

**TOPIC: DETERMINATION OF FABRIC FIBER COMPOSITION AND FABRIC SHRINKAGE****Suvonova Ma'mura Yusupovna**

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**Abstract:** Textile manufacturing enterprises supply garment factories with various fabrics and sewing threads necessary for producing different types of clothing. Consequently, the garment industry produces seasonal, fashionable clothing that meets economic requirements for the general population and all sectors of the national economy. To utilize sewing materials effectively and produce high-quality, elegant products, industry personnel must possess a deep understanding of material sourcing, properties, mechanical characteristics, and assortments. This is because the properties of garment materials depend heavily on their fiber composition, thread structure, weave, finishing, and other related parameters.

**Keywords:** Garment enterprises, fibers, threads, weave, finishing, parameters, assortments, products, fiber composition, shrinkage, fabric, clothing, weft thread, warp thread, yarn, creases, folds, steam ironing, bending behavior, dry cleaning, washing, ironing, garment shell, lining, wrinkles in clothing, product, textile, synthetic fibers, woven fabrics, wool fabrics, synthetic fabrics, interlining.

**Аннотация:** Предприятия текстильной промышленности поставляют швейным предприятиям различные ткани, катушечные нити, используемые в швейном производстве, для пошива различных видов одежды. В результате швейная промышленность выпускает сезонную, отвечающую современной моде одежду для населения и всех отраслей народного хозяйства, удовлетворяющую экономические потребности. Работники этой промышленности должны хорошо разбираться в технологии производства, свойствах, механических показателях и ассортименте материалов для эффективного использования швейных материалов, производства высококачественных, изящных изделий. Потому что свойства швейных материалов зависят от используемых волокон и нитей, их плетения, отделки и других показателей.

**Ключевые Слова:** Швейные предприятия, волокна, нити, прядение, отделка, показатели, ассортимент, изделия, волоконный состав, усадка, ткань, одежда, нить утока, нить основы, нить мотка, помятости, складки, мокрое глажение, при сгибании, химическая чистка, стирка, глажение, лицевая сторона одежды, подкладка, складки на одежде, продукция, текстильный, синтетические волокна, трикотажные ткани, шерстяные ткани, синтетические ткани, выкройка одежды.

A variety of materials are used in the production of sewing materials.

Primary materials - intended for the outer surface and main structural parts of a garment - include knitted fabrics, nonwoven materials, and fabrics made from artificial or natural fur. The fiber composition of fabrics is determined through organoleptic and laboratory methods. The organoleptic method refers to determining the fiber composition of fabrics by using human senses such as sight, touch, and smell. When using this method, it is recommended to identify the fiber composition in the following sequence: examining the external appearance of the fabric; touching and crumpling it; determining the types of warp and weft yarns; breaking the warp and weft yarns; and observing the burning behavior of both yarns.

When determining a fabric's fiber content, attention must first be paid to its color, luster, thickness, and density. Next, the fabric should be tested by hand. To do this, fold the fabric, press it firmly in the hand, release it after a short moment, and smooth it out. Based on the characteristics of the resulting creases, the fabric composition can be inferred. The warp and weft yarns should then be inspected visually. It is important to remember that each yarn differing in color or luster must be tested separately. After that, the burning behavior of the yarns is observed. Burning the fabric until it turns to charcoal may lead to incorrect results. Greige cotton fabrics are typically yellowish, while greige linen fabrics have a grayish or slightly green hue. Unlike cotton fabrics, linen fabrics exhibit a more noticeable luster. When touched, linen fabrics feel rougher and cooler than cotton fabrics. When a linen spun yarn is broken, the broken end forms a bundle of fibers that vary in length and thickness. When cotton spun yarn is broken, the resulting fiber bundle consists of fibers of relatively uniform length and thickness. When the twist of a linen yarn is loosened, it separates into fibers of uneven lengths and thicknesses; when the twist of a cotton yarn is loosened, it separates into fibers that are generally uniform in length and thickness. Fabrics woven from natural silk are thinner, softer, and less prone to wrinkling than fabrics woven from man-made fibers. Natural silk fabrics have a soft, subtle sheen, while fabrics made from chemical fibers exhibit either a sharp, harsh shine or no shine at all. When wet, the strength of natural silk does not decrease.

When touched, wool fabrics feel slightly fuzzy, like fine fibers rising from the surface. To determine the type of wool fabric, it may also be crumpled by hand. In pure wool fabrics, crumpling produces small creases that disappear when smoothed by hand. In wool fabrics woven with plant fibers, large creases form, and these do not disappear when the fabric is smoothed. In wool fabrics blended with lavsan (polyester), large creases also form, but they do disappear when smoothed by hand.

To determine whether wool fabrics contain any fiber blends, the warp and weft yarns must be subjected to a burn test. Pure wool spun yarn burns with a sizzling sound in the flame; once removed from the flame, it does not continue to burn. Small black, brittle beads form at the ends, and when rubbed between the fingers, they crumble easily, releasing the characteristic odor of burnt hair. If the yarn contains up to 10% plant fibers, a glowing ember forms behind the bead, quickly travels along the yarn, and leaves a gray trail of ash. In this case, too, the smell resembles that of burnt horn. If the burnt yarn contains 15–20% plant fibers, then approximately 1.5–2 cm of the yarn burns rapidly and extinguishes immediately, again producing the smell of burnt horn. If the yarn contains more than 25% plant fibers, it burns completely and leaves behind a gray ash. The presence of wool in a yarn is determined by the distinct smell of burnt horn released during burning.

The method of determining the fiber composition of fabrics using microscopes and chemical reagents is known as the experimental (laboratory) testing method. To apply this method correctly, one must have a solid understanding of fiber structure and chemical properties.

Wrinkling refers to the formation of creases and folds in a fabric when it is bent or compressed. The creases and folds that appear only after steam ironing are considered plastic deformations and indicate the fabric's tendency to wrinkle. Fibers with a high proportion of elastic and resilient extension recover their original shape either slowly or quickly after bending or compression. Drapeability is the ability of a fabric to form smooth, rounded folds. It depends on the fabric's weight, stiffness, and softness. Stiffness is the fabric's resistance to changes in shape, whereas flexibility is the opposite property, reflecting a fabric's ability to change its shape easily.

Electrostaticity is the tendency of materials to accumulate static electricity on their surface. During production and use, textile materials inevitably come into contact with and rub against other objects. As a result, electric charges continuously accumulate and dissipate on their surfaces. If the balance between charge accumulation and dissipation is disrupted, static electricity builds up on the material's surface, causing it to become electrostatically charged.

Shrinkage is the reduction in fabric dimensions under the influence of heat and moisture. Garments shrink when they are washed, wetted, steam-ironed, or pressed. As a result of fabric shrinkage, the finished garment may decrease in size and its components may lose their original shape. If, during wet cleaning, washing, or ironing, the garment shell and lining shrink at different rates, wrinkles and folds may appear on the garment.

The reason fabrics shrink is that during all stages of the textile process—spinning, weaving, and finishing—the fibers, spun yarn, and threads remain under tension. This tension is especially high in the warp direction, where the yarns are stretched tightly and fixed in that state through pressing. When the fabric is washed or wetted, the fibers and yarns relax. Under the influence of heat and moisture, the fibers become more elastic, swell, and shorten. As a result, the fabric shrinks, and the tension levels within the yarn systems become more balanced. The highly tensioned warp yarns tend to buckle. Therefore, fabrics generally shrink more in the warp direction than in the weft direction. In some fabrics, after washing, the warp direction shrinks but the fabric expands in width—this phenomenon is called fabric bowing or spreading. If the warp yarns are highly tensioned and bend significantly during shrinkage, the fabric will spread in width. In such cases, the bending of the weft yarns decreases, the weft yarns straighten, and the fabric becomes slightly wider.

During ironing, that is, forced shrinkage, certain sections of a fabric are intentionally reduced in size. By ironing or pressing specific areas of a wool fabric that has been lightly folded into small wave-like creases and moistened, it is possible to create controlled shrinkage in designated parts of the fabric. The method of forced shrinkage is used when shaping a garment through wetting and ironing. Fabric shrinkage is determined according to the methods specified in standards. The shrinkage of wool fabrics is tested by moistening a cut sample, while the shrinkage of other fabrics is determined by washing the sample.

Shrinkage in the warp direction and shrinkage in the weft direction are always determined separately. The following formulas are used:

$$U_t = \frac{L-L'}{L} \times 100; U_a = \frac{L-L'}{L} \times 100$$

where:

$U_t$  is for warp direction and  $U_a$  is for weft direction

$L, L'$  — the initial dimensions of the fabric in the warp and weft directions;

$L', L'$  — the corresponding dimensions of the fabric after testing.

Fabric shrinkage depends on the fiber composition, structure, and finishing of the fabric. Since shrinkage is influenced by the degree to which fibers swell, fabrics woven from synthetic fibers shrink very little because synthetic fibers absorb almost no moisture and do not swell. To reduce fabric shrinkage, the textile industry employs various treatments such as stretching, steaming, processing on special shrinking machines, and applying shrink-resistant or low-shrinkage finishes. Practical studies show that, when garment production is organized properly, the shrinkage of fabrics used for garment construction should not exceed 4%. For this reason, when selecting materials for the outer layer, lining, and interlining of a garment, their shrinkage properties must be taken into consideration.

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