

## Textile curved sieve

**Filter system for solids separation from wastewater streams with low-maintenance cleaning concept based on structured pile textiles with defined separation behavior**

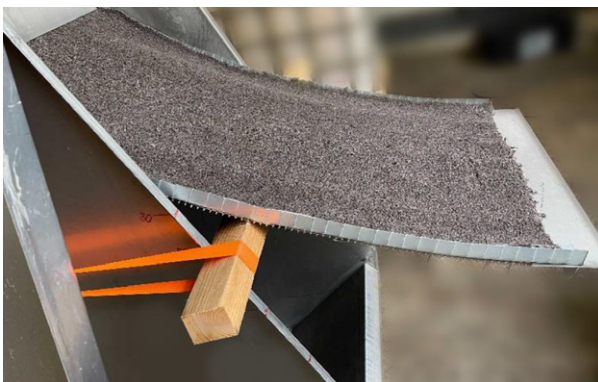
The energy consumption of wastewater treatment plants for the purification of wastewater depends on the aggregates used. In order to make wastewater treatment as efficient and space-saving as possible, the use of a low-maintenance filter system (textile curved sieve) was tested in the project. A textile with a pile structure developed by the Institut für Bodensysteme at RWTH Aachen e.V. (TFI) was used as the filter medium. This was installed in place of the rigid screen surface of a curved sieve and was used to separate liquids from solids. In addition to the filtration of the developed textile curved sieve, the cleaning of the textile was also investigated.

Filters for solids separation have long been used successfully in environmental and wastewater engineering. However, increasing demands on planning, operation and maintenance of wastewater treatment plants lead to a constant need for new robust, efficient materials and composite complexes. Together with the Institut für Bodensysteme at RWTH Aachen e. V. (TFI), a filter system for solids separation was developed as part of the project funded by the BMWK, which was intended to combine the advantages of pile textiles and those of curved sieves. The aim of the research project was to make wastewater treatment more efficient by means of the low-maintenance filter system. For this purpose, tufted textiles with pile structure were combined in the filter system, which was based on the process technology of a curved sieve.

As part of the project, a project-accompanying committee was also formed, in which representatives from textile industry and water management sectors were able to

contribute to the success of the project through their expertise. In a multi-stage process and in close coordination with the project-accompanying committee, tufting structures were systematically developed, manufactured and examined, and the filtration results were discussed.

The area of application was defined in the specifications as the effluent of the secondary sedimentation of a wastewater treatment plant. Against this background, the filtration behavior of the developed textiles was extensively tested on a laboratory test rig. Furthermore, a device for cleaning the textiles with water was developed and its use was tested. For the evaluation of the individual textiles, an evaluation matrix was prepared which takes into account turbidity and dry residue values of the filtrates as well as service life and retentate quantities. In addition to the evaluation matrix, fiber discharge and length change were observed. A textile flowed across the tuft rows with a lattice-knitted support was given the highest score in the



*Modified curved sieve with protection against lateral overflow and textile for filtration. © FiW e. V.*



*Left: Feed sample before filtration; right: filtrate sample after filtration. © FiW e. V.*



*Manual cleaning with developed nozzle holder.*  
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overall comparison. However, the results of the filtration tests showed that none of the textiles developed in the project could meet the requirements in terms of tolerable dry residue in the filtrate, loading capacity and micro-plastic discharge. For this reason, the development of a moving textile as was conceived in the proposal, was not pursued further.

Contrary to the original objective, the results are of only limited use to the manufacturers of filters for the treatment of liquids. However, the knowledge gained in the project can be used in future research projects for the production of textile floor coverings.

The final report can be obtained from the research institutions.

### Acknowledgments

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## Project overview

### PROJECT TITLE

Textile curved sieve – Filter system for solids separation from wastewater streams with low-maintenance cleaning concept based on structured pile textiles with defined separation behavior

### PROJECT PERIOD

06/2020 – 05/2022

### PROJECTPARTNERS

TFI – Institut für Bodensysteme an der RWTH Aachen e. V.

### FUNDING

SPONSERED BY THE



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### SUPERVISED BY



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### STATUS

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