

Biological Wastewater Treatment

Taiwan Prosperity Chemical Corp.

Bamag Deep-Tank
Bioreactor



Taiwan Prosperity Chemical Corporation treats its phenol production effluents in an in-plant biological wastewater treatment system. To provide maximum operating flexibility, the wastewater treatment system is built in two lines which can be operated either in parallel or in series.

The selected Bamag deep-tank bioreactor technology features minimum floor area requirements and good treatment economics while consistently complying with the guaranteed treated effluent criteria, thus making a significant contribution to surface water protection.

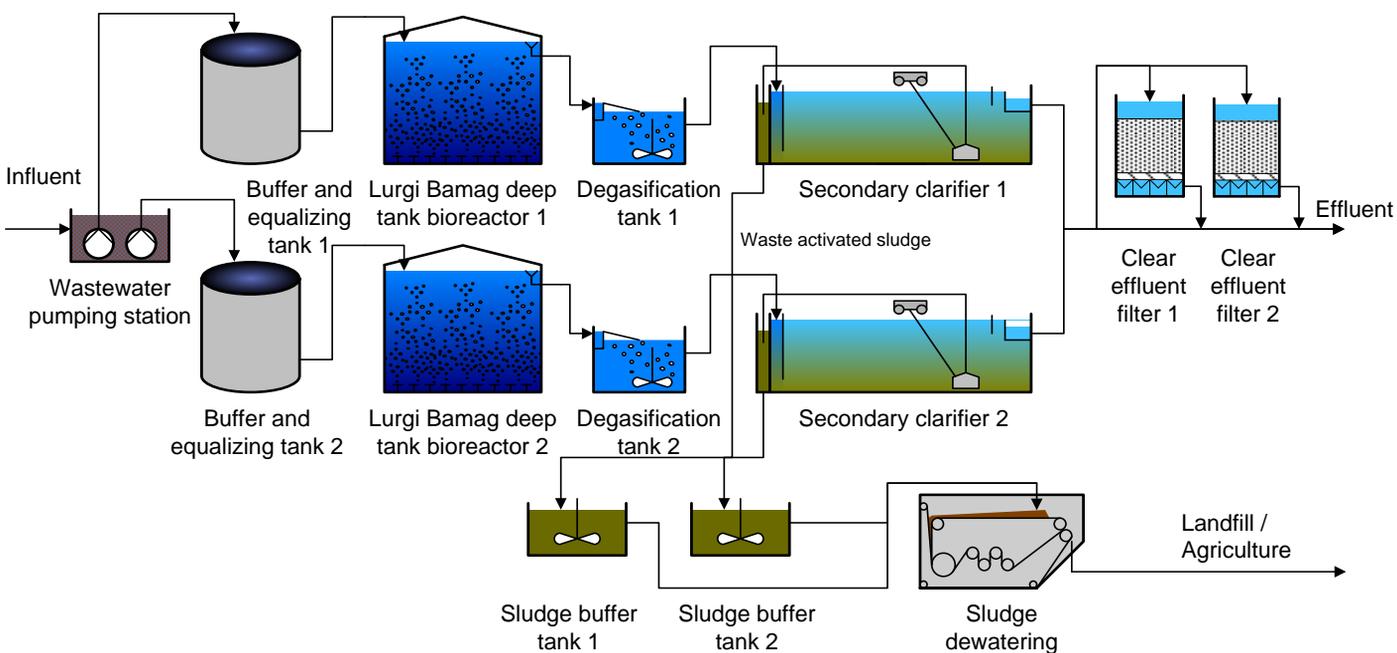


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1. Objective

Industrial wastewater treatment

- Design data

Throughput	3.000 m ³ /d
BOD ₅ load	≥ 2.500 mg/l
COD load	≥ 3.700 mg/l
Phenol	≥ 90 mg/l
Suspended solids	≥ 50 mg/l
pH	8.0 - 9.0
Temperature	≥ 35 °C

- Treatment criteria

BOD ₅	≤ 20 mg/l
COD	≤ 100 mg/l
Phenol	≤ 1 mg/l
Filterable solids	≤ 30 mg/l
pH	7.5
Temperature	≤ 27 °C

2. Plant concept

- Process steps

Buffering and equalisation, Lurgi Bamag deep-tank bioreactor, degasification, secondary clarification, clear effluent filtration, sludge dewatering

- Brief description

After having passed through a CPI, the diverse phenol production effluents differing greatly in their characteristics are directed to two buffer and equalising tanks to level out fluctuations in flow and composition.

Further treatment is accomplished in a Lurgi Bamag deep-tank bioreactor consisting of two identical, series-connected aeration tanks.

The bioreactor effluent is subjected to degasification and then routed to two rectangular, cross-flow secondary clarifiers where the waste activated sludge is settled and removed by suction scrapers. The discharging clear effluent is virtually free from solids and can be processed through an additional clear effluent filter, if required. A pre-dewatering drum and belt press dewater the waste activated sludge to a dry solids concentration making it suitable for landfarming.

3. Characteristic plant data

- 2 buffer tanks
Volume 3,600/3,000 m³
with propeller mixers and aeration system
- 2 Lurgi Bamag deep-tank bioreactors
Volume 3,000 m³/tank
Ø 16 m
Depth of water 15 m
Space loading 0.8 kg BOD₅/m³·d
1.4 kg COD/m³·d
Sludge loading 0.16 kg BOD₅/kg·d
Aeration system jet aerators
Degasification
- 2 rectangular secondary clarifiers
Depth of water 4 m
Clarification area 184 m²/tank
Surface flow rate < 0.5 m/h
- Sludge treatment
2 sludge buffer tanks
Pre-dewatering drum
Belt press

4. Operating experience

Despite the complex waste water composition, the plant reached full capacity after a short start-up phase and has been operating trouble-free ever since.