ELASTIC POLYPROPYLENE WET SUIT FABRIC

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ABSTRACT

An elastic polypropylene wet suit fabric is made of fine count polypropylene fibers with fine denier counts. The elastic polypropylene wet suit fabric has a texture designed on the basis of elastic features and is woven with a high speed circular knitting machine and then treated in a finishing process. Such polypropylene wet suit fabric is laminated with an artificial rubber sponge in a laminating process and then made to be a polypropylene wet suit fabric piece with high elasticity, low modulus, better flushing capability and high dye fast grade at a special elasticity-processing stage. The laminated polypropylene wet suit fabric piece is suitable for the production of wet suits and other related products. The polypropylene wet suit fabric of the present invention is better in elasticity than conventional single-directional and low-elastic wet suit fabric, and capable to improve the comfort, flushing capability and dye fast grade of wet suits.
ELASTIC POLYPROPYLENE WET SUIT FABRIC

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a wet suit fabric, more particularly to an elastic fabric made of polypropylene for production of wet suits having higher elasticity, better flushing capability, high dye fast grade and comfort.

2. The Related Arts

Traditionally, the fabric piece used for the production of wet suits is a one-sided knitted cloth made of 100% nylon and laminated with an artificial rubber sponge. However, since wet suits must be a good fit, the conventional wet suits made of the aforementioned fabric piece, that has only single-directional low elasticity, restricts the movement of each joint of the body of a wearer of the suit. In addition, since each part of the human body is different, the constraint needed for individual parts of the human body is variable. However, the conventional wet suits are not capable to meet this demand and make wearers uncomfortable due to poor fit of such wet suits.

The present invention provides a polypropylene wet suit fabric to improve the aforementioned disadvantages of conventional wet suits.

SUMMARY OF THE INVENTION

An object of the invention is to provide a wet suit fabric with improved elasticity, flushing capability, dye fast grade and comfort. The wet suit fabric of the present invention is made of fine count artificial polypropylene fibers with fine denier counts, woven with a high-speed circular knitting machine and laminated with a layer of artificial rubber sponge to form a fabric piece that is suitable for production of wet suits and other related products. In comparison with conventional single-directional and low-elastic wet suit fabric pieces, the fabric is capable to provide better flexibility for each joint of the wearer’s body and reduce uncomfortable constraint on individual parts of the wearer’s body. The wet suits made of such fabric are more fitted, softer and more comfortable.

The present invention is described in details with reference to the attached drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a wet suit fabric of the present invention laminated to one single side; and

FIG. 2 shows a wet suit fabric of the present invention laminated to both sides.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

A method for producing wet suit fabric of the present invention is divided into two phases: a first phase of manufacturing polypropylene wet suit fabric and a second phase of lamination of artificial rubber sponge.

Phase I: Manufacturing Process of Polypropylene Wet Suit Fabric

The wet suit fabric of the present invention is made of fine count artificial polypropylene fibers with fine denier counts and has a texture designed on the basis of elastic features. Such fabric is woven with a high-speed circular knitting machine and treated in a finishing process.

The yarn used in the aforementioned process is made of polypropylene fibers having a primary color and a specification below 100 deniers. This is because the fine yarn of the polypropylene fibers below 100 deniers and having a specific gravity lower than 1 (nylon 1.14) is light-weighted and capable to reduce water absorbency of fabrics to as low as 0%. Further, since the polypropylene fibers have a primary color, the dye fast grade reaches up to 4-5 grades.

The wet suit fabric of the present invention has a plain weave, a gram/yard ratio of 100 to 250 g/yd and a breadth between 54 and 60 inches. Such fabric is woven with a loom having a needle range of more than 28 gauges, so as to create a high weaving density, reach the expected elastic level and bring an excellent elongation to laminated finished products. In the weaving process, high weaving density is maintained, yarns with low fluff are used, the tension of the yarns is appropriately controlled and a higher tension of the lower fabric is applied to the loom.

After being fined, shaped and otherwise treated in the process, the gray cloth of the polypropylene wet suit fabric is readjusted to be within 100 to 250 g/yd and a breadth of 54 to 60 inches.

The above process (Phase I) makes the polypropylene fabric 20 of the present invention that has an excellent elasticity.

Phase II: Lamination of Artificial Rubber Sponge

The polypropylene wet suit fabric of the present invention 20 is laminated with an artificial rubber sponge 10. The thickness of the artificial rubber sponge 10 is variable. As shown in FIGS. 1 and 2, the polypropylene wet suit fabric is capable to be laminated to one single side or both sides with a blender 30, respectively. The laminated polypropylene fabric is then made to be a polypropylene wet suit fabric piece with high elasticity at a special elasticity-processing stage.

The differences between the performances of the present invention and the conventional wet suit fabric are shown in the attached Table 1, including bursting strength (kgf/cm²), elongation at specified load (%/4.5 kg), tensile breaking strength (kg), 60% elastic modulus (kg/60%), 120% elastic modulus (kg/120%) and water absorbency (%).

As shown in Table 1, the present invention is obviously better in performance than the conventional wet suit fabric, especially in the aspects of comfort, flushing capability and high dye fast grade, due to the high elasticity and low modulus thereof. In the application to professional wet suits, the present invention is more comfortable, flexible and fitted for wearers in comparison with conventional wet suit fabrics, and is capable to provide higher value in industrial applications.
TABLE 1

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Direction</th>
<th>Conventional Wet Suit Fabric</th>
<th>The Present Invention</th>
<th>Tester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bursting Strength</td>
<td>#N/A</td>
<td>10</td>
<td>15</td>
<td>Mullen Bursting Strength</td>
</tr>
<tr>
<td>(kgf/cm²)</td>
<td></td>
<td></td>
<td></td>
<td>Tester (15 x 15 cm/PC)</td>
</tr>
<tr>
<td>Elongation at</td>
<td>WARP</td>
<td>90</td>
<td>greater than 180</td>
<td>CRE/Grab</td>
</tr>
<tr>
<td>Specified Load (%)</td>
<td>WEFT</td>
<td>140</td>
<td>greater than 180</td>
<td>Method (Fabric &amp; Piece)</td>
</tr>
<tr>
<td>#4.5 kg)</td>
<td>Piece</td>
<td></td>
<td></td>
<td>Piece/Clamp Width 1&quot;)</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>WARP</td>
<td>28</td>
<td>33</td>
<td>CRE/Strip</td>
</tr>
<tr>
<td>(kgf/cm²)</td>
<td>WEFT</td>
<td>21</td>
<td>37</td>
<td>Method (2.54 x 12 cm/PC)</td>
</tr>
<tr>
<td>60% Elastic Modulus</td>
<td>WARP</td>
<td>1.7</td>
<td>0.6</td>
<td>CRE/Strip</td>
</tr>
<tr>
<td>(kg/90%)</td>
<td>WEFT</td>
<td>0.9</td>
<td>0.6</td>
<td>Method (2.54 x 12 cm/PC)</td>
</tr>
<tr>
<td>120% Elastic Modulus</td>
<td>WARP</td>
<td>—</td>
<td>1.6</td>
<td>CRE/Strip</td>
</tr>
<tr>
<td>(kg/120%)</td>
<td>WEFT</td>
<td>2.6</td>
<td>2.0</td>
<td>Method (2.54 x 12 cm/PC)</td>
</tr>
<tr>
<td>Absorbency (Nylon 100%)</td>
<td>#N/A</td>
<td>100%</td>
<td>67%</td>
<td>Comparative Test (10 x 10 cm/PC)</td>
</tr>
</tbody>
</table>

[0019] Although the substantial functions and uniqueness of the present invention have been illustrated and described with reference to the preferred embodiment thereof, it should be understood that it is in no way limited to the details of such an embodiment but is capable of numerous modifications within the scope of the appended claims.

What is claimed is:

1. An elastic polypropylene wet suit fabric made by laminating a polypropylene wet suit fabric with an artificial rubber sponge in a laminating process, comprising:

   a polypropylene wet suit fabric made of fine count polypropylene fibers with fine denier counts, having a texture designed on the basis of elastic features, woven with a high speed circular knitting machine and treated in a finishing process, yarns made of a polypropylene fibers with a primary color and a specification below 10 deniers being used for a knitting process, said polypropylene wet suit fabric having a plain weave, a gram/yard ratio of 100 to 250 g/yd and a breadth between 54 and 60 inches, after being fined, shaped and otherwise treated in said process, a gray cloth of the polypropylene fabric being readjusted to be 100 to 250 in the gram/yard ratio and 54 to 60 inches in the breadth to acquire a polypropylene wet suit fabric with high elasticity, and

   a laminated artificial rubber sponge the thickness of which is variable and on which the polypropylene fabric is laminated, a blender being applied to a laminating surface of the polypropylene fabric to form a laminated polypropylene fabric piece, which is then made to be a polypropylene wet suit fabric piece with high elasticity at a special elasticity-processing stage.

2. The elastic polypropylene wet suit fabric as claimed in claim 1, wherein the artificial rubber sponge is laminated on one single side with the polypropylene fabric in said laminating process.

3. The elastic polypropylene wet suit fabric as claimed in claim 1, wherein the artificial rubber sponge is laminated on both sides with the polypropylene fabric in said laminating process.

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