Inlet structure

Problem: Deposits in the inlet structure due to non-uniform inflow.
Solution: An adaptation of the building geometry results in a uniform inflow.
With CFD-Simulation: Enhancement of the inflow by 20 %.

Bar screens

Problem: The assignment of the bar screens is different. This results in deposits due to non-uniform inflow and in increased maintenance effort.
Solution: An adjustment of the building geometry leads to a uniform inflow of the bar screens. In this way, dead zones and/or underruns of the minimum speed are avoided.
With CFD-Simulation: Enhancement of the distribution by 60 %.

Grit channel

Problem: Due to unfavorable flow velocities (retention times), too much organic matter remains in the sand. Sand deposits in the biology or in the digester occur.
Solution: Optimisation of the air entry as well as of the building geometry in the grit channel.
With CFD-Simulation: Increasing the deposition rate by an average of 200 % and reduction of the energy consumption approximately 60 %.

Primary sedimentation

Problem: The deposition rate of organic substances in the primary sedimentation is too low and results in an overloaded biology.
Solution: Increasing the deposition rate by using flow optimisation.
With CFD-Simulation: Increase of the deposition rate by 30 % and more primary sludge for higher energy yields.

Aeration

Problem: Unfavourable oxygen transfer (SSOTR) due to a negative interaction of the flow and ventilation. Short circuit flows.
Solution: Examination of the arrangement of the aerators, agitators as well as the influent and effluent.
With CFD-Simulation: Increase of the aeration efficiency by an average rate of 20 %.

Final sedimentation

Problem: Increased effluent values. Hydraulic limitation of the treatment plant. Unfavourable flow conditions.
Solution: Height-variable inlet construction or pure conventional flow-optimised conversion.
With CFD-Simulation: Increase of the efficiency of sludge volume feeding and retention of fine particles.

Ozone reactor

Problem: Design of the required reactor volume. The turnover rate is a function of the concentration and the reaction time.
Solution: Calculation of the turnover rates taking into account the flow and concentration ratios. Optimisation of the reactor geometry through guide walls.
With CFD-Simulation: Decrease of the reactor volume by 70 %.

Sludge treatment

Problem: Low gas yield/deposits. Poor mixing. Low flow velocities.
Solution: Flow optimisation by using other mixing units.
With CFD-Simulation: Increase of the active volume of the digester by 30 % and prevention of deposits.

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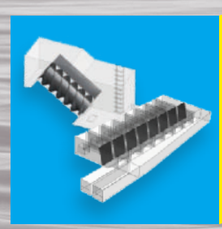
Optimisation potential around your treatment plant with CFD of hydrograv

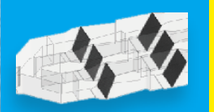
Measurement. Simulation. Assessment. Solution.

1. Inlet structure



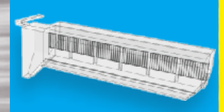
20%
Enhancement
of the inflow

2. Bar screens



60%
Enhancement
of the distribution

3. Grit channels



200%
more
sand removal

4. Primary sedimentation

30%
more
sludge separation

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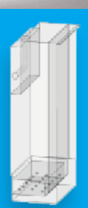
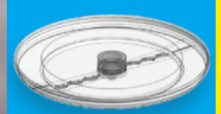
Obtained optimisation potential from practice
around the wastewater treatment plants of our customers
with CFD-Simulations by hydrograv



70%
Decrease
of the volume



40%
Increase of the
continuous feeding

20%
Increase of the oxygen
transfer efficiency

7. Ozone reactor

30%
Increase of the
mixing

8. Sludge
treatment

6. Final sedimentation

5. Aeration