

KNITTING MACHINE FOR PRODUCING COMPRESSION-STIFF SPACED TEXTILES

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Duration: 04/00 - 12/01

Initial Situation

Generally, developments in the field of technical textiles give rise to technical modifications in existing machines to make them fit for the production of innovative products intended for additional market segments. As a specific type of warp knitting, spaced textiles knitting offers a number of strategic options for the use of such machinery to produce technical textiles.

Research target

Based on specified special groups of products, this project is aimed at developing a laboratory double raschel machine for the production of spaced textiles featuring workpiece-type, near-net-contour and pressure-elastic characteristics as well as strong application-specific properties. Within the framework of this project, focus is on creating an integrated machine concept based on the increased application of mechatronic components.

Research results

A double raschel machine of type HDR-DPLM made by Messrs. Karl Mayer Textilmaschinenfabrik Obertshausen was used as a basic machine, which was modified according to product-related and technical requirements in order to develop a textile production system meeting the demands involved in the development and manufacture of a range of 20 to 60mm thick spaced textiles with mainly pressure-elastic properties, under laboratory conditions.

To obtain 3D-warp knitted fabrics with near-net-contour product characteristics under near-production laboratory conditions, the central processing areas of the thread systems were technically adapted to the thread feeders, and the use of special functional threads was examined.

Priority was attached to redesigning the fabric take-down device.

The project also included application testing of the products as well as investigations into textile finishing issues.

Another essential aspect of work under the project was process visualization.

Application and economic advantages

In an extremely wide range of applications, varying the 3D-warp knitted fabrics results in product versatility that opens up major development opportunities in the field of technology developments, too.

The following essential aspects are identified from the results obtained in the research work under this project:

- provision of products with completely new performance characteristics
- new opportunities to develop versatile textile options within the framework of machine-related technological solutions
- extremely reduced development times for textile products
- economical implementation of special textile developments without the need of performing any additional mechanical change-over work as in the past
- new markets for technical textiles
- sustainable textile products and value chains.

Developed within the framework of this project and installed at Cetex, the laboratory machine for the manufacture of pressure-stiff and near-net-contour 3D-warp knitted fabrics in new dimensions is now available for the development of products for relevant markets and a wide range of possible applications.

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Figure 1: Near-net-contour seat upholstery with three upholstery segments



Figure 2: Laboratory machine with crane unit