

**EXPOVAL, Transfer-oriented research and development in the field of wastewater - Validation of design rules on full-scale plants - Subgroup 3: Trickling Filters**

Trickling filters are an appropriate wastewater treatment process above all in regions with limited energy resources and a difficult infrastructure. They are robust, operationally stable, and given favorable topographic boundary conditions, can be operated almost without electric power. Trickling filters can meet the requirements associated with extensive nitrification, but can also be used if the water is being used for irrigation purposes and the N and P nutrients are to remain in it. The main goal of the project is to develop and validate a practicable design algorithm for planning and dimensioning trickling filter carbon removal and partial nitrification systems for use in both hot and cold climatic zones. In addition, practical instructions relating to trickling filter operation in other climatic zones are being drafted.

Alongside the impact of temperature elevated salt content is also being taken into account; the limits of the use of the trickling filter process are to be defined too. To this end, a decision matrix containing all the relevant quantities (e.g. volumes, overall height, flushing power, etc.) needed to ensure optimum use of the trickling filters in other climates, is to be drawn up. The matrix is to take into account purification targets (especially if departures from German standards are involved), ascertainment of the values to be monitored (combined sample, composite samples, statistical mean values, etc.) and criteria for the selection of packing material.

**Operating sequences:**

- Validation strategy: Results derived from various tests are to be validated by extensive data samples, measurements and analyses relating to industrial-scale trickling filter systems.
- Collection of existing data: The existing data required for the validation process are to be collected from selected trickling filter system sites, and then viewed and evaluated.

- Measurement campaigns: Intensive Media check at trickling filter in Georgia (Photo: GEA 2H) measurement campaigns (e.g. Dubai, Managua, Batumi) are to be carried out on several industrial-scale trickling filter systems and on one semi-industrial trickling filter.
- Data evaluation and trickling filter assessment: The data pool thus acquired is to be evaluated and the performance of the trickling filters examined is to be assessed on the basis of guide parameters.
- Validation process: The existing planning, design and operating recommendations are to be extended to cover trickling filter systems used in other climatic conditions by comparing and supplementing the results derived from semi-industrial trials with industrial-scale data and readings relating to plants in service.



Fig.2: Media check at trickling filter in Batumi (Georgia)

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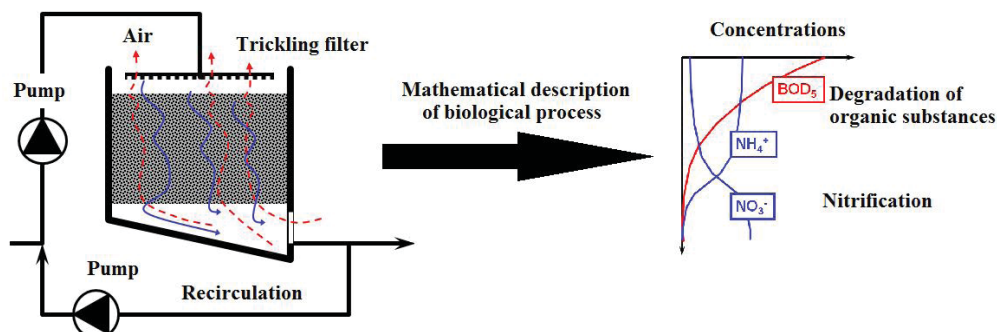


Figure 1: Schematic of a trickling filter (left) and idealized carbon removal and nitrogen transformation over the height of a trickling filter (right)