MEMBRANE AERATED BIOFILM REACTOR

MABR Technology for Efficient Biological Nutrient Removal
Wastewater Treatment for Every Need at Any Scale

fluence

How it Works

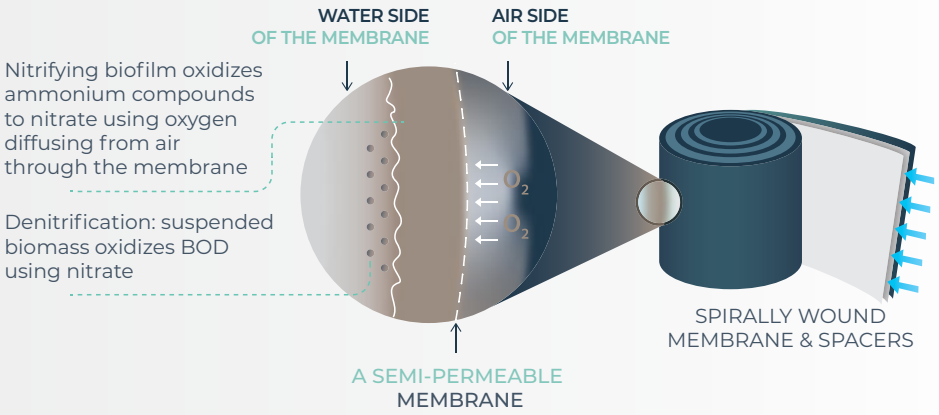
Fluence's MABR is a patented, validated technology for treating municipal wastewater and industrial wastewater containing ammonia. Fluence's MABR is a spirally-wound self-respiring membrane that supports the formation of an aerobic biofilm in an anoxic environment, resulting in simultaneous nitrification and denitrification.

The semi-permeable membrane is submerged into the wastewater tank while low pressure air is blown through the air side of the membrane.

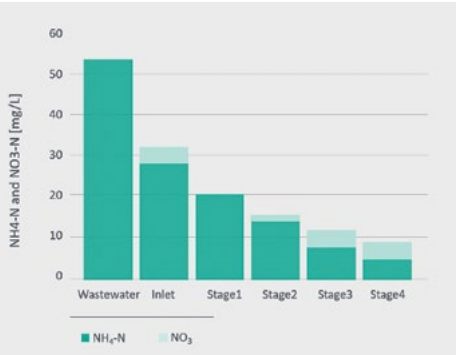
Oxygen constantly passively diffuses to the fixed nitrifying biofilm that develops on the wastewater side of the membrane while denitrification occurs in the anoxic bulk liquid.

The low pressure, passive aeration offers significant energy savings over conventional, high pressure aeration. The unique MABR process provides highly efficient biological nutrient removal which results in operational savings and minimal footprint requirements.

Simultaneous Nitrification and Denitrification



MABR Multi-Stage



Nitrification is staged and measurable along the reactor. Anoxic conditions in the mixed liquor enable denitrification.

Up to 90% biological phosphorus removal in one pass process, correlating to the ORP levels.

- Very low total nitrogen (TN) effluent is achieved with simultaneous nitrification and denitrification
- Up to 50% less energy required for aeration compared to conventional treatment
- Fixed film treatment ensures stable and reliable effluent quality
- Operating cost up to 50% lower than with conventional treatment

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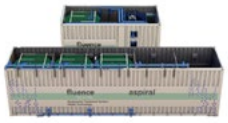
MABR

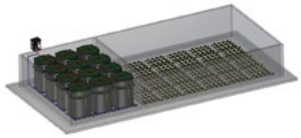
Towers
Integrate MABR in existing solutions

Aspiral™ Flex
Containerized units

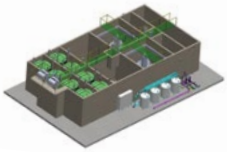


Aspiral™ Flex Plant
End-to-end wastewater solution

SUBRE Retrofit
WWTP retrofit and expansion



SUBRE Greenfield
New WWTP

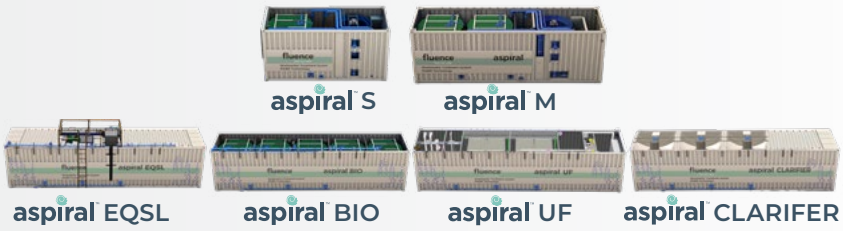


Nitro
Shortcut nitrogen removal

aspiral™ flex

Containerized Wastewater Treatment Units

- Treats 5-800 m^3/d (1.3k-200k GPD) of municipal wastewater in a 20 ft or 40 ft container
- The units can be combined with one another to create a full plant or they can be integrated into your existing wastewater treatment design



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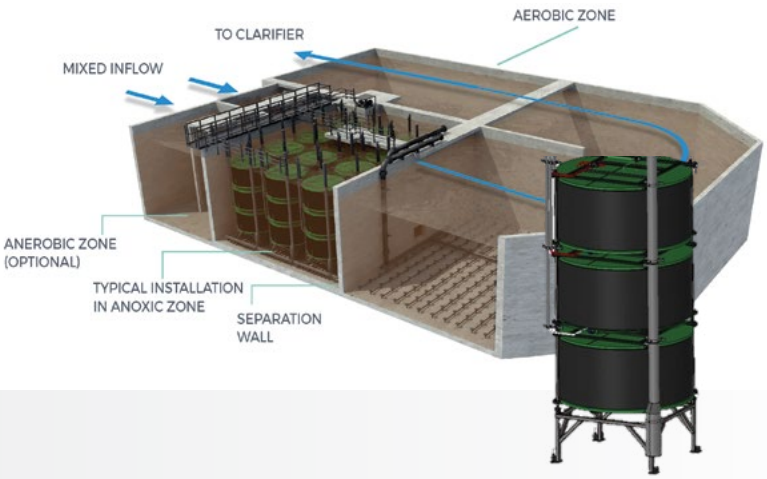
Retrofits, Expansions, and Greenfield Wastewater Treatment Plants

- Stable, high biological nutrient removal despite seasonal changes
- Capacity ranging from 0.5-25 MGD (2,000-100,000 m^3/d)
- Low Opex
- Retrofits use existing anoxic basin and aeration system, so no added footprint
- One-pass treatment - no need for nitrate circulation
- Fast and easy installation with immediate results

Typical SURBE Installation Configuration



Nitro

Shortcut Nitrogen Removal for High-Strength Wastewater

- More than 90% TIN removal can be achieved. Eliminates up to 20% of total nitrogen load to the plant.
- Uses 40% less energy than conventional nitrogen removal processes
- Non-invasive installation, one-pass, low maintenance, and simple-to-operate

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Examples of Installations

Jamaica, Couples Resort
30,000 GPD (110 m³/d)

- Aspiral™ M1+ for resort
- BOO service model

Cambodia, Xwater
5M GPD (20,000 m³/d)

- SUBRE greenfield plant with 90 three-tier MABR stacks
- First biological treatment plant in Cambodia

China, ITEST
53,000 GPD (200 m³/d)

- Highway service area wastewater treatment
- High loads of nitrogen in the influent
- Minimal odor and noise

Jamaica, Colbeck
680,000 GPD (2,580 m³/d)

- SUBRE greenfield plant based on MABR process
- Low energy consumption and footprint

Israel, Ma'ayan Zvi
2.7 MGD (10,500 m³/d)

- Upgrade municipal plant to increase the treatment capacity
- SUBRE modules installed in the anoxic zone

USA, Pilot Flying J
10,000 GPD (38 m³/d)

- Aspiral™ M1 for truck stop
- Insulated unit
- Treats highly concentrated influent so it can be safely discharged into the environment

USA, Dow City
30,000 GPD (110 m³/d)

- Lagoon retrofit/polishing
- Improved TN removal in existing solution

China, Siping
317,000 GPD (1,200 m³/d)

- Local low temperature, -20°C in winter
- 6 Aspiral™ Bio systems

Global Fluence MABR Installation Map

Over 300 MABR installations all over the world

ABOUT FLUENCE

Fluence is a leader in the decentralized water, wastewater and reuse treatment markets, setting the industry pace with its Smart Products Solutions, including Aspiral™, NIROBOX™ and SUBRE. Fluence offers an integrated range of services across the complete water cycle, from early stage evaluation, through design and delivery to ongoing support and optimization of water related assets, as well as Build Own Operate Transfer (BOOT) and other project finance solutions. With established operations in North America, South America, the Middle East, Europe and China, Fluence has experience enabling businesses and communities worldwide to maximize their water resources.

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