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Biological Wastewater Treatment

ZAB Leuna / Germany

Bamag Deep Tank Bioreactor

The central wastewater treatment plant at Leuna Werke AG is designed for the combined treatment of refinery production effluents and sewage from the municipality of Leuna, Germany.

The (Lurgi) Bamag deep tank bioreactor employed not only features compact design and optimum treatment economics but at the same time ensures consistent compliance with the guaranteed treatment criteria, making a significant contribution to water pollution control.

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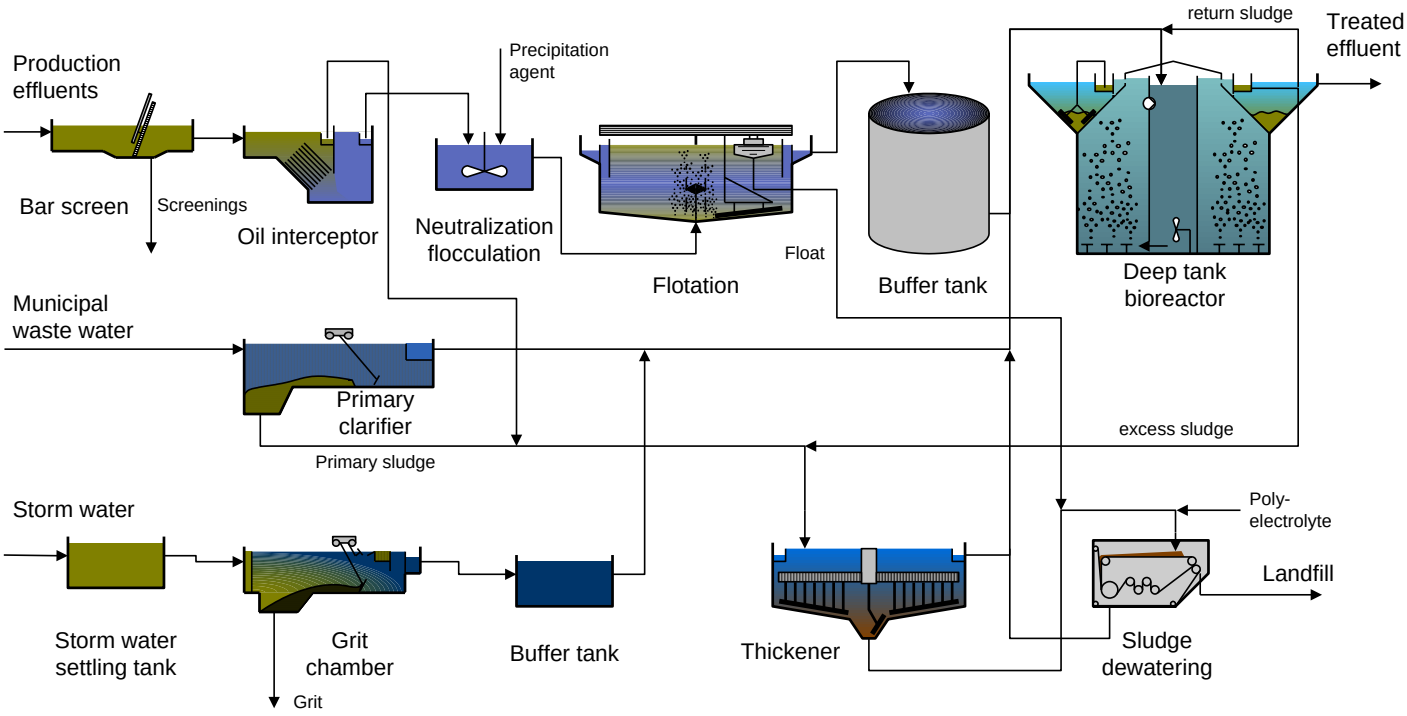

1. Objective

Treatment of industrial and municipal wastewater

- Design data

Throughput	19,000 m³/d
BOD_5 load	7,000 kg/d
COD load	16,000 kg/d
Total N	3,000 kg/d
Total P	150 kg/d
Suspended solids	400 kg/d
Hydrocarbons	600 kg/d
pH	6.0 - 8.0

- Treatment criteria

BOD_5	≤ 10 mg/l
COD	≤ 150 mg/l
Suspended solids	≤ 10 mg/l
Hydrocarbons	≤ 0.1 mg/l

pH values in the neutral range

2. Plant concept

- Process steps

Mechanical and chemical/physical pre-treatment, flotation, modified Bamag deep tank bioreactor with integrated nitrification, denitrification and secondary clarification, sludge dewatering and conditioning, exhaust air cleanup

- Brief description

The municipal waste water is fed via a separate pre-treatment route to the Bamag deep tank bioreactor stage consisting of two identical, parallel-operated aeration tanks with external nitrification and internal denitrification zones.

The refinery production effluents are processed through coarse and fine bar screens, an oil interceptor, mixing, neutralisation, flotation and buffer tanks before being admitted to the Bamag deep tank bioreactor for biodegradation of their organic pollutant load.

In the downstream secondary clarifier built compact in the form of a concentric ring space around the deep tank bioreactor, the activated sludge is settled and drawn off by means of suction scrapers.

The waste activated sludge is thickened, dewatered on belt filter presses and subsequently conditioned with lime.

3. Characteristic plant data

- 2 aeration tanks

Volume	9,650 m³/ tank
Ø	31 m
Depth of water	15 m
Space loading:	0.8 kg BOD_5/m³·d 1.4 kg COD/m³·d 0.16 kg N/m³·d
Sludge loading:	0.16 kg BOD_5/kg·d
Aeration system:	jet aerators

Degasification

- 2 integrated secondary clarifiers

Clarification area	750 m² each

- Sludge treatment

Thickener

Belt filter press

CaO conditioning

4. Operating experience

The central waste water treatment plant at Leuna Werke AG achieved the guaranteed effluent discharge criteria after a short running-in period and has been operating without any troubles ever since successful acceptance testing.