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SÄCHSISCHES TEXTIL FORSCHUNGS INSTITUT e.V.

Thermoplastic rCF-Tapes
– Technology –

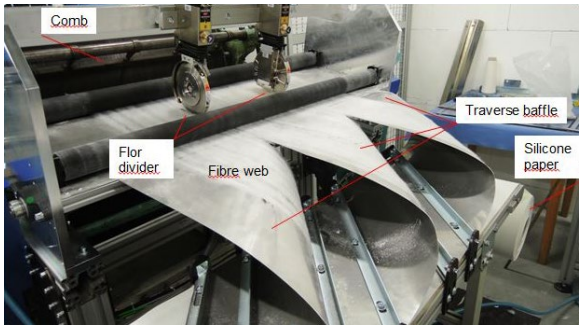
Objective

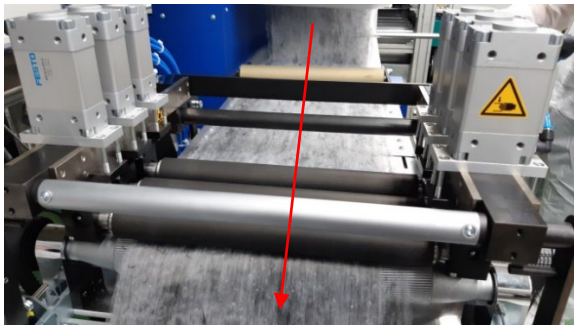
CF tapes are semi-finished textile products in form of unidirectional scrims made from pre-spread and parallel carbon rovings. To increase the drapability of such semi-finished products, recycled long carbon fibres between 60 and 80 mm fibre length with increased fibre orientation were transferred to a flexible semi-finished textile tape for composite production. In contrast to previously published state of research

- both a flat equalization of the web basis weight supported by the principles of web division or doubling,
- the increase in MD fibre orientation over the working width can be integrated into the process by means of a drafting system, specially tailored to the process.

Solution and results

As a result of the project, both have succeeded in the designed inline process. From rCF staple fibres, both PP and PA 6 could be used to produce homogeneous fibre blends, to card them and to pull them off the card as a fibre web. With a web division and subsequent triple doubling, surface weights of 25 g / m² or a width of 300 mm were achieved in the resulting web wrap. The web wraps were then doubled and placed on a 3-roll web drafting system. Total drafting of 1.8 and 2.4 were realized in the drafting system. With the help of thermal consolidation, tapes with a maximum width of 360 mm were produced.





During the subsequent pressing to CFRP test specimens, fibre volume contents between 13 and 21% were achieved. As a result of the bending test, a bending strength of 457 MPa and a bending stiffness of 25 GPa were achieved. A tensile strength of 491 MPa or 27 GPa were determined for the tensile modulus during the tensile test. With implementation of the project goal for the production of staple fiber tapes from rCF / PA, the development step from a strand-like (sliver or yarn) to a longitudinally oriented, flat semi-finished product was successful. This means that a highly oriented, flat textile semi-finished product is available as an alternative to primary fibre tapes or stretch broken tape materials.

INNO-KOM-Ost

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