Institut für Textiltechnik und Lehrstuhl für Textilmaschinenbau
RWTH AACHEN UNIVERSITY

Project title:	Development of a new filter technology with reduced adhesion - ReHaFil
Partner:	WKI Absaugtechnik GmbH, Eschweiler
Duration:	02/2022-01/2024
Funding Agency:	Framework of the Central Innovation Programme for SMEs of BMWK

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State of the art
Particles are separated with conventional filters (partly coated)

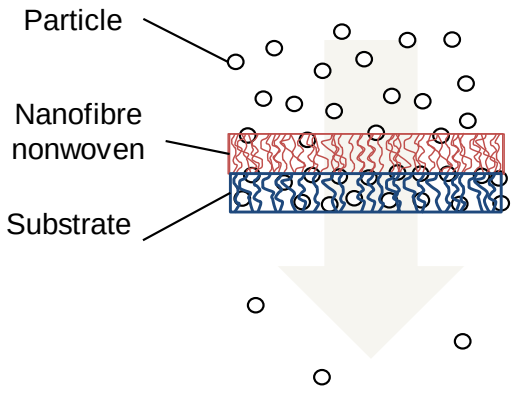
Deficit
Particle adhesion and depth penetration lead to limited filter service life

Aim
Bag filter with double service life, 99.99 % separation efficiency, pressure drop < 1500 Pa

Approach

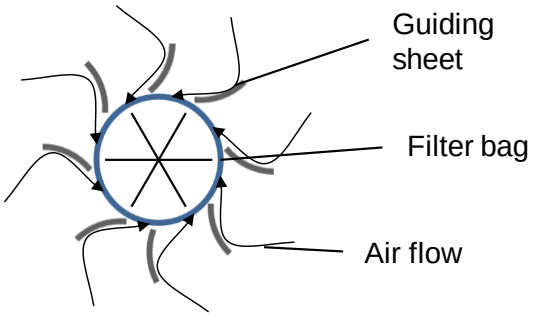
ITA Material development

Nanofibre filter medium with surface filtration



Process development WKI Absaugtechnik

Air flow in low angle



Economic relevance

- Potential markets for filter technology to be developed:
  - German market for air filtration >€220 million with expected average growth of 7.8% p.a.

Mission Statement

Air filtration systems are used in all industries to control the quality of the incoming air or to prevent pollution of the environment by exhaust air. Filtration takes place over the entire depth

of the filter medium and particles are trapped within the medium. This mode of action is called depth filtration and has some shortcomings in dust collector applications: Low initial performance, high pressure drop and energy consumption, no complete cleaning and low service life.

Therefore, in the ReHaFil project, a new type of filter technology is being developed that minimizes depth penetration and adhesion to the filters used, resulting in a 100% longer filter service life compared to filters currently used by WKI Absaugtechnik GmbH. For this purpose, both material-technical and process-technical innovations are being developed. The conventional filter media are used as a basis for the material-technical development and coated with nanofibers with a diameter of 100 nm to 400 nm. As a result, in addition to the sieve effect, the effects of impaction and interception also act more strongly, and depth filtration is shifted to surface filtration.

In the second step, the flow of the novel filter medium is optimized for the longest possible service life, both by developing a system module and by varying the filter design, without adversely affecting the existing filter efficiencies (ePM10 according to DIN EN ISO 16890). To this end, flow guide elements are being developed which optimally introduce the air flow to be cleaned into the bag filter and, by means of the filter packaging adapted to it, also pass it on in the filter in order to optimize the impact velocity and angle to maximize the filter service life.

Acknowledgement

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