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ANALYSIS OF THE DESIGN OF SPORTSWEAR FOR PRESCHOOL CHILDREN FOR SWIMMING

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Abstract
The article is presenting a classification of the range of sportswear with brief information about the fabrics recommended in the production of training clothes for swimmers, including "Smart Fabrics".

Keywords: Sportswear, comfort, performance, knitted fabrics, smart fabrics, water-repellent features.

Classification of the Range of Sportswear

The functional purpose of modern sportswear is wide and varied. For example, for specific sports, it is customary to use special and different types of clothing. They have a specific cut and a regulated appearance, allow protecting the athlete's body from physical injuries and, accordingly, assist the athlete in achieving high sports results. In addition, the range of sportswear includes products and accessories that occupy an intermediate position between sportswear [1].

It would be appropriate to name the main factors here as an increase in the population, which explains the growing demand for textiles for household use, while the production of natural fibers of plant origin is declining, due to displacement from the cultivated area and competition from food crops, in particular due to the fact that their cultivation provides a great profit. Also, an important factor worth noting is the constant improvement of existing performance properties and new types of chemical fibers. This, in turn, contributes to a significant expansion of their scope for both household and technical products [2].

The range of mixed materials for household use is also developing in connection with the creation of knitted fabrics of new structures that combine all the advantages of materials made from chemical fibers (namely, shape stability, significant wear resistance, non-shrinkage and crease resistance) and natural fibers (which contribute to increased moisture absorption and moisture release, steam and moisture-permeable and other important properties), which invariably ensure the comfort and quality of products [3].

In the Republic of Uzbekistan, the production of various knitwear from both natural and mixed fibers has been established. It is worth mentioning that cotton products, in addition to good hygienic properties, have a number of negative qualities such as high shrinkage, relatively low tensile strength and / or elongation, as well as low form stability. The most positive effect is the use of cotton mixed with other fibers: cotton with nitron, silk with nitron [4], cotton with lavsan, etc.

An analysis of the literature confirmed that such sports products as trousers, knitted and windproof tracksuits, various jackets (light and insulated), overalls and semi-overalls, bathing suits, sweaters, knitted jumpers, jerseys and others - differ in ease of use, ease of assembly and interchangeability.

ORIGINAL THERMO products are widely recognized and well-known in the knitwear market in the sports industry. A distinctive feature of "ORIGINAL THERMO" is that in conditions of increased sweating, wet clothing does not cause the athlete to feel cold in it. Cotton, wool or a mixture of them with polyester fibers is used to make the front side of this brand's jersey. At the same time, the wrong side is produced from yarn

from polyacrylonitrile fibers (PAC), which are characterized by a significantly higher volume and significantly lower thermal conductivity compared to yarn from natural fibers[5].

The most characteristic of this jersey is the “warm neck”. A person in such clothes quite naturally feels comfortable in dry heat.

Smart Fabrics in Light Industry:

A person always remains interested in improving the level of quality and functionality of clothing, and it is for this reason that the question of the possibility of improving products always remains relevant. The development of special - "smart" (intellectual) - fabrics that are able to recognize changes in the environment and painlessly adapt to them through functional transformations, is necessary in cases of not only protection from a sudden change in weather, but also from mechanical injuries, or other unforeseen situations.

Depending on the degree of development of the "intellectual" properties of tissue, they can be: passive, which only reveal changes in the environment; active, who are able to respond to them; and "very smart" B, meaning the ability to adapt to all sorts of changes. The scope of their application ranges from the military industry (fabrics with customizable characteristics for equipping troops) to medicine (fabrics with built-in sensors and sensors that allow monitoring the state of health)[7].

Custom fabrics:

In the desert, in space, on the Arctic shelf or in other hard-to-reach areas, the human body can experience various kinds of overloads associated with temperature changes, physical or mechanical injuries (bruises, sprains, for example) and other factors. Fabrics with customizable characteristics are aimed at protecting a person from them and reducing the consequences of these loads. At the same time, their structure is capable of changing in accordance with the potential requirements of the environment: keeping warm, or heating in the cold, exactly, as well as vice versa, cooling in the heat, acquiring shockproof, water-repellent or other functions[8].

Fiber optics, metals, conductive polymers and other materials are most often used to create such fabrics. It should be noted that there is an increasing trend towards the introduction of nanostructures for the modification of natural and synthetic fibrous materials. These manipulations are caused by the need to impart hydrophobic, antibacterial properties, protect the owner from the negative effects of ultraviolet radiation, and others. Zimmermann engineers (a German company) have learned how to weave thin wires into the material, which can heat clothes to the required temperature (maximum - 420°C). To do this, it provides a miniature battery with a weight of up to 200g and a capacity of 2200mAh. Safety is also provided: the voltage is only 7.4V. When you go outside and press the button, the clothes will heat up to the set temperature.

Properties of a personal doctor in "Smart" clothes:

The problems with comfort in today's world are exacerbated by the rise of a wide range of chronic diseases in people who may not be aware of their illness. However, in the case of wearing clothes equipped with touch sensors that will collect basic information about human health in order to provide it for subsequent analyzes, this problem can be, if not eradicated, then at least reduced. With the help of "smart" clothing, it will be possible to prevent the development of diseases in the early asymptomatic stages, which will undoubtedly remove potential risks to people's health[9].

Indicators of pulse rate, respiration, heart rate, sugar level, etc., which will be measured by sensors woven into the "smart" fabric, will then be broadcast to the user's mobile phone, or to the attending physician. The

thickness of each sensor will remain within a few millimeters, which will not cause discomfort to the wearer. Another important achievement in this area, which is rightfully considered promising, is the development of tissues that diagnose diseases and implants capable of administering medications (for example, insulin) on a schedule [10].

The phrase “like water off a duck's back” is now relevant not only in relation to birds and indifferent people. In the modern world, the most popular are things with protective coatings that repel both moisture and dirt, resembling goose feathers in functionality. The list of the most common protective fabrics includes:

Teflon - is a 1930s find that is a transparent protective film. The most effective Teflon coating fabric designed to protect against wind, water and other damage. At the same time, Teflon products are quite easy to maintain and do not interfere with ventilation.

Ventile - first developed for military needs. It is a type of Egyptian cotton. The cotton weaving technique is designed to let air through but block water.

Gore-Tex - reminiscent of Ventile properties: waterproof and dry. However, unlike the same Ventile, the effectiveness of Gore-Tex is not due to the weaving of cotton, but to the membrane, which, in turn, provides protection from water.

Things with these fabrics can be found in the assortment of many famous brands that produce products for outdoor activities or sports. An example is The North Face, who posed extensively for waterproof Gore-Tex jackets and pants.

"Smart" Textiles for Sports:

Not only streetwear, but also tracksuits have been influenced by the development of textile technology. Below is a more detailed list of fabrics actively used by brands in the creation of sportswear collections.

Dri-FIT - is a technology patented by Nike. An excellent feature of the fabric is that it is made from a polyester base of highly functional microfiber. Dri-Fit supports the body's natural ability to cool itself. Thanks to this, the fabric perfectly wicks away sweat.

ClimaCool - is actively exploited by another sports brand Adidas. The technology is based on a special material with a three-dimensional structure. It provides coolness during hot workouts, while actively removing moisture from the athlete's skin.

Techfit - is the most widely used in athletics and running. Techfit is the closest fit to the body to reduce friction, immobilizing the athlete, which makes it easier to perform quick maneuvers, helping to better feel every movement. It is also considered that the fabric is aimed at helping in muscle recovery and relieving tension after prolonged strength training [11].

What could the first "smart" swimsuit look like?

The Fastskin 4.0 from famed spitting company Speedo has been billed as "the smartest swimsuit of all time". It is stated that the swimsuit should speed up athletes by 4%.

In addition to Speedo itself, AQUALAB participated in the development of the Fastskin 4.0 concept. According to Dr. Rob Blenkinsopp (head of development at AQUALAB), Fastskin 4.0 is thought out in the most detailed way, including intelligence integration fabrics and textures.

Among other things, they plan to equip it with built-in intelligence. The very same "fabric" will be created from bioengineered genetically modified bacteria, which will increase the possibility of decomposition of the suit up to 80%.

It is assumed that the "corset" of the swimsuit will be equipped with a built-in exoskeleton, the surface of which will imitate the skin of a shark, which should help the swimmer to improve performance. An equally interesting fact is the presence of built-in AI Live Coach technology, which helps the athlete listen to the coach while remaining underwater.

The official website of Speedo says that Fastskin 4.0 is planned to be equipped with an "artificial intelligence trainer". The suit will also include micro-sensors that monitor the performance of the athlete before, during and after the race. And this means that not only coaches, but also the athletes themselves will be able to track their condition during the race and control their recovery period.

Unfortunately, at the moment Fastskin 4.0 is only a concept and the release of real costumes and models remains the subject of theoretical discussion [12].

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