

DRY UNIDIRECTIONAL (UD) MATERIALS

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ABSTRACT

The target of the research project was the development of a plant technology, that makes it possible to manufacture a rolled UD tape of dry carbon tapes that shows only slightest differences in tape length and tape width between the single tapes along the whole length of the material.

On the basis of theoretical considerations and the evaluation of existing technology the following main points were determined:

- Minimisation of the variations in tension of the single tapes
- Prevention of slippage in the delivery device
- Avoidance of twists in the creel during the unwinding process
- Defined winding of the spreaded tapes

The concept of the UD plant is based on an open design which makes it possible to integrate changes very quickly. The rovings run from the unwinding creel via an intermediate guide to a first delivery device. After passing the delivery device, a defined tension is applied on every single tape by means of a dancer roll. That is the prerequisite for ensuring that all tapes have the same conditions for the subsequent spreading process. It turned out that it is advantageous to spread the material in two planes. By means of the spreading process, the tapes are drawn through a second delivery device that is designed in such a way that a slip-free delivery can be assumed. Then the tapes are wound with an intermediate paper layer.

Various carbon basic materials from manufacturers with different forms of supply were processed with the prototype machine. The working width and the weight per unit area of the UD fabrics were varied as well. The quality of the created winding was evaluated as very good. Two patent applications were filed together with the business partner. Producers of carbon rovings and users of the manufactured UD fabrics, e.g. from the automotive sector, have already shown a considerable interest in the plant.

Acknowledgement

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We offer the production of samples to interested parties. More information you may find here:

http://www.cetex.de/html/institut/eng/research/transfer_ud.htm