

CLASSIFICATION OF SPECIAL FABRICS, THEIR COMPOSITION AND APPLICATION

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Abstract. *This article examines the classification of special fabrics, their composition and fields of application, and analyses the physical and mechanical properties of special fabrics.*

Key words: workwear, special fabric, fabric composition, alova, bonding, jordan, rip-stop, taslan, taffeta, greta.

Overalls are one of the basic means of personal protection. The main purpose of overalls is to provide reliable protection of the human body from various production factors while maintaining normal functional condition and performance. Overalls are universal, waterproof, protect against radioactive contamination and X-rays, acid-proof, alkaline-proof, oil-proof, mechanical shock-proof, dust-proof, protect against organic solvents and toxic substances, thermal, electrical and signal-proof. Modern protective clothing (Table 1) must meet the high requirements of state standards and the requirements of the conditions in which it is used, while providing the worker with the necessary level of safety, hygiene and comfort. It is not possible to create such workwear without careful selection and analysis of fabric composition. Both natural and modern high-tech fabrics of various compositions are used in the production of workwear, depending on the working conditions and the purpose of the final product.

Alova is a membrane fabric of synthetic origin made of polyester, it is absolutely not subject to deformation during washing, which is very good for workwear. Alova fabric is comfortable in all weather conditions for the human body, has a pleasant body surface and does not freeze even at extremely low temperatures. Treated with a compound that makes it waterproof, windproof and vapour permeable. Provides excellent protection against wind and rain.

Bonding is a material (100 % polyester), produced according to a special technology, by joining upper fabrics with duplicating materials (mainly knitted fabrics). This makes it possible to create a high-density structure combined with the elasticity of the material, ergonomic in wear, flexible materials with good water repellency and increased thermal protection properties. At the same time, the individual appearance of the outer fabrics is retained. Used for sewing working clothes for men, women and hats.

Jordan is a dense fabric made of synthetic fibres (100 % polyester). The look of the fabric is due to its smooth shimmering surface, it is soft to the touch and lightweight. It has good water resistance and simultaneously allows the skin to breathe (breathability). The fabric is windproof and has good abrasion resistance. Jacket fabric with water-repellent impregnation. Distinctive feature is the striped sheen. Outerwear made of this material is characterized by lightness, does not constrain the movement. The fabric is used for production of outerwear for men, women and workwear. Rip-stop fabric features heavy duty mechanical protection, abrasion resistant fabric, no pilling, high moisture absorption. Rip-Stop fabrics are manufactured using reinforced yarns. Reinforced yarns are inserted into the fabric structure every 5-6 mm, forming a high-strength 'lattice'.

Taslan is a universal polyamide fabric with a porous, water-repellent coating on the inside. The fabric has a specific structure with a small welt, which is created by weaving polyamide yarns together in a repetitive weave. To improve the absorption properties, the fabric is impregnated with a waterproof layer which protects the fabric against dirt and does not accumulate between the woven yarns. The coating protects the fabric against water and dirt, is resistant to sebum and sweat, is feather-tight and therefore suitable for down-filled jackets. The fabric is resistant to friction, repeated bending and UV radiation, it is light, pleasant to the touch and has good air permeability. It is widely used for sewing overalls: jackets, mackintoshes, for fishing and hunting.

There are two types of taffeta: a fabric made of chemical fibers, nylon taffeta and polyester taffeta of a particular structure with various coatings. The coatings come in polyurethane, Milky, Silver and PVC. The coating provides the fabric with a waterproof feature and gives it other specific properties. Polyester and nylon taffeta have practically identical features: it is light, tough, absorbs body excreted moisture and transports it to the outer layers of the garment; it hardly stretches when wet and is highly resistant

to wear. It also has good air-exchange properties. For example, it is windproof, resistant to skin grease and organic solvents, and has sun protection properties. Taffeta is used in the production of tents, tourist equipment, bags, awnings, umbrellas. Taffeta fabrics are also used in outdoor clothing, workwear and as a lining fabric. Blended fabric, camouflage fabric – a fabric with a special reinforcing yarn in the weave structure. This fabric can be either a blended fabric or a single fibre fabric. Suitable for the manufacture of uniforms for special services – military and other law enforcement units, security companies, for hunters, fans of active and extreme recreation. Blended fabrics, due to the presence in the fabric, in addition to synthetics, natural and artificial fibres – cotton (sometimes silk) or viscose. Such fabric is considered to possess some properties of natural fabrics – it absorbs moisture and lets the skin «breathe».

Table 1 – Composition of fabric

Fabric name	Fabric composition
Greta	47 % polyester and 53 % cotton
Diorite	45 % polyester and 55 % cotton
Oxford	100 % polyester
East	100 % polyester
Duspa	100 % polyester
PAN (polyacrylonitrile)	100 % acrylic
Twill	100 % organic cotton
Indura	100 % natural cotton
Canvas tarpaulin	49 % cotton and 51 % natural flax
Tent	or 100 % cotton
Calico	100 % cotton
Diagonal	100 % cotton
Brocade	100 % cotton
Boston	The basis of the brocade is silk and the decorative pattern is created with gold or silver threads or imitation materials
Gabardine	Classic 100 % wool
Calico	100% merino wool, some are blended with synthetic fabrics or viscose. Gabardine can be woven from cotton or silk
Microfiber	100 % cotton
Composition of cotton fabric	100 % nylon or 100% polyester . Microfibre yarns are half the thickness of silk
Fleece (non-woven pile fabric)	100 % cotton or with a mix of synthetic fibres to reduce imperfections of the cotton fabric
Alova fabric (synthetic, double ply membrane fabric)	100 % polyester

Woven fabrics are made of 100 % cotton, 100 % linen or 50 % linen, 50 % cotton. It is used for production of outerwear (jackets, overalls), work and work clothes, clothes and equipment for hunters and fishermen, awnings, tents, backpacks and covers. It is used in industries with high demands on uniforms. Fireproof tarpaulin is widely used in the field of fire-hazardous works – these are suits and firefighters, and workers of foundries and smelters. tarpaulin with an added layer of insulation is widely used as a winter version of protective clothing.

Calico is used for making bedding and underwear, casual wear, work clothes, lightweight outerwear for hunters and fishermen, tailoring jackets and coats, as well as military uniforms for the military. Advantages of natural fabrics of 100 % cotton: environmental cleanliness, the ability to hold shape, transmit air and absorb moisture, durability, withstand a large number of washings, retain colour and density of tissue, unpretentious care.

Reflective fabric- such material is durable, water-repellent, windproof. It is used in the clothes of rescuers, road service professionals and people of some other professions. There are several technologies which can be used to increase the luminosity of the fabric. In one of them a micro beads are embedded into the fibres of the fabric (fluorescent pigments are added into the dyes). Another method is to apply a dusting of light-reflecting particles onto the already-ready fabric. This gives the fabric an intense colour and luminescence.

Greta (47 % viscose / 53 % polyester)-the fabric features an unusual way of weaving. The polyester fibres are on the front and the cotton fibres are on the back. Cotton ensures comfort and cosiness, while polyester gives the fabric a nice silky sheen. The greta fabrics do not cause any allergic reactions, have good heat transfer and are breathable. The special water-repellent finish reliably protects against dirt and moisture. High density provides dust permeability, high abrasion resistance and durability. The greta jacket fabric is excellent for protective workwear for personnel in various industries. Performance of greta fabric: to mechanical abrasions; when splashed with liquids; when exposed to atmospheric precipitation; when exposed to industrial contaminants.

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РАЗРАБОТКА НЕПОДВИЖНОГО КОЛОСНИКА ПРЯМОТОЧНОГО ДЖИНА

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Реферат. В статье рассмотрены процесс джинирования и определения параметров вращающегося колосника в прямоточного джина.

Ключевые слова: процесс, хлопок-сырец, оборудование, летучек, оголённое семя волокна.

Джинирование летучек в джине с вращающимися колосниками проходит последовательно от одной секции к другой. После последней секции проджинированные летучки должны быть удалены через сетчатую поверхность, а опущенные – должны быть возвращены к первой секции и вместе с новыми поступившими летучками повторить процесс джинирования. Предыдущие исследователи концентрировали свое внимание на научном обосновании этого принципа джинирования и на самом узле джиинирования, его геометрических и кинематических параметрах. Однако вопросы транспортирования летучек между секциями, выделения оголенных семян и возврата летучек к первой секции остались еще нерешенными.

Так, летучки в переходе между секциями могут попасть в междупильное пространство. Ввиду того, что диаметр междупильной прокладки увеличен до 0,28 м, есть вероятность заклинивания летучки между прокладкой и лопастью колосника с последующим дроблением семян. Кроме того, после последней секции выход семян через сетчатую поверхность затруднен, здесь образуется забой и игольчатый барабан начинает интенсивно повреждать семена. Вследствие этих явлений наблюдались забои хлопком как на транспортных путях, так и в зоне игольчатого барабана и сетки.

Проанализировав работу джина, условия взаимодействия летучек с рабочими органами, была разработана конструкция неподвижного колосника (рис. 1), которая ограждала летучки на всем ее пути джиинирования от первой секции до последней и выпадания в междупильное пространство.

Он по своей форме повторяет окружность междупильной прокладки и установлен с зазором 5 мм. Хорошо обработанная рабочая поверхность колосника снижает силы трения с движущимися летучками и предотвращает возможные междупильные забои хлопком.