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(54) **Textile fabric, in particular single-layer fabric and a textile product with such fabric**

(57) The invention relates to a textile fabric, in particular to a single-layer fabric, which consists of alternating stripes of hydrophobic and hydrophylic material, while the entire surface of hydrophobic material stripes is larger than the entire surface of hydrophylic material stripes, which absorb moisture in higher amounts.

The invention also relates to a textile product with

such textile fabric, where the textile fabric with hydrophobic material and hydrophylic material stripes is situated at least on that part of textile product, on which there is a demand on higher thermal contact resistance and thermal insulating resistance.

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Description

Technical field

[0001] The invention relates to a textile fabric, in particular to a single-layer fabric.

[0002] The invention relates also to a textile product with this textile fabric.

Background art

[0003] In last twenty years there are on the textile market textile products providing comfortable thermal handle and sufficient thermal insulating resistance also wet, due to sweat sorption in consequence of a high physical strain (sport, heavy work). Such a classic product is a Czech knitted fabric with a trade name Klimatex, composed of two layers.

[0004] The upper, outward oriented layer consists of cotton or viscose fibres, while the layer in skin contact is produced from polypropylene torque yarn. Liquid sweat after physical effort permeates through hydrophobic polypropylene and accumulates in the outer layer, from which it slowly evaporates. The moisture passing-through the contact layer is provided by capillary forces, which effect is increased by decreasing diameter of pores in fibre structure. To provide high efficiency of this effect, the used polypropylene filament yarn is twisted, bringing continuous filaments together.

[0005] A disadvantage of this so-called integrated knitted fabric is provision of sweat penetration to the polypropylene layer surface. In socks this penetration provides a dynamic force, so-called pumping effect induced by walking. Compressing the bottom part of sock develops a pressure providing sweat penetration into the polypropylene layer.

[0006] In underwear there is no effect like this. Thus, in some Japanese and French knitted fabrics is the contact layer chemical treated - hydrophylised. In Klimatex products is the sweat sorption in underwear provided by presence of so-called sorptive wicks - small patches of cotton or viscose fibres penetrating from accumulation layer into the contact layer. In Klimatex products these sorptive wicks at the same time provide interlacing of both layers. Because the cotton fibre content in contact layer is low, a comfortable thermal contact of such products is kept also in wet. It must be emphasized, that the mentioned thermal contact perception occurs only in the case when the functional clothes persists in a constant or prevailing direct skin contact, therefore this type of functional clothes is almost exclusively in the form of knitted fabric. However, fabrics containing small elastic fibre content showed up lately, which on principle can also provide a good skin contact with the textile fabrics.

[0007] In other products, e.g. Italian, there is used instead of sorptive wicks a combination of polypropylene and polyamide filament yarn, which is hydrophylic. Because polypropylene filament yarn has spread world-

wide lately, many European and Asian manufacturers produce double layer knitted fabrics, where instead of polypropylene filament yarn is polyester filament yarn used. To increase capillary effect this polyester filament yarn is a special cross-section shaped with a structural surface.

[0008] Integrated knitted fabrics are nowadays supplied by almost every manufacturer of quality sportswear. The main disadvantage of the integrated knitted fabrics is high price reaching up to five times the price of single-layer knitted fabrics made from classic materials. The high price of integrated knitted fabrics is caused partly from the initial price of polypropylene or polyester filament yarn with a special cross-section and further the necessity to produce these knitted fabrics on expensive circular knitting machines with two independent system of laying threads. In regard of high price of these machines are integrated knitted fabrics used almost exclusively in sports and did not come into use on a regular basis.

[0009] Lately on the market there are knitted fabrics, where to strengthen the knitted fabric the manufacturer combines less strong yarn from a natural fibre exhibiting a high sorption with a stronger synthetic yarn with a vision of that the resulting yarn will exhibit both good clothing physiological properties (good thermal insulating resistance) and also a good strength. In reality, when the applied cellulose fibre gets wet by sweat, it forms so-called thermal bridge decreasing insulating resistance of the combined hydrophobic yarn, thus the advantage of the hydrophobic polymer vanishes. If such enforcement in the knitted fabrics creates streaks or similar shapes, then this structure does not mean increase of thermal contact and thermal insulating comfort of the knitted fabric.

[0010] Instead of thermal contact perception many consumers search on the market for clothes, which would in some extent lower joint ache during a joint illness. The thermal contact perception and a high thermal insulating resistance in itself have a favourable impact. It was further discovered, that electrical charge generation for example in PVC fabrics has also favourable impact in this sense. PVC products in itself, which conduct water poorly, are inconvenient to wear in muggy weather and moreover they are expensive. That is why use of all PVC clothes is not that much spread. There is no product on the market at this time, in which the manufacturer would emphasize any "antirheumatic" effects.

[0011] The goal of the invention intends to eliminate or at least to minimize the drawbacks of the art.

Principle of the invention

[0012] The goal of the invention is reached by a textile fabric, in particular single - layer fabric, whose principle consists in that it consists of alternating stripes of hydrophobic and hydrophylic material, while the entire surface of hydrophobic material stripes is larger than the entire

surface of hydrophylic material stripes. The hydrophylic material stripes absorb moisture in higher amounts and hydrophobic material stripes can transport moisture very well. Because the stripes made of hydrophylic material such as cotton are distinctively narrower than the stripes of hydrophobic material, the entire thermal handle also of wet product is warm enough and the final thermal resistance is high enough.

[0013] Nevertheless, it is advantageous when the stripes of hydrophobic material are made of polypropylene fibre.

[0014] According to Claim 3 and 4 the hydrophylic material stripes can be made of cotton fibre or regenerated cellulose fibre.

[0015] In particular textile product the textile fabric according to the invention can be used in e.g. such part of the product, on which is demand on higher thermal contact and thermal insulating resistance of the textile fabric.

[0016] The textile products made of the textile fabric according to the invention, for example socks or underwear, represent products with a high degree of thermal comfort, while their production is economic.

[0017] The textile fabric, in particular single - layer fabric, exhibits while wearing not only higher thermal comfort but also some antirheumatic effect caused by that in consequence of friction between fabric and skin the stripes of hydrophobic material charge to a high electrostatic charge, while the stripes of hydrophylic material do not charge. During mutual movement of the fabric and skin sore parts of the body, such as joints, are exposed to repeated action of electrostatic charge which can according to the known art soothe some kinds of pain much more efficiently than relatively constant, permanent charge, which display e.g. textile products manufactured from hydrophobic and hydrophylic material fibre blend because such blends basically form in resulting textile fabric electric short-circuit. Laminated textiles containing fibres from hydrophylic material as well do not provide antirheumatic effect, where the close presence of these fibres leads to fast discharge.

[0018] The products from new textile fabric represent cost-effective products with high parameters of thermal-contact and thermal-insulating comfort with certain antirheumatic effect.

Specific description

[0019] The invention is described in some examples of specific use of a textile fabric, in particular single-layer fabric, which consists of longitudinal or transverse straight or any shape stripes of different material, while the adjacent stripes are made of textile materials distinctively different in their ability to absorb water, while average width of hydrophobic stripes, or their entire surface, is larger than average width, or entire surface, of hydrophylic stripes, which absorb the moisture in higher amounts.

[0020] According to the first example of embodiment the textile fabric is used in a sport sock, where the stripes of hydrophobic material are made of polypropylene yarn and the stripes of hydrophylic material are made of cotton yarn. The width of stripes of hydrophobic material is 4 to 8 mm, while the width of stripes of hydrophylic material is around 3 mm. The stripes can be straight or they can form concentric ellipses centred on the sock foot. The instep part of the sock can be made of another material combination. While using the sock by user a special effect typical for this product takes part, when sweat is formed on the entire foot sole, but the stripes of hydrophylic material, which are in distance from one another, absorb in the first instant only the sweat from the stripes of hydrophylic material surroundings. While the user is walking, small movements of the foot in the sock occur, by which means the sweat pores of the user's foot always get into contact with stripes of hydrophylic material (in particular when the stripes are advantageously oriented across to longitudinal axis of the foot) and the sweat is then transported by stripes of hydrophylic material into the outsole. Because the stripes of hydrophylic material made of e.g. cotton are significantly narrower than permanently dry stripes, the entire (i.e. average) thermal handle of otherwise wet sock remains relatively warm and dry. From the same reason the thermal insulating resistance of such product remains high enough.

[0021] According to another example of embodiment the textile fabric is used in a T-shirt, then it is advantageous that the stripes in the T-shirt are while wearing by the user oriented horizontally. Moisture, or sweat, flowing down the user's skin by action of gravity, is always retained and accumulated in stripes of hydrophylic material, for example cotton. The stripes of hydrophylic material can, except from cotton, also be made advantageously from viscose fibres or lyocell fibres with high moisture absorption, while for formation of stripes from hydrophobic material can except polypropylene be also used polyester fibres or yarn. In both cases can be used advantageous properties of fibres with star cross-section, which due to higher capillary tension feature fast moisture transport. A disadvantage of cross-section shaped fibres is their higher price.

[0022] The invention is not limited to above mentioned embodiments, but embodies all textile products made of textile fabric consisting of stripes of different materials, while adjacent stripes are made of hydrophobic and hydrophylic materials, which can be formed of any textile fibres combinations having hydrophobic or hydrophylic properties. The hydrophobic stripes can be made in particular of polypropylene or polyester fibres or other fibres with a good ability to transport moisture and the hydrophylic stripes can be made in particular of cotton, viscose, regenerated cellulose or of other fibres with a high moisture sorption.

Claims

1. A textile fabric, in particular single - layer fabric,
characterized by that it consists of alternating
stripes of hydrophobic and hydrophylic material, 5
while the entire surface of hydrophobic material
stripes is larger than the entire surface of hydrophyl-
ic material stripes.
2. A textile fabric as claimed in Claim 1, **characterized** 10
by that the hydrophobic material stripes consist of
polypropylene fibre.
3. A textile fabric as claimed in Claim 1, **characterized**
by that the hydrophylic material stripes consist of 15
cotton fibre.
4. A textile fabric as claimed in Claim 1, **characterized**
by that the hydrophylic material stripes consist of 20
regenerated cellulose fibre.
5. A textile product with a textile fabric as claimed in
any of previous claims, **characterized by** that the
textile fabric with hydrophobic material and hydro- 25
phylic material stripes is situated at least on that part
of textile product, on which is a demand on higher
thermal contact resistance and thermal insulating
resistance.

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