



## 2-Street Biological Wastewater Treatment Plant (SBR-Principle) of Town **Kozlodui** (Bulgaria)



SB-reactor 1 of wastewater treatment plant Kozlodui during fill-up-phase

- **Connection load:** 15,000 population equivalents  
(1<sup>st</sup> stage of extension)
- **Sewer system:** combined system
- **Process target:**

BOD <sub>5</sub>	<	25.0 mg/l
COD	<	125.0 mg/l
N <sub>total</sub>	<	15.0 mg/l
P <sub>total</sub>	<	2.0 mg/l
TSS <sub>total</sub>	<	35.0 mg/l
- **Pre-treatment of wastewater:** compact pre-treatment station consisting of fine screen, aerated, "Cylindrical grit separator", grease trap and screw press
- **Aeration technology:** HyperClassic<sup>®</sup>-mixing and aeration systems
- **Sludge-treatment:** two aerobic sludge reactors with disc membrane aerators
- **Sludge-dewatering:** high performance centrifuge with SIMP-Drive and addition of polymer
- **Features:** Doubling of the inlet quantity in the second extension phase, sand separation with patented "Cylindrical grit separator", simultaneous precipitation of phosphorus by use of a FeCl<sub>3</sub>-solution
- **First start-up (bio-stage):** 2014
- **Second start-up (sludge stage):** 2014
- **Final acceptance test:** 2014
- **Wastewater quantities:**

3,564 m <sup>3</sup> /d (dry weather)
375 m <sup>3</sup> /h (rainy weather)
- **Operation results:**

BOD <sub>5</sub>	<	12,0 mg/l
COD	<	69,0 mg/l
N <sub>total</sub>	<	9,0 mg/l
P <sub>total</sub>	<	1,0 mg/l
TSS <sub>total</sub>	<	10,0 mg/l
- **Process-strategy of biological treatment stage:** low load active sludge plant as 2-street SBR-WWTP, design according to M 210, including nitrification, denitrification and simultaneous, partial stabilization of the active sludge
- **Control-concept:** fully automatic operation with Siemens- SPS, SCADA-central control as well as remote maintenance



By using a compact pre-treatment station the wastewater is fully automatically cleaned from fine solids, sand and fat with a minimum of space requirement.



Current process data are locally readable as well as at each control instruments.



The aeration of the incoming wastewater is performed intermittently with rest periods, in which the wastewater is only slightly mixed.



Excess sludge will be stabilized by membrane aeration within a sludge storage tank, before it is fed to the sludge dewatering.



Reactor 1 during the aeration phase: Two vertical stirrers, type "HyperClassic®" are responsible for a sufficient mixing capacity with a bottom flow velocity of > 30 cm/s, but also as aerator. After a rest period, clear water is discharged by lowering of the BSK®-decanter.



High-capacity rotary piston blowers provide a sufficient air input into the wastewater.



The excess sludge is dewatered by a high-performance centrifuge and with adding of polymers to a DS-concentration of up to 25 %.