SUBRE

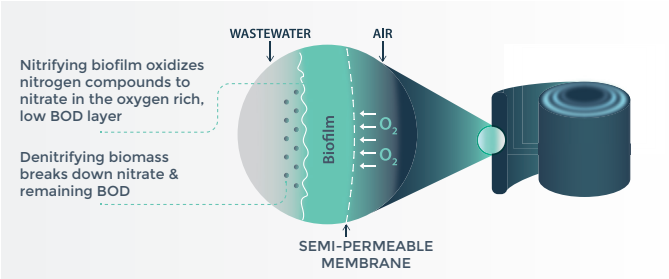
SUBMERGED MABR SOLUTION

Upgrade to conventional WWTP for enhanced nutrient removal

Increases capacity within the existing plant footprint

SUBRE is a highly efficient, cost effective upgrade solution for existing wastewater treatment basins of conventional activated sludge (CAS) processes. SUBRE achieves excellent nutrient (TN, TP) removal even in basins that were not designed for this function, without reducing the basin's treatment capacity. SUBRE utilizes Fluence's Membrane Aerated Biofilm Reactor (MABR) technology, to increase a plant's capacity and improve effluent quality.

Fluence's MABR is an innovative, well validated technology for low-energy treatment of municipal wastewater. It uses a spirally wound, self-respiring membrane sleeve to provide aeration by diffusion for the wastewater treatment process. The spiral membrane module at the heart of the biological reactor performs simultaneous BOD, TN and TP removal, all in a single pass.



SUBRE enhances the removal of:

- Nitrogen (TN) - both ammonia and nitrate
- Phosphorous (TP / EBPR)
- BOD (through de-nitrification)

SUBRE achieves:

- Increased basin treatment capacity
- Reduced energy costs
- Reduced carbon source requirement

A SUBRE module with 1, 2 and 3 MABR Spirals

SUBRE Typical Biological Nutrients Removal Effluent (mg/l)

Ammonia	NO_3	TP	COD	TSS
<2	<8	<1	<50	<20

SUBRE Typical Enhanced Nutrient Removal Values (mg/l)

Ammonia	NO_3	TP	COD	TSS
TN <3		<0.3	<50	<10

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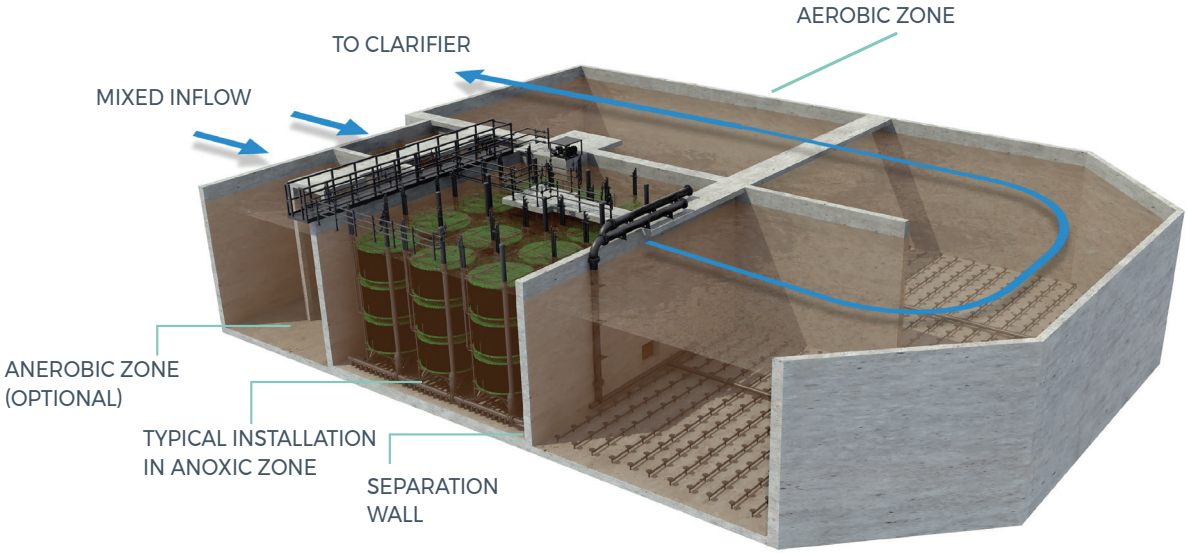
Upgrade Project Design

- Basin Sizes: 2,000 - 100,000 m^3/d (0.5 - 25 MGD)
- MABR Modules are installed inside an existing reactor (10%-30% of reactor area)
- A partition is set up between the anoxic MABR zone and the aerobic zone
- Mixed Liquor nitrate circulation is ceased
- **Retrofit is performed:**
  - Utilizing existing basins and existing aeration equipment
  - With minimal interference to plant operation (basin-by-basin)
- **Retrofit provides immediate results (2-4 weeks):**
  - Simultaneous Nitrification and De-nitrification (SND) is performed to meet effluent requirements
  - Enhanced Bio-Phosphorous Removal (EBPR) processes remove 80%-90% of phosphorous compounds
  - Decrease of 20%-30% in the WWTP's energy consumption



Features

- Typical SUBRE upgrade reduces energy consumption by 20%-30%
- Integral Enhanced Bio-Phosphorous Removal
- Simultaneous Nitrification and De-nitrification
- Increase flow rate while keeping effluent quality constant

Benefits

- Saves energy and environmental footprint
- Low chemical consumption (coagulant)
- Cancels nitrate circulation
- Simplifies operation, and reduces footprint
- Saves CapEx - eliminates need to build new basins

Scope of Supply

Design	• Process design • Equipment and components specification • MABR air piping design • MABR-related SOO • Detailed design review
Supply	• MABR modules • All internal module piping and components
Works Onsite	• Installation supervision • Process startup supervision and instruction
Documentation	• Process description • Installation instructions • Operating instructions
Guarantees and Warrantees	• Performance guarantee • Product warranty

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