



# AMBR

ADVANCED MEMBRANE  
BIOREACTOR TECHNOLOGY



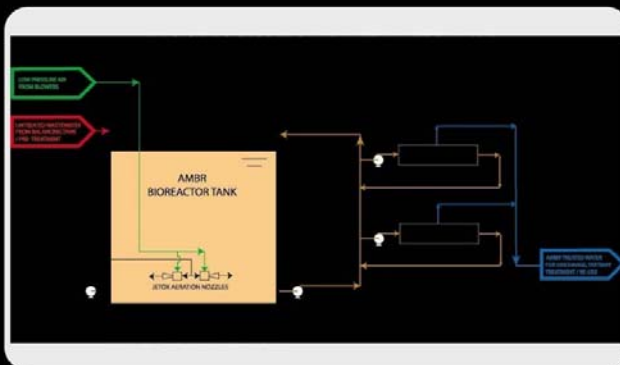
HIGH QUALITY  
WASTEWATER TREATMENT  
WITH LOW SURPLUS  
SLUDGE PRODUCTION

# Advanced Membrane Bioreactor Technology



## THE AMBR PROCESS

- AMBR™ is an aerobic wastewater treatment solution, combining jet aeration with membrane bioreactor technology.
- The basic process is an intensive activated sludge system with high biomass concentrations which enables a compact installation with high organic carbon removal and low surplus sludge yields.
- The separation of biomass from the treated effluent is achieved by a 'cross flow' ultrafiltration membrane system, thus producing very high quality effluent suitable for reclamation or potable reuse in combination with post treatment by reverse osmosis/disinfection (e.g. UV, ozonation, chlorination).
- Aeration and mixing is provided by the JETOX™ system which delivers high oxygen mass transfer rates with easily accessible and low maintenance equipment.
- Option for unique use of the pressurised biomass return stream from the membrane separation system to provide the liquid motive for the JETOX™ aeration and mixing system.



## THE ADVANTAGES OF AMBR

- Low surplus sludge production compared to conventional aerobic processes due to uncoupling of the hydraulic and solids retention times.
- High biomass population significantly reduces bioreactor volumes and ensures a robust and reliable process.
- UF membrane separation eliminates the limitations and process problems (e.g. bulking etc.) associated with conventional activated sludge settlement.
- High quality, suspended solids free, treated effluent, requiring no further pre-treatment before tertiary membrane treatment and/or disinfection for potable water.
- Separate control of air (oxygen) injection and reactor mixing functions, results in significantly reduced power use for processes with high fluctuations in reactor feed load. This also allows system to be configured for nitrification /denitrification duty.
- Sub-surface aeration and 'closed' a separation loop reduces aerosols/VOC emissions to atmosphere.
- Deep tank capability with very low air blower pressures, further reduces treatment plant 'footprint' requirements.
- Intractable (or 'Hard') COD is removed more easily compared to conventional aerobic processes, especially under thermophilic conditions.
- Capability to upgrade existing overloaded activated sludge systems.
- Can be configured for fully automatic operation, requiring minimal operator input.



Biomass separation using crossflow ultrafiltration modules.



AMBR Post Treatment by Reverse Osmosis and Ultra-violet Disinfection

## USES OF TREATED WATER

- Sewer discharge (cost saving/consent compliance)
- River/Watercourse discharge (cost saving/consent compliance)
- Water reclamation/re-use:-

Vehicle washing and other 'non-potable' applications (no tertiary nanofiltration and/or RO/disinfection required)

Boiler/cooling tower feedwater

Product quality reuse (essential tertiary membrane, RO, and post-disinfection required with suitable QA/QC monitoring)



Samples showing untreated wastewater, biomass, AMBR treated water and post RO treated water.

## AMBR PROJECTS

- Process and Engineering Evaluation
- Treatability and Proving Trials
- Process Design and Basic Engineering Package
- Specialist Equipment Supply
- Turnkey Design and Build
- Upgrade of existing facilities
- Project Management

## AEROBIC PROCESSES AND SLUDGE

- Aerobic biological pre-treatment techniques remain the preferred core processes for effective 'bulk' COD/BOD removal for organic wastestreams which are unsuited to anaerobic pre-treatment techniques, or require higher quality final effluents.
- With increasing legislative and commercial pressures on waste sludge disposal priority is now being given to reducing the production of sludge at source.
- Disposal or handling of waste primary and secondary sludge now usually constitutes the single major operating cost for aerobic wastewater treatment plants.
- High waste sludge volumes may also necessitate high capital expenditure on dewatering equipment or secondary digestion processes to reduce off-site disposal costs.
- Some industrial sludges contain unacceptable levels of toxic or recalcitrant constituents for which disposal can be difficult or expensive.

AMBR enables enhanced management of bioreactor F/M ratios and sludge age resulting in improved control and reduction of waste sludge yields.

## AMBR PILOT PLANT



- Mobile pilot plant for on-site treatability and proving trials
- Raw effluent COD concentrations from 1,000 to > 50,000 mg/l
- Blower assisted or 'self-entraining' aeration options
- Mesophilic and thermophilic MBR operation
- Process monitoring instrumentation (dissolved O<sub>2</sub>, pH, temperature)
- Investigation of effluents with recalcitrant ('hard') COD - i.e. using high sludge ages, specialised microbiology and/or supplementary oxidation/chemical treatment
- Plant operation and Laboratory service available in conjunction with Aquabio Limited



## Activities

- Wastewater
- Contaminated Groundwater
- Process Water
- Water
- Sludge
- Air

## Capabilities

- Process and engineering evaluation
- Process design and basic engineering
- Turnkey design and build
- Specialist equipment supply for the industrial and public sectors

## Customer Commitment

- Quality Partnership
- Health and Safety
- Training



Aquabio Limited

Water, Wastewater & Air Treatment  
Design, Process & Project Management

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