Manufacturing of spacer fabrics in technical and clothing area

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Overview

Spacer fabrics and their properties

Determination of cut

Types of separation

Ways of joining and types of manufacturing machines

Products from spacer fabric

Summary
1 Spacer fabrics

1.1 Architecture of spacer fabrics
1 Spacer fabrics

1.2 Type of production

3D weft knitting

3D warp knitting

3D weaving

Flock technology
1 Spacer fabrics

1.3 Materials used

All usual market materials can be used for the production of spacer fabrics. Therefore the implementation of stable monofilaments in the distance layer are necessary.

Different yarns can be combined with custom-built materials. These materials can reach desired properties in innovative products.

Only flock filaments have to be prepared in a special way - they have to be equipped with an electrostatic coating. Thus the application is limited.
1 Spacer fabrics

1.4 Properties of spacer fabrics

3D weft knitting
- Thickness up to 20 mm
- Possible to knit different forms of products
- Possible to implement channels for frames and supports
- Limited design of structures

3D warp knitting
- Thickness up to 55 mm
- Possible to produce as rowing or square
- Wide possibilities of structures
- Limited dimensional accuracy

3D weaving
- Thickness not defined
- Eligible as light weight construction
- Necessary to consolidate

Flock technology
- Height depend on the length of the fibres and press stability
- Flexible creation of patterns
- Low stability in washing process
1 Spacer fabrics

1.4 Properties of spacer fabrics

3D spacer knitting, weaving
- Extremely high breathability
- Washable
- Unique point pressability
- Flexible
- Variable properties due to combination of different yarn materials
- Light weight
- Support of another matrix materials

Flock
- Breathability depends on wear material
- Washable
- Extremely flexible
- Possibility to combine pattern and colors
2 Determination of cut

- 3D Product geometry
- Material properties (thickness, elasticity)
- CAD cut development
- Classic cut development
- Determination of 2D cut
- Nesting
3 Type of Separation

Mechanical
- Scissors
- Band saw
- Roll knife

Thermal
- Plasma
- Ultrasonic
- Laser
- Hot wire

Experience:
- The monofilaments fall out from the fabric and are not fixed in the surface any more. The feel is not accepted by customers.

Experience:
- The monofilaments are melted in the surface meshes.
- The energy has to be regulated adequately to avoid carbonized points.
- Hot wire is quickly polluted from polymers.

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4 Ways of joining and types of manufacturing machines

4.1 Sewing

Border seam

Paola Lenti

ITM, TU Dresden
4 Ways of joining and types of manufacturing machines

4.2 Welding
4 Ways of joining and types of manufacturing machines
4.3 Adhesive bonding

Mainly in mattresses, applicable only on large surfaces.
5 Products from spacer fabric

5.1 Outdoor

Paola Lenti

Offecct

SKYliving

TITV Greiz

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5 Products from spacer fabric

5.2 Indoor

- Longlife
- Offecct
- Aktivshop
- Benjamin Hubert, ZERO
- Koblender
5 Products from spacer fabric

5.3 Automotive
5 Products from spacer fabric

5.4 Insulation
5 Products from spacer fabric

5.5 Clothing and Sport
5 Products from spacer fabric

5.6 Sport
5 Products from spacer fabric
5.7 Mattresses
5 Products from spacer fabric

5.8 Reinforcement

V. Fraas

Groz-Beckert

Textilbetonzentrum
5 Products from spacer fabric

5.9 Others
6 Summary

Spacer fabrics are very innovative materials. At present only 10% of all properties of the materials are used.

Material combinations allow to reach exact “custom-built” properties.

The positive effects of spacer structures on environment are clearly to see: light weight saves fossil fuels in transport area.

The fields of applications are named, production machineries for the rowings are developed - but the manufacturing of spacer fabric still has huge demands on the development of new manufacturing machines.
Thank you for your attention