50x200 mm based on by duck	N	311 221	367 258	362 384	536 421	395 301	412 315	598 357
3	Color fastness Dry friction Wash Sweat	score	5 5/5 5/5	5 5/4 5/4	5 5/5 5/5	white colour	4 5/4 5/4	4 4/4 4/4	4 4/4 4/4
4	Breathability	dm ³ /m ² * sec	851	775	906	665	865	851	524
5	Hygroscopicity	%	10,3	10,1	10,4	11,2	9,91	9,86	5,12
6	Pilling ability	pcs/ 10 sm ²	-	1	-	1	2	2	4
7	Abrasion	Cycle	10 500	11 200	10 000	14 200	15 800	14 500	22 100
8	Number of threads per 10 cm By basis By duck	pcs.	300 240	280 240	360 440	280 220	300 260	300 280	360 240
9	Change in linear dimensions after wet processing, By basis By duck	%	- 3 - 1	- 3,5 - 1	- 1,5 - 1	- 5 - 2	-4,5 -2,0	- 4,5 -2,0	-1,0 -1,0

The first indicator that determines the quality of the fabric is the surface density. From this indicator directly depends on how strong and durable the bed linen will be in operation. According to GOST 31307-2005 "Bed linen. General technical conditions "this indicator should be at least 110 g / m². All selected fabrics meet the standard [6].

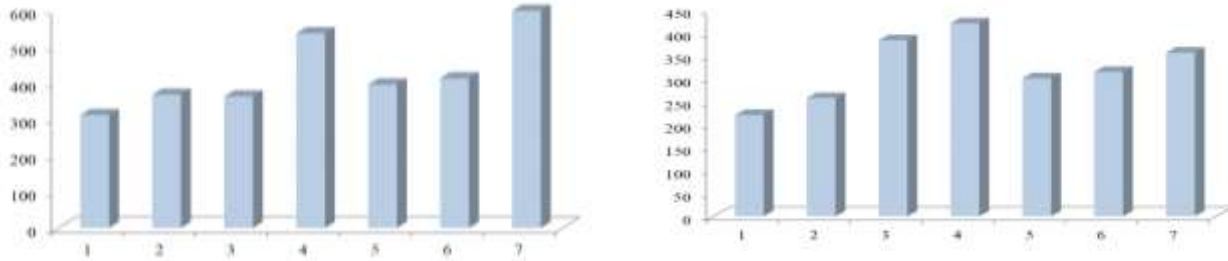


Fig.2 Breaking load on warp and weft, cN

Hygroscopicity is the ability of a material to absorb and retain moisture in the fibers. Cotton and linen fabrics have the best hygroscopicity. The rate of absorption and return of moisture depends not only on the hygroscopicity of the fibers, but also on the structure of the fabric. The denser and thicker the fabrics, the slower they absorb and release moisture and the better they ensure the constancy of humidity and temperature of the air gap between the bed and the human body [6, 15].

Breathability - allows free air exchange. In a dream, many people sweat, and so that this feature does not cause discomfort, and sweat does not cause irritation on the skin, it is necessary to give preference to such types of bed linen fabrics that are sewn from hygroscopic and breathable fabrics. The breathability of fabrics depends on the presence of pores, which are larger in thin, low-density and unfinished fabrics, and less in thick, dense, finished fabrics.

According to GOST 31307-2005 "Bed linen. General technical conditions" this indicator should be at least $100 \text{ dm}^3 / \text{m}^3 \cdot \text{sec}$ [6.12]. Shrinkage is a reduction in the size of the fabric during soaking, washing or wet-heat treatment. This is a negative property of the fabric, as it leads to significant losses in production and degrades the quality of finished garments (changes in the size of the product, deformation, skew).

The shrinkage of fabrics made from different fibers will be different. To prevent significant shrinkage, fabrics are subjected to forced shrinkage (the fabric is processed on special shrinkage machines - decanting) or anti-shrink finishing is carried out (processed with synthetic agents, resins), while finishing is carried out with minimal fabric tension.

Fabrics, depending on their fibrous composition and structure, have different shrinkage values.

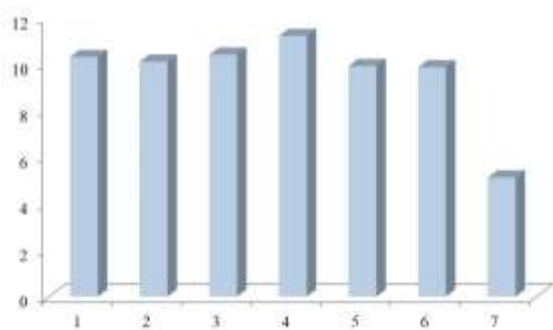


Fig.3. Indicators of hygroscopicity, %

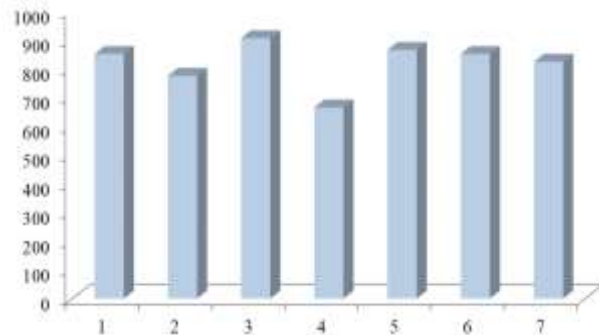


Fig.4. Air permeability values, $\text{dm}^3 / \text{m}^3 \cdot \text{sec}$

In accordance, all fabrics are divided into three groups according to the amount of shrinkage:



- 1) non-shrinking - shrinkage on the warp and weft up to 1.5%;
- 2) low shrinkage - shrinkage on the warp up to 3.5%, on the weft up to 2%;
- 3) shrinkage - shrinkage on the warp up to 5%, on the weft up to 2%.

The amount of shrinkage of fabrics depends on many factors, and primarily on the type of fibers, the structure of the threads and the fabric. Fabrics made of hydrophilic fibers have the greatest shrinkage, which are able to absorb a large amount of water and significantly change their size when wet (cotton, linen, viscose fibers, etc.). In this case, linen fabric has the greatest shrinkage [6].

When using fabrics for bed linen, the strength of the dye-fiber bond is important, which can be broken under the influence of water, chemicals, and mechanical factors. As a result, the partial removal of the dye from the fiber structure causes a change in color and staining of the contacting surfaces. Color fastness is evaluated by a complex of physical, mechanical and chemical influences: dry friction, sweat, soap solution. The strength of the material directly depends on the fibrous composition and is determined on a tensile testing machine.

The greatest force that a material can withstand at the moment of rupture is called breaking load. (GOST 3813-72) from the data obtained it is clear that linen and satin, due to weaving, these figures are higher [6,12].

Abrasion resistance is the ability of a material to resist fracture from friction. Abrasion of tissues occurs as a result of friction on various surfaces. The resistance of materials to abrasion directly depends on the fibrous composition, weave and linear density of the yarn. This is confirmed by the ongoing experiment [12].

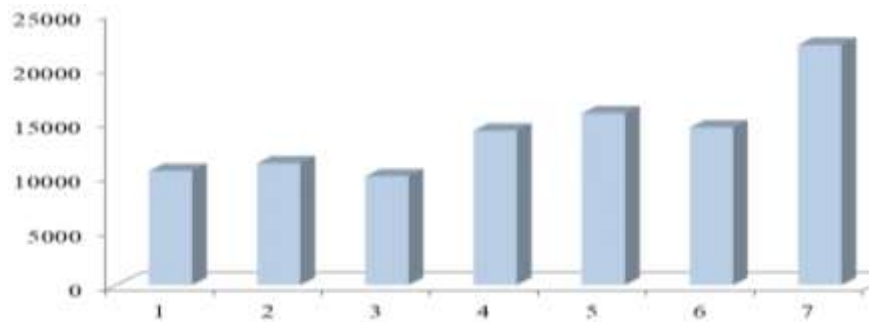


Fig.5. Indicators abrasion, cycle

Pilling ability characterizes the ability of fabrics during operation or during processing to form small balls (pills) on the surface from rolled tips and individual sections of fibers. The pilling ability of fabrics depends on the fibrous composition of the material, the geometric and mechanical properties of the fibers, the structure of the threads and the fabric. In this case, pilling was formed from coarse calico, flax and polycotton. But the result is quite small and this is acceptable according to the standard [6,12]. After analyzing the results, we can conclude that the best option for bedding fabric is linen fabric and satin weave cotton fabric.

Fabric Recommendations

- ✚ Examine the bed linen package.



- ✚ Check the quality of the seams and edges of the pillowcases, duvet cover and sheets.
- ✚ See if the linen dyes? To do this, run your hand over the surface of the fabrics. If there are no traces of paint on the hand, the underwear is of high quality.
- ✚ Bed linen should be natural with a minimum amount of synthetic material.
- ✚ In winter, choose warm types of fabrics. These include terry and flannel materials.
- ✚ With allergies, it is better to sleep on bamboo or linen fabric.
- ✚ With heavy sweating, it is recommended to sleep on materials that absorb moisture, such as satin, calico or chintz.
- ✚ If you need bedding with a long service life, buy sets of linen, satin, jacquard or calico.
- ✚ It is better for children to buy linen made from natural fabrics - coarse calico, chintz, poplin, etc.

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