

Further development of an electron beam process for desizing textile fabrics

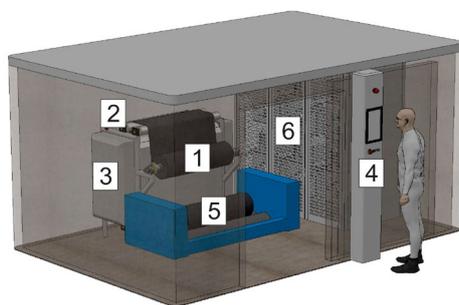
Motivation

The desizing of textile reinforcement structures, e.g. made of carbon fibres, is necessary to remove disruptive sizes on the fibres and improve the fibre-matrix bond. Even when carbon textiles are stored for more than five years, the sizing can age, meaning that it no longer performs its original function of optimally bonding the matrix to the fibres. In this case, it is advisable to remove the sizing. The textile can then either be coated with a new sizing agent or laminated with a different type of matrix polymer. The aim of the research project was to take the electron beam process for desizing textile reinforcement structures, which was investigated for the first time in a previous research project, beyond the level of basic research and develop it further for industrial use.

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Approach and results

The project involved further developing the ebeam process, in which accelerated electrons strike the surface of textile fabrics with high energy according to the principle of the 'Braun tube', destroying any adhesives on these textile fibers. The project partner Evonta-Technology GmbH, Dresden, (Evonta) supported the extended tests on the 'EBLab-200' laboratory device for desizing carbon textiles using electron beams. This process is gentler on the fibres and uses less energy than a thermal desizing process. The low energy consumption ensures significant resource savings, which makes an important contribution to sustainability and cost reduction. The solution involved validating the parameters, effectiveness and optimisation of the electron beam process on the static laboratory device and continuously expanding it across the board. Furthermore, the solution involved the construction of a continuously operating electron beam system for desizing textile webs with widths of up to 1,000 mm and a process speed of 2 m/min. Technological recommendations and the transfer of the results into industrial production were defined by the company Evonta.



- 1) Unprocessed raw material
- 2) Deflection rollers
- 3) ebeam module incl. 6 sources
- 4) Control unit with touch screen
- 5) Peripheral winder
- 6) HV generators

Illustration: Design of a radiation chamber for industrial desizing textile fabrics

INNO-KOM

Acknowledgement

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The final report on this project is available on request.

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