

Thermal pad – Development of a thermal regulating pad made from 3D spacer textiles

Objective

On warm days, people often perspire while sitting. This can have unpleasant consequences, such as damp outer clothing in the backrest or trouser area. Seat paddings allowing air to circulate and wick moisture away from the body would be particularly desirable for people in wheelchairs.

The aim of this research project was a comparison of the textile manufacturing processes weaving, warp knitting and knitting for the production of thermoregulating, three-dimensional spacer textiles.

Approach and results

As part of the project, various production techniques (weaving, warp knitting, knitting) for spacer textiles were analysed in terms of their material consumption, production costs and the patterning options for thermophysiological use and post-processing.

The surface structure and material selection of the cover surfaces of the pad were a key focus of the project. Various patterns and yarn materials were analysed comparatively, particularly with regard to their thermophysiological properties. Moreover, specific contribution of different yarn materials improving the thermophysiological performance of the textiles was also analysed.



Sweat rug in practical test: real image (left), the infrared image shows evaporative cooling (right)



Wheelchair pad

A comprehensive analysis of the project's requirements led to the conclusion that warp knitting is the optimal method. This technique demonstrated superior performance in meeting the technical and physiological textile requirements, as well as offering an economically efficient manufacturing process.

A pattern with a closed cover surface with lanes proved to be the preferred variant for the design of the spacer structure. A sweat rug and a wheelchair cover were created as demonstrators in this research project, which proved their worth in practical tests.

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The final report on this project is available on request.

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