Biological Waste Water Treatment

Antibioticos / Spain

Bamag Deep Tank biological treatment for waste water of the pharmaceutics industry

In its plant in the north of Spain, Antibioticos S. A. company manufactures mainly penicillin and derivative substances of this product. The highly contaminated effluents arising from the production processes could not be cleaned under stable operating conditions in the originally installed anaerobic treatment unit. The reason for that was strong fluctuations of the effluents composition. The Deep Tank bio treatment plant built by Bamag . Since then reliable and efficient treatment of the waste water has been achieved, allowing to maintain the effluent specification at all time. The dimensioning parameter have been based on the results from a pilot plant operating by Bamag.

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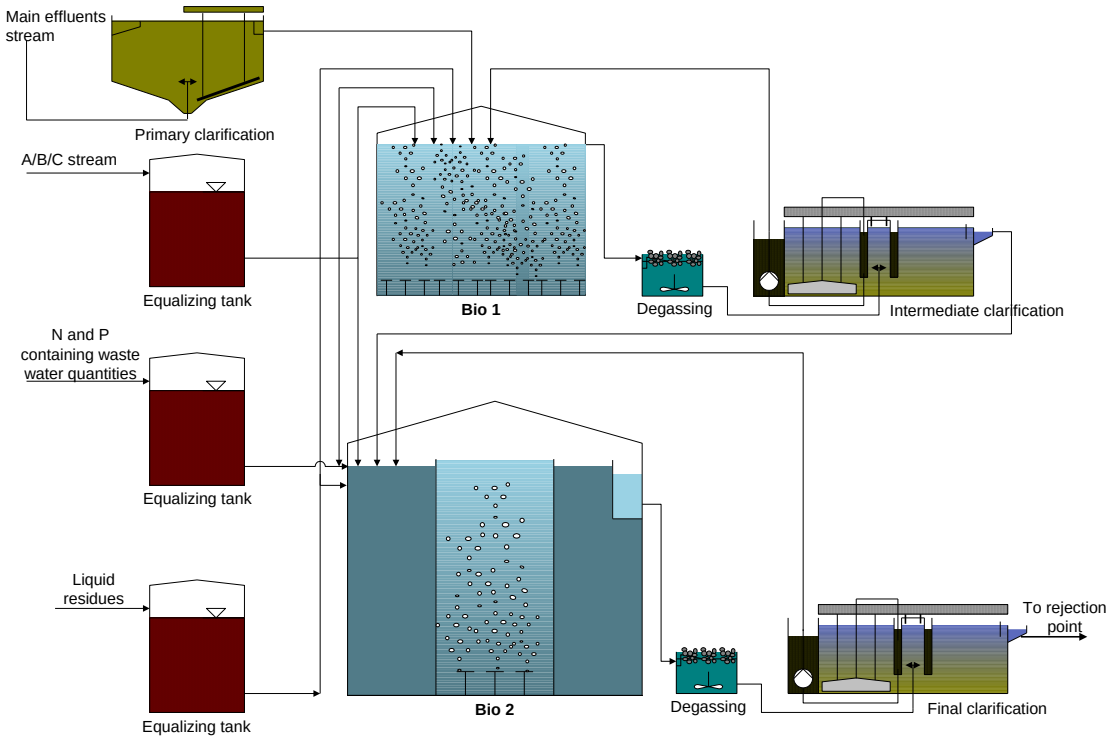

1. Objective

Industrial waste water treatment

- Design data

Biotreater load after primary clarification

Effluent	8.600 m³/d
Wash water	600 m³/d
COD-load	60.500 kg/d

Inlet concentration values on non settled effluent

COD	6.580 mg/l
BOD_5	4.300 mg/l
TKN	325 mg/l
Ammonium N	150 mg/l
Phosphorus	20 mg/l
Suspended solids	300 mg/l

Treatment criteria

COD	≤ 900 mg/l
BOD_5	≤ 150 mg/l
TKN	≤ 60 mg/l
Ammonium N	≤ 25 mg/l
Phosphorus	≤ 8 mg/l

2. Process treatment scheme

- Treatment steps

Primary clarification, 2 step Bamag Deep Tank biotreaters with nitrification and denitrification, phosphates precipitation, degassing, final clarification, sludge thickening and dewatering, incineration

- Short description

The continuously arising effluents of the production plant are collected in the sewerage system and directed to the WWTP. This stream is first directed to the primary clarification where an important amount of suspended solids is separated and then pumped to the first biological treatment step.

Other waste water quantities with very variable contaminating and hydraulic loads are stored in three equalizing tanks and distributed over both biological treatment steps in view of a dilution of inhibiting substances.

Both biotreaters are made of steel. The abatement of the easily degradable organic contaminants takes place in the first step, whereas the remaining contaminants, some of them with low property towards degradation, are eliminated in the second step where the residence time is longer and the mass loading lower. The second biotreater consists of a peripheral denitrification and central nitrification zone. Phosphorus compounds are elimi-nated with alum sulphate addition and precipitation.

The mixed liquor at the outlet of each biotreater flows through degassing facilities, specially developed by Bamag, where the over saturation dissolved gas volumes will be released. The biomass settles then in the intermediate as well as in the final clarifiers. Both clarifiers are equipped with suction scrapers which perform the necessary RAS withdrawal.

The surplus sludge of the first treatment step is directed to the second biotreater whereas the final surplus sludge stream is withdrawn from the second treatment step, thickened, dewatered by means of belt filter presses, temporarily stored in a silo and subsequently incinerated.

3. Characteristic plant data

- Biological treatment step 1

Volume	6.300 m³
Ø	23 m
Water depth	15 m
Space loading	5 kg COD/(m³·d)
Mass loading	0,8 kg COD/(kg·d)

- Degassing tank
- Intermediate clarifier

Ø	33 m
Clarifying area	855 m²
Rise rate	0,4 m/h

- Biological treatment step 2

Volume	16.000 m³
Ø	37 m
Water depth	15 m
Space loading	2 kg COD/(m³·d)
Mass loading	0,2 kgCOD/(kg·d)

- Degassing tank
- Final clarifier

Ø	33 m
Clarifying area	855 m²
Rise rate	0,5 m/h

- Sludge handling

Sludge thickener
Belt filter press

4. Operating experience

The plant achieves an outstanding cleaning performance with a COD degradation grade exceeding 90 % and nitrogen elimination above 90 %. The effluent quality reliably meets the requirements or is lying beyond of them.

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