


Biological Waste Water Treatment

Aachen-Soers / Germany

Clear water nitrification
Flocculation filtration

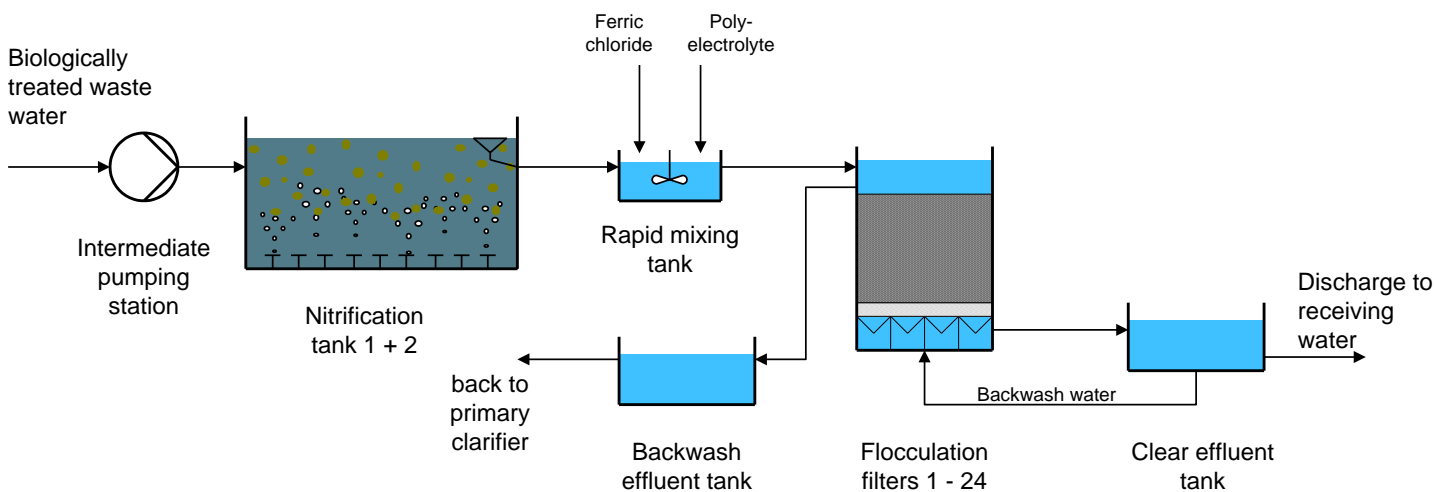


At the Aachen-Soers sewage works, the existing biological treatment plant has been extended by a tertiary treatment stage comprising clear effluent nitrification in combination with flocculation filtration to meet the regulatory nitrogen and phosphate discharge standards on a permanent basis. Nitrification on attached biomass in the first process step ensures consistent compliance with the extremely stringent NH_4^+ discharge limits while in-depth filtration in combination with flocculation in a second process step provides maximum solids reduction as required for optimum phosphate elimination.



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The treated effluent discharging into the receiving water, the Wurm, fully satisfies the demanding regulatory requirements.

1. Objective

Municipal waste water treatment

- Design data

Throughput	125,000 m ³ /d
BOD ₅ load	875 kg/d
COD load	5,000 kg/d
TKN	1,000 kg/d
PO ₄ -P	315 kg/d
Suspended solids	2,500 kg/d
- Treatment criteria

BOD ₅	7 mg/l
COD	35 mg/l
NH ₄ -N	1 mg/l
Total P	0.4 mg/l
Suspended solids	5 mg/l

2. Plant concept

- Process steps

Nitrification, flocculation filtration
- Brief description

The biologically treated waste water enters an intermediate pumping station from where it is pumped to the two-line clear water nitrification system.

Phosphate precipitation is accomplished in a rapid mixing tank by ferric chloride addition. Adding polyelectrolyte to the mixing tank effluent ensures optimum conditioning for subsequent flocculation filtration.

In the downflow filters, the precipitated phosphate and the flocculated solids are removed. The filters are periodically backwashed to remove the separated solids from the filter bed.

The filter backwash effluent is returned to the waste water treatment plant.

The waste water feed to the filters, frequency, duration and type of backwash cycles are automatically controlled as a function of the influent pollutant load.

The treated effluent is discharged to the receiving water via a discharge channel. The effluent quality is continuously monitored by an automated analyser station.

3. Characteristic plant data

- 2 Nitrification tanks

Volume	2,600 m ³ /tank
Aeration system:	diffuser grid
Max. influent rate	13,500 m ³ /h

Agitators, O₂ control, foamed plastics cubes for attached biological growth
- Rapid mixing tank

Volume	approx. 140 m ³
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Chemicals and flocculant dosing stations, agitator
- 24 flocculation filters

Filter area	37.5 m ² /filter
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open, submerged dual-media filters
- Backwash water tank

Volume	120 m ³
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- Backwash effluent tank

Volume	330 m ³
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4. Operating experience

The plant has demonstrated excellent process stability and has a sufficient reserve to handle adverse conditions. The dual-media flocculation filters built by Lurgi Bamag consistently achieve the excellent treated effluent criteria listed above. All guaranteed data for the different load cases are met reliably.