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(54) Title: METHOD FOR PRODUCING GEOTEXTILES WITH A DEFINED ISOTROPY FROM MELT-SPUN FILAMENTS

(57) **Abrégé/Abstract:**

The invention relates to a method for producing geotextiles with a defined adjustable isotropy, particularly of the mechanical properties in the longitudinal and transverse direction.



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(54) Title: METHOD FOR PRODUCING GEOTEXTILES WITH A DEFINED ISOTROPY FROM MELT-SPUN FILAMENTS

(54) Bezeichnung: VERFAHREN ZUR HERSTELLUNG VON GEOTEXTILIEN MIT DEFINIERTER ISOTROPIE AUS
SCHMELZGESPONNENEN FILAMENTEN(57) Abstract: The invention relates to a method for producing geotextiles with a defined adjustable isotropy, particularly of the
mechanical properties in the longitudinal and transverse direction.(57) Zusammenfassung: Die Erfindung betrifft ein Verfahren zur Herstellung von Geotextilien mit definierter einstellbarer Isotro-
pie, insbesondere der mechanischen Eigenschaften in Längs- und Querrichtung.

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Method for Producing Geotextiles With a Defined Isotropy From Melt-Spun Filaments

The invention relates to a method for producing geotextiles with a defined adjustable isotropy, particularly of the mechanical properties in the longitudinal and transverse direction.

According to DE 23 0 331, a largely isotropic behavior of the property values in the longitudinal and transverse direction is achieved, for example, by using a vibrating baffle plate at the deposition of the threads on the conveyor belt.

In AT 399 169 B, a method for controlling the anisotropy of the non-woven fabric properties in the longitudinal and transverse direction is known, in which the vibration frequency of the baffle plates at the deposition of the filaments is varied, depending on the desired proportion of anisotropy.

It is the task of the present invention to provide a method for producing geotextiles with a defined isotropy in which the desired mechanical properties are adjustable as defined in every direction.

The subject matter of the present invention is therefore a method for producing geotextiles with a defined isotropy, characterized in that the melt-spun filaments are deposited in at least 2 layers, wherein the filaments in the first deposit are deposited, via guide plates,

predominantly in parallel beside each other in an angle adjustable by the guide plates, and are deposited in the same manner, but mirror-inverted, in a second deposit.

To produce the filaments, all thermoplastically processable synthetic materials can be used, for example polyolefines, polyester or polyamides; preferably used are polyolefines, especially polypropylene and polyester.

The filaments are usually produced from the melt of the appropriate polymer, with the addition of processing auxiliaries, if applicable.

Usually, the filaments or threads extruded from a spinning nozzle can be cooled and stretched. Afterwards, they are deposited on a conveyor by a guide plate.

Preferably, the depositing of the filaments occurs largely in parallel to each other, via a guide plate.

In this process, the deposition angle can be adjusted as defined by shifting the guide plate, wherein the deposition angle means an angle whose one leg presents the guide plate and whose second leg presents an imaginary line at a right angle to the production direction. Subsequently, at least one second layer of filaments is deposited across the thus defined deposited layer of filaments, namely, mirror-inverted.

By varying this angle, the proportion of longitudinal to transverse solidity can be chosen as defined, wherein it applies that the larger the angle, the larger the proportion of longitudinal to transverse solidity.

If necessary, several layers can be deposited over the last layer of filaments in this manner, each mirror-inverted.

Afterwards, the non-woven fabric deposited in a manner according to the present invention can be stitch-bonded in the usual manner, wherein known needling methods as well as water jet stitch-bonding methods can be applied.

To a particular advantage, a stitch-bonding method can be applied in which the filaments are deposited in a manner according to the present invention on a screen belt, which then transports the deposited filaments at least into the first hardening stage.

The melt-spun filaments are thus initially deposited in a manner according to the present invention on the endless screen belt and transported to the first hardening stage on this screen belt. During the transport, the deposited filaments are fixated on the screen belt by suction zones, so that no disruptions can occur during the transport of the not yet hardened filaments.

In the first hardening stage, the water jets either work through the screen belt and/or the screen belt serves as a support, depending on the stitch-bonding device assembly.

After stitch-bonding in the first hardening stage, the geotextile is sufficiently hardened, so that it can also be guided without the support of a conveyor belt without causing damage to the structure.

If necessary, however, the screen belt can also be guided through any further hardening stages.

The non-woven fabric formation as well as the stitch-bonding takes place on the screen belt.

By this method, it is possible to avoid any disruption in the structure of the not yet hardened geotextile after depositing.

Therefore, complex procedure guiding like, for example, an alternating guiding, can be avoided.

The geotextiles produced in this manner are distinguished by a great homogeneity and regularity and their defined mechanical properties in the longitudinal and transverse direction.

Therefore, the geotextiles produced in a manner according to the present invention can be used in particular for fixation purposes, as base frames or drainage installations in roads, pathways, bridges, airport runways, slopes, causeways and similar.

Example 1:

Spinning mat made of PP, ca. 100 g/m^2

Deposition angle 40°

Proportion of longitudinal to transverse solidity 1:1

Example 2:

Spinning mat made of PP, ca. 100 g/m^2

Deposition angle 55°

Proportion of longitudinal to transverse solidity 1.6:1

Example 3:

Spinning mat made of PP, ca. 100 g/m^2

Deposition angle 35°

Proportion of longitudinal to transverse solidity 0.7:1

Example 4:

Spinning mat made of PET, ca. 300 g/m^2

Deposition angle 43°

Proportion of longitudinal to transverse solidity 1:1

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Example 5:

Spinning mat made of PET, ca. 300 g/m²

Deposition angle 53°

Proportion of longitudinal to transverse solidity 1.5:1

Patent Claims:

- 1) Method for producing geotextiles with a defined isotropy, characterized in that the melt-spun filaments are deposited in at least 2 layers, wherein the filaments in the first deposit are predominantly deposited in parallel beside each another by guide plates in an angle adjustable by the guide plates, and deposited in the same manner, but mirror-inverted, in a second deposit.
- 2) Method according to Claim 1, characterized in that the deposition angle is 20 to 70 degrees.
- 3) Method according to one of Claims 1 to 2, characterized in that the deposition angle is 20 to 70 and the strip tension proportion of longitudinal to transverse direction after stitch-bonding is 3.5:1 to 0.3:1.
- 4) Method according to one of Claims 1 to 2, characterized in that 2 to 10 layers are deposited as per Claim 1.
- 5) Method according to one of Claims 1 to 4, characterized in that the filaments deposited as per the method according to one of Claims 1 to 4 are subsequently water-jet stitch-bonded or needled.

- 6) Method according to Claim 5, characterized in that the filaments are deposited on an endless screen belt according to a method as per Claims 1 - 4 and are transported through the first hardening stage on that screen belt, wherein the filaments are additionally fixated on the screen belt by suction zones for the entire duration of the process, and are thus already sufficiently hardened in the first hardening stage, so that a disruption-free transport without a conveyor belt is possible.
- 7) Geotextiles produced according to one of Claims 1 - 6.
- 8) Use of the geotextiles according to Claim 7 for fixation purposes, as base frames or drainage installations in roads, pathways, bridges, airport runways, slopes, causeways and similar.