

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

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

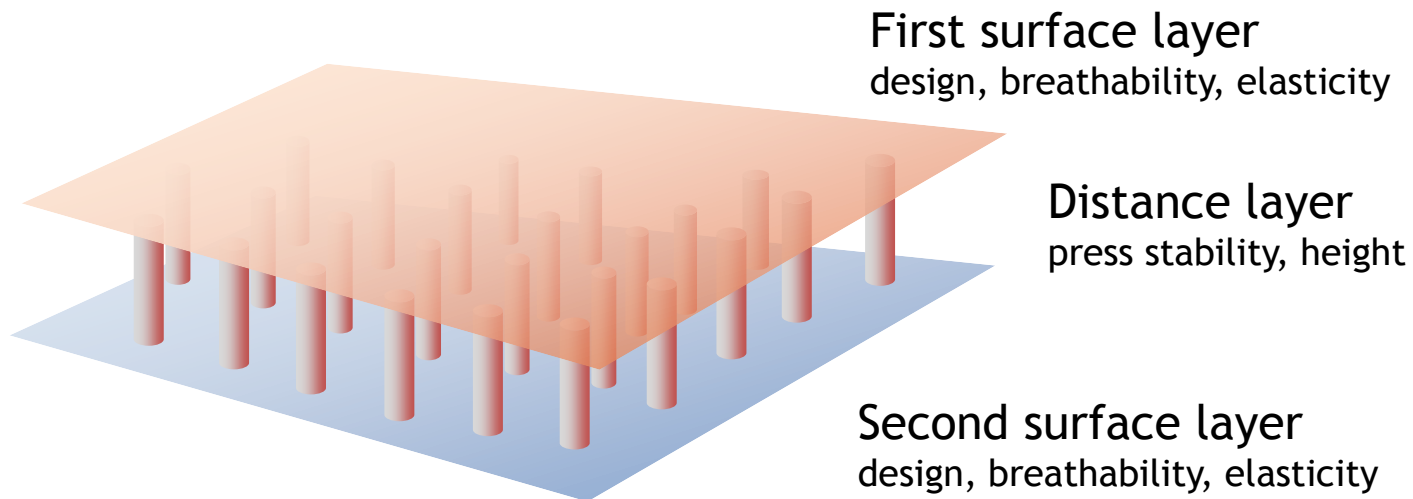
Products from spacer fabric

Summary



1 Spacer fabrics

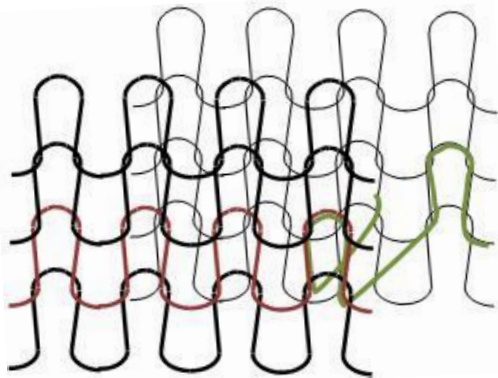
1.1 Architecture of spacer fabrics



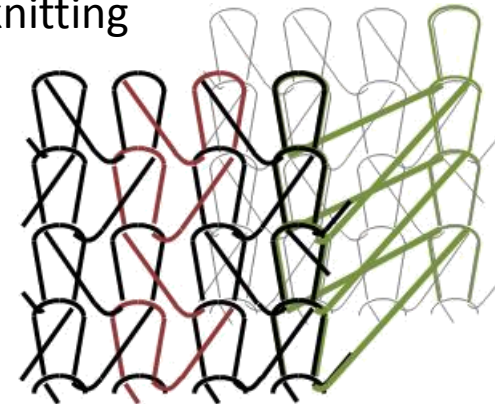
1 Spacer fabrics

1.2 Type of production

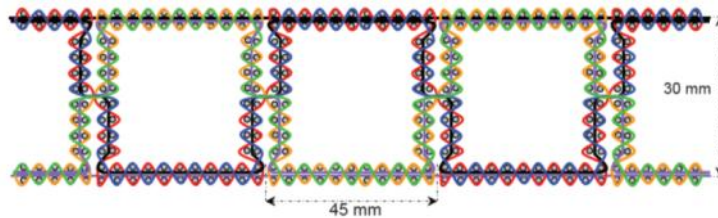
3D weft knitting



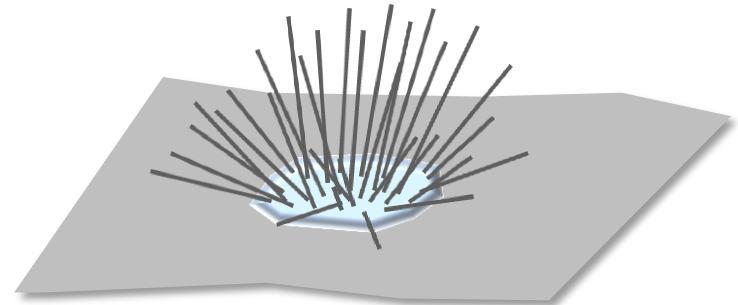
3D warp knitting



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 weaving

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

3D warp knitting

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

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

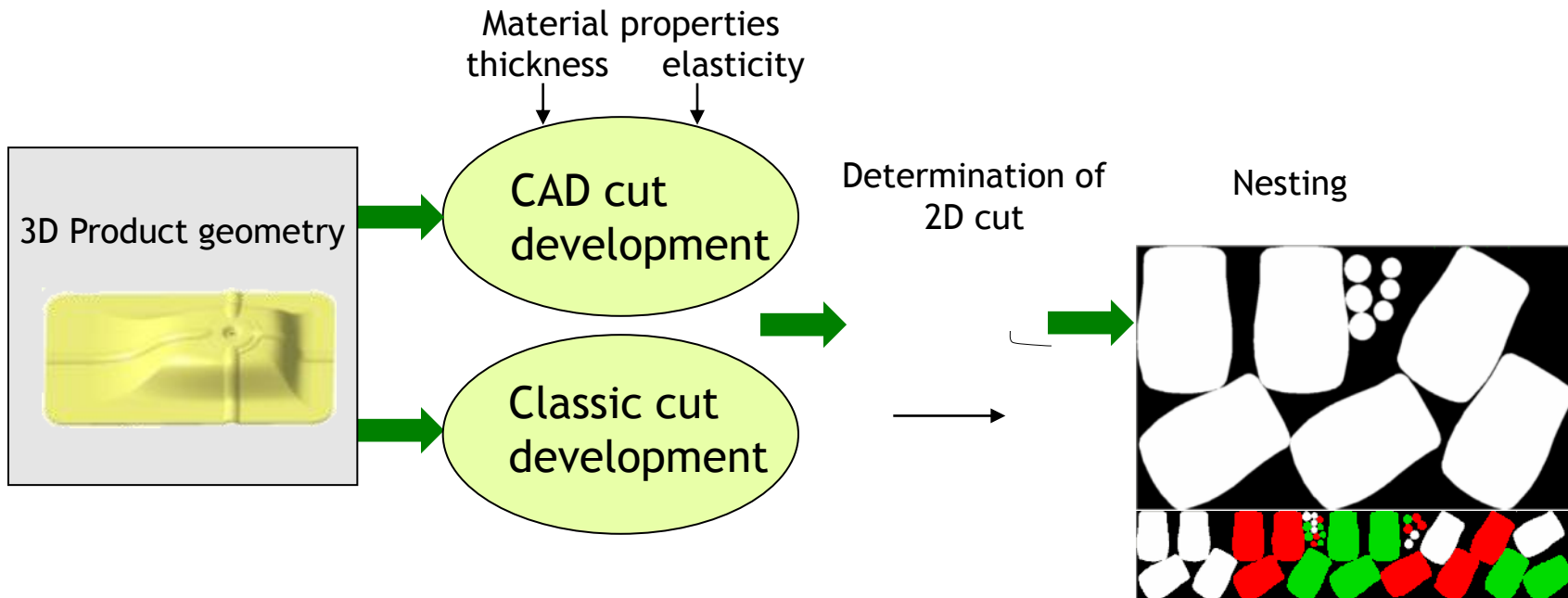
3D spacer knitting, weaving

- 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



3 Type of Separation

Mechanical

- Scissors
- Band saw
- Roll knife

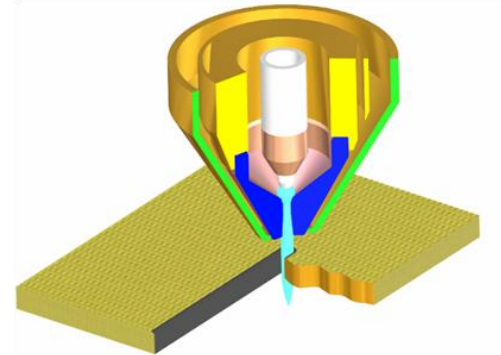


Experience:

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

Thermal

- Plasma
- Ultrasonic
- Laser
- Hot wire

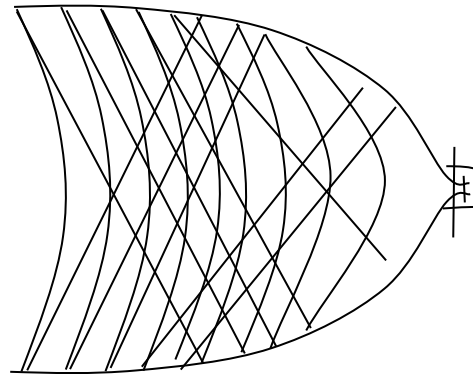


Experience:

- 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.

4 Ways of joining and types of manufacturing machines

4.1 Sewing



Border seam



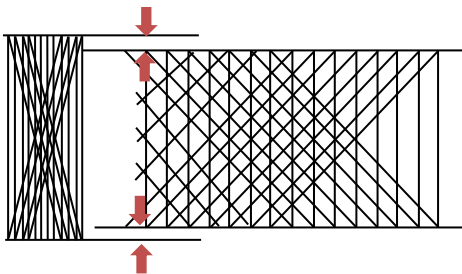
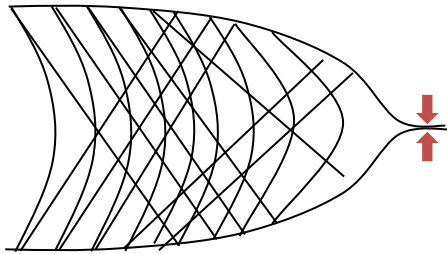
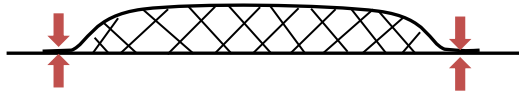
Paola Lenti



ITM, TU Dresden

4 Ways of joining and types of manufacturing machines

4.2 Welding



Russka



IOF, TU Dresden

4 Ways of joining and types of manufacturing machines

4.3 Adhesive bonding

Mainly in mattresses, applicable only on large surfaces.



Zöllner

5 Products from spacer fabric

5.1 Outdoor



Paola Lenti



SKYliving



Offect



TITV Greiz

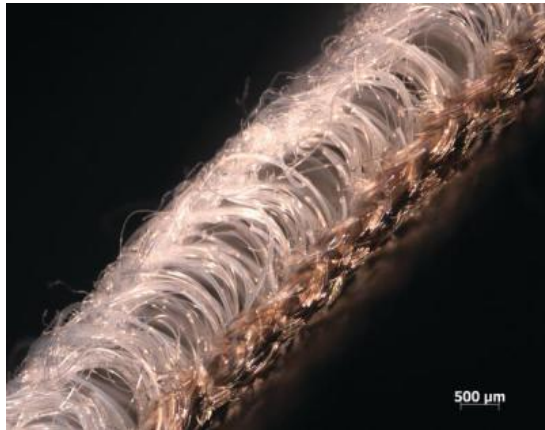
5 Products from spacer fabric

5.2 Indoor



5 Products from spacer fabric

5.3 Automotive



TITV Greiz



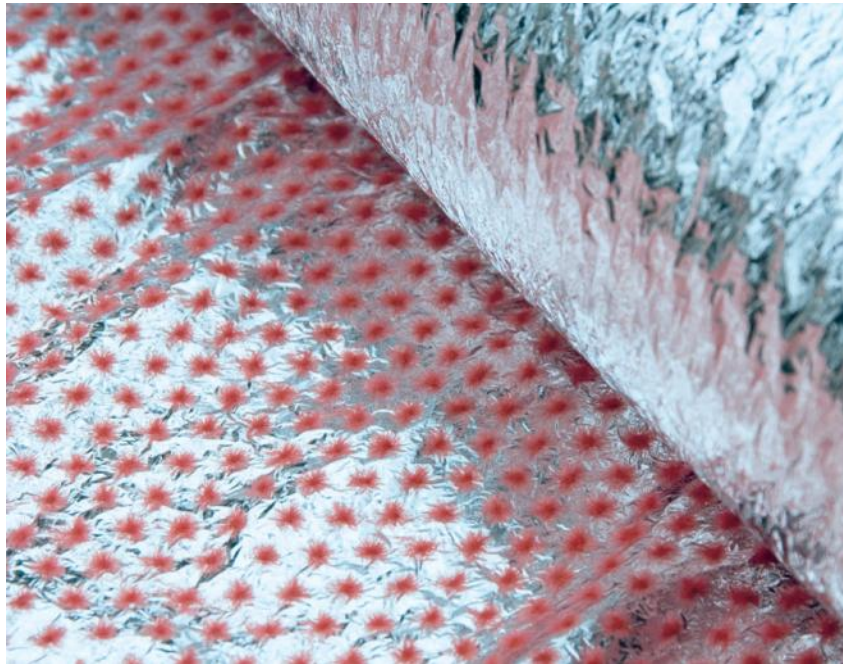
Aktivshop



Cetex

5 Products from spacer fabric

5.4 Insulation



ITB, TU Dresden



TU Berlin, Festo AG

5 Products from spacer fabric

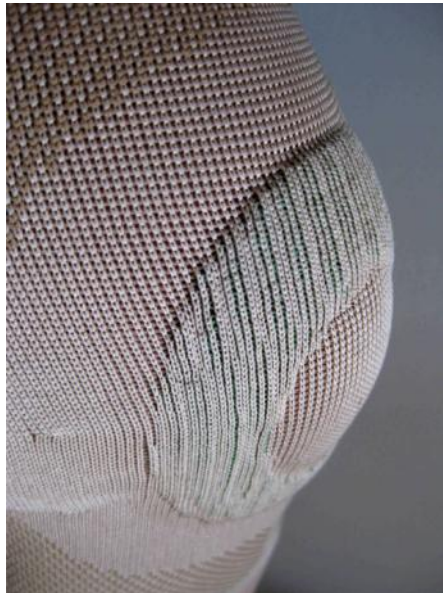
5.5 Clothing and Sport



AiF-Nr.13806 BG

5 Products from spacer fabric

5.6 Sport



ITM, TU Dresden



Intexsol

5 Products from spacer fabric

5.7 Mattresses



Phiton



Auping



Matratzenherstellung Strohmeier

5 Products from spacer fabric

5.8 Reinforcement



V. Fraas



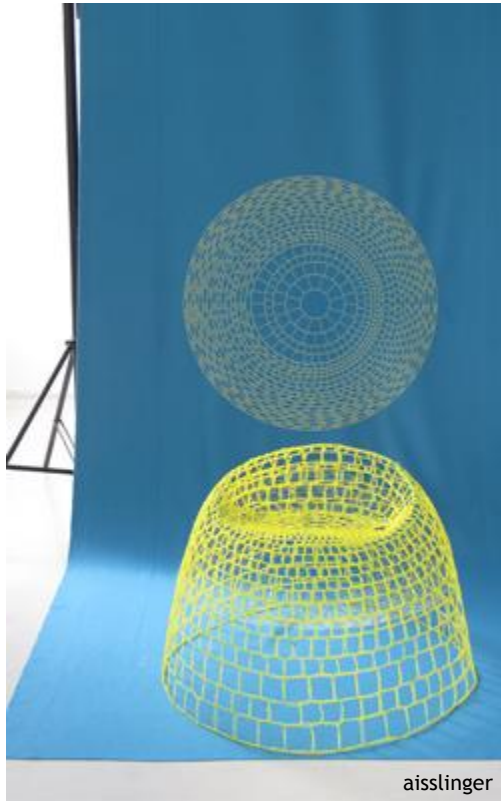
Groz-Beckert



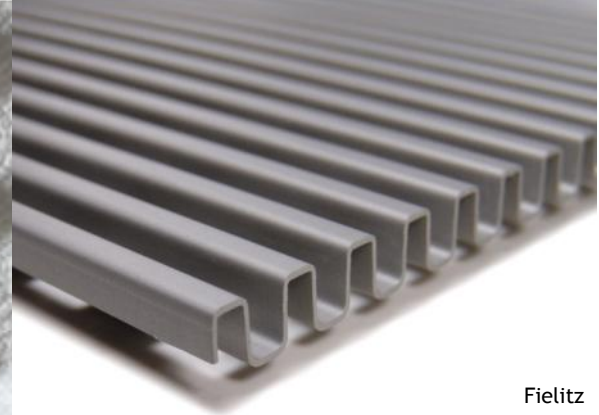
Textilbetonzentrum

5 Products from spacer fabric

5.9 Others



abinitio



Fielitz

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