

3. DeAmmon® efficient denitrification system based on MBBR process

Anaerobic ammonia oxidation refers to the process in which anaerobic ammonia oxidizing bacteria use NO_2^- -N as an electron acceptor to directly oxidize NH_4^+ -N into N_2 under anaerobic conditions. This process is catalyzed by the specialized anaerobic autotrophic bacteria of anaerobic ammonia oxidizing bacteria (AnAOB).

No.	project name	Capacity	Location
1	Hattingen wastewater treatment plant, Germany	200 kgN/d	Germany
2	Himmerfjärden sewage treatment plant, Sweden	480 kgN/d	Sweden
3	Bekkelaget wastewater treatment plant in Oslo, Norway	1000 kgN/d	Norway



Hattingen wastewater treatment plant, Germany

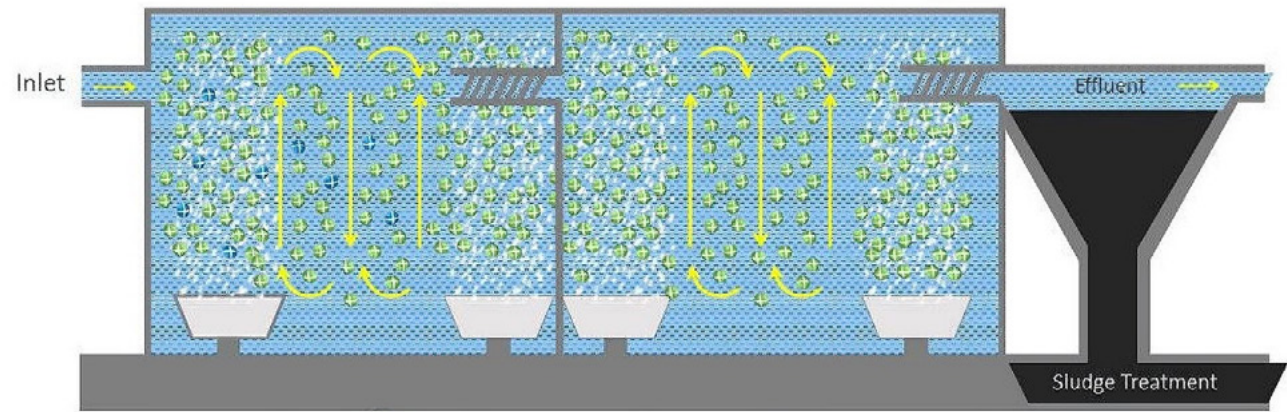


Himmerfjärden sewage treatment plant, Sweden

PURAC MBBR expansion and upgrading process

MBBR (Moving Bed Biofilm Reactor) is an ideal solution for municipal and industrial wastewater treatment. It can minimize the construction investment required for upgrading and reconstruction, improve treatment capacity without increasing the floor area, and can be widely adapted to the treatment requirements of water quality and seasonal changes. For the system upgraded by the MBBR process, the loads of BOD and TN can be increased by 40-45%.

PURAC focuses on combining MBBR technology with integrated fixed-film activated sludge (IFAS) technology or anaerobic ammonium oxidation (DeAmmon) technology to carry out the upgrading treatment of wastewater treatment plants.



Technical Features

- High flexibility, can be designed as an IFAS system or DeAmmon system based on MBBR.
- In situ upgrading enhances the capacity or water quality of sewage treatment plants, with simple and convenient upgrading and low investment cost.
- Easy to hang film, fast startup and recovery.
- Biological fillers have a large specific surface area, so that has a high biological load and save land area.
- High microbial concentration makes it more adaptable to changes in water quantity and quality, and has strong resistance to shock loads.
- The patented design of new fillers and proprietary filler cleaning system ensure that there will be no microbial blockage.
- Widely used in the upgrading of municipal sewage, with significant denitrification effect. Nitrification and denitrification can use the same filler, and existing structures can be reused, making the upgrading convenient and the operation flexible.



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Core components

Suspended fillers

- ◇ Durable and sturdy structure, no need for replacement caused by damage.
- ◇ Large specific surface area and strong capability.
- ◇ The open structure ensures high oxygen transfer efficiency, low possibility of blockage, and high mass transfer efficiency.



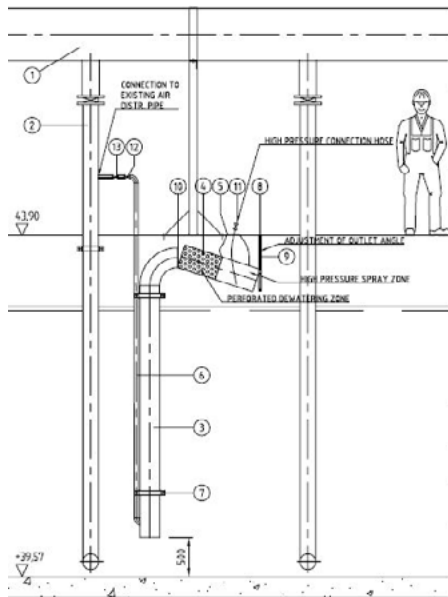
Bottom aeration system and effluent screen

- ◇ Each project is designed separately, with uniform aeration effect.
- ◇ Easy to install, maintenance free.
- ◇ No blockage, maintenance free.



Filler cleaning system

- ◇ The patented gas lift system is used for continuous cleaning of fillers.
- ◇ Equipped with imported high-pressure cleaning pumps and cleaning nozzles to ensure trouble free operation of the cleaning system.



Application area

1. Replacing anaerobic system as aerobic pretreatment for high concentration industrial wastewater

- ◇ Organic matters degrade more thorough.
- ◇ No odor and safety concerns generated by anaerobic system.
- ◇ Fast startup and flexible operation.
- ◇ Widely used in industrial fields such as pulp and paper, food and brewage, and biological fermentation.

No.	project name	Capacity	Location
1	Kostzryn copperplate paper wastewater treatment project, Poland	16000m³/d	Poland
2	Kavrasveden mechanical wood pulp wastewater treatment project, Sweden	16000m³/d	Sweden
3	Varo Bruk pulp mill bleached kraft pulp wastewater treatment project, Sweden	27000m³/d	Sweden
4	Stenal pulp mill bleached kraft pulp wastewater treatment project, Germany	40000m³/d	Germany
5	Union paper wastewater treatment plant, Malaysia	6000m³/d	Malaysia



Stenal Pulp Mill, Germany



Stora Enso Fors AB Pulp Mill, Sweden

2. Utilizing the denitrification of MBBR for wastewater upgrading

Based on the existing facilities of sewage treatment plants, adding MBBR can reduce the hydraulic load, organic load, and total nitrogen load of municipal sewage, especially suitable for upgrading and expanding of sewage plants. Upgrade the traditional activated sludge process to an IFAS system (Integrated Fixed Film Activated Sludge) to meet the requirements of new standards and treatment capacity.

No.	project name	Capacity	Location
1	Sjolonda Sewage Treatment Plant Upgrading Project in Malmo, Sweden	380000m³/d	Sweden
2	Sjöviksverket WWTP, Trelleborg Expansion Project, Sweden	12000m³/d	Sweden
3	Stockholm WWTP Upgrading Project, Sweden	860,000m³/d	Sweden



Sjolonda Sewage Treatment Plant Upgrading Project in Malmo, Sweden

