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(54) Elastic knitted fabric containing heat-shrinkable plastic yarns

(57) A warp knitted fabric comprises a structure containing interlaced yarns, part of said yarns being of heat-shrinkable plastic and part of said yarns being rigid, said yarns being knitted in accordance with a structure with unidirectional interlacements.

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Description

This invention relates to an elastically deformable knitted fabric.

Warp-knitted fabrics have been known for many years and are used in particular in the sports clothing field (for example in swimming costumes). Most of them have a structure containing elastomer yarns knitted together with rigid yarns, for example of polyamide.

However, for some years heat-shrinkable yarns have been available commercially, such as the textured polyester yarn known by the commercial name of TREVIRA ESP or the yarn known as TYPE ELITE-PBT (polybutyleneterephthalate). These heat-shrinkable plastic yarns, when considered by themselves, possess high elasticity and can be be easily dyed.

By using these yarns, articles of clothing (in particular sports clothing such as swimming costumes) which well adhere to the user's body can be formed. This characteristic is very important for example for such swimming costumes if used in the competition or semi-competition field. In this respect, adhesion to the user's body enables the athlete to move more rapidly through the water without water penetrating his costume and hence slowing down his movement.

However the use of such yarns results in articles of very limited elasticity, which for most users (and in particular those who do not take part in competitions) is a negative characteristic, as such limited elasticity makes these articles difficult to put on and uncomfortable to wear.

An object of the present invention is to provide a warp-knitted fabric article which, while using heat-shrinkable plastic yarns, is at least as elastic as the well known knitted fabric articles containing elastomers.

A further object is to provide a fabric article of the aforesaid type which is simple to produce, is reliable in use and is of lesser cost than known fabrics with elastomers.

These and further objects are attained by a warp-knitted fabric in accordance with the accompanying claims.

According to the invention, a warp-knitted fabric comprises a structure defined partly by rigid yarns (such as polyester yarns) and partly by heat-shrinkable plastic yarns such as polybutyleneterephthalate or modified polyester yarns, such as those already commercially available yarns with the commercial name of TREVIRA ESP. In this structure, said yarns are warp-knitted with unidirectional interlacements.

This structure is obtained by a machine for warp knitting for example of non-run type, comprising reeds (at least two, each operating on one type of yarn) forming weaves which move in the same direction during the same beat-up. The reeds preferably operate such as to form a unidirectional parallel double zig-zag stitch; advantageously, however, some stitches can be in single zig-zag so as to obtain a structure which largely comprises parallel double zig-zag interlacements and to a minimum extent single zig-zag interlacements. These latter enable the double zig-zag interlacements to be "bound" in an optimum manner to prevent opening of the structure stitches.

Alternatively said reeds can operate to form a single or double parallel or unidirectional twill stitck (or Atlas twill); some stitches can be double or single.

The particular characteristic of the warp knitting with unidirectional interlacements using heat-shrinkable plastic yarns has surprisingly resulted in a fabric of considerable elasticity comparable with that of the best elastic fabrics with elastomers. This is in spite of the fact that up to the present time no warp knitted fabric obtained from such yarns has possessed this elastic characteristic. This new surprising characteristic is precisely related to the type of interlacements present in the fabric of the invention. In this respect, these unidirectional interlacements allow optimum stretching and retraction of the heat-shrinkable yarns, which are hence not "throttled" in the interlacement by the rigid yarns. These characteristic interlacements are not commonly used in knitted fabrics containing elastomer yarns or in commercially available elastic warp knitted fabrics with this heat-shrinkable yarn. Likewise, opposing interlacements are also present in known warp knitted fabrics containing non-elastic plastic yarns.

The present invention is therefore obtained by other than the common methods of the expert of the art, and achieves surprising results which are not predictable from the usual knowledge of such an expert of the art.

Additionally, a fabric obtained according to the invention retains less moisture than known elastic fabrics, hence reducing drying time with obvious advantages for the user. Moreover, the obtained fabric has a considerable capacity for retaining colours with time compared with already known elastic articles, and can be subjected to those upgrading operations (such as dyeing, printing, fluffing and the like) to which fabrics are usually subjected.

Claims

1. A warp knitted fabric comprising a structure containing interlaced yarns, part of said yarns being of heat-shrinkable plastic and part of said yarns being rigid, said yarns being knitted in accordance with a chain structure with unidirectional interlacements.

2. A fabric as claimed in claim 1, characterised in that at least part of the yarn interlacements are of parallel double zig-zag stitch.

3. A fabric as claimed in claim 2, characterised in that part of the yarn interlacements are of single zig-zag stitch.

4. A fabric as claimed in claim 1, characterised in that

the yarn interlacements are of parallel twill stitch.

5. A fabric as claimed in claim 1, characterised in that the heat-shrinkable plastic yarns are of modified polyester.

6. A fabric as claimed in claim 1, characterised in that the heat-shrinkable plastic yarns are of polybutyleneterephthalate.