



# aspiral™

## SMART PACKAGED WASTEWATER SOLUTIONS



Aspiral™ is a smart, packaged wastewater treatment solution based on the Membrane Aerated Biofilm Reactor (MABR) technology.

Fluence 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.

MABR passive aeration and single pass flow consumes significantly lower energy compared to the energy consumed by typical conventional treatment technologies.

Select the right configuration for the most suitable

solution for small- to medium- sized treatment plants 20-2,000 m<sup>3</sup>/day (5,300-530,000 GPD) serving villages, residential communities, resort hotels, commercial complexes and more. All Aspiral configurations can be remotely monitored and controlled.

The Aspiral system arrives fully equipped and checked for fast installation and start-up. It incorporates durable membrane materials with a life expectancy of over 20 years. The MABR biological treatment has no moving parts which leads to reduced maintenance. Aspiral meets the most stringent effluent regulations such as Class 1A (China) and Title 22 (US), and the effluent can be reused for agriculture and landscape irrigation with shorter implementation schedule and reduced regulatory procedure.

**A standard Aspiral system will achieve the following removal rates at the clarifier effluent:**

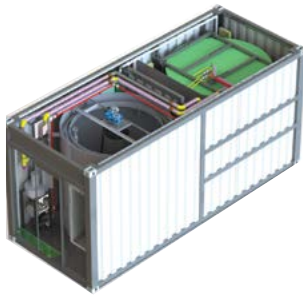
The Aspiral system can be cost-effectively designed for higher removal rates as required.

Typical energy consumption is 0.25 kWh/m<sup>3</sup> (0.001 kWh/gal) for flow rates of >500 m<sup>3</sup>/d (132,000 GPD).

Contaminant	Removal %	Typical entry value	Typical effluent value
BOD <sub>5</sub>	>96%	300 ppm	<10 ppm
COD	>88%	600 ppm	<70 ppm
NH <sub>4</sub> N	>89%	45 ppm	<5 ppm
TN	>82%	55 ppm	<10 ppm
TP	>80%	8 ppm	<1 ppm
TSS	>94%	350 ppm	<20 ppm

Value from Water

# The Aspiral Family of Solutions



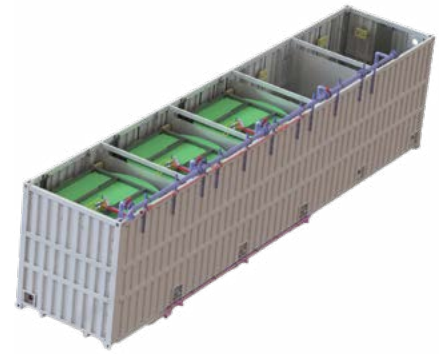
## Aspiral S1

- Treats up to 50 m<sup>3</sup>/d of raw municipal wastewater
- Includes integral pre-treatment screen and clarifier



## Aspiral M2\*

- Treats up to 115 m<sup>3</sup>/d of raw municipal wastewater
- Includes integral pre-treatment screen and clarifier



## Aspiral L3

- Treats up to 300 m<sup>3</sup>/d of raw municipal wastewater
- 40% of volume is aerated by fine bubble diffusers for residual BOD removal
- External clarifier for cost-effective multiple-reactor installations

## Aspiral Product Line

Configuration	Length **	# of MABR modules - Diameter	Capacity	People Equivalent	Integral Clarifier
Aspiral S1	20ft	1 - 220 cm Ø (86 in)	Up to 50 m <sup>3</sup> /d (13,000 GPD)	~300	✓
Aspiral M2*	30ft	2 - 220 cm Ø	Up to 115 m <sup>3</sup> /d (30,000 GPD)	~700	✓
Aspiral L2	40ft	2 - 220 cm Ø	Up to 185 m <sup>3</sup> /d (49,000 GPD)	~1100	
Aspiral L3	40ft	3 - 220 cm Ø	Up to 300 m <sup>3</sup> /d (79,000 GPD)	~1800	
Aspiral L4	40ft	4 - 220 cm Ø	Up to 350 m <sup>3</sup> /d (92,000 GPD)	~2100	
Aspiral L5	40ft	5 - 220 cm Ø	Up to 350 m <sup>3</sup> /d very low energy	~2100	

\*M2 will be launched soon.

\*\* Standard marine container high cube dimensions

## Unique Features and Benefits

### Features

Typical MABR biological energy consumption 0.25 kWh/m<sup>3</sup> (0.001 kWh/gal) >500 m<sup>3</sup>/d (132,000 GPD)

Reduced carbon source requirement

Integral Bio-Phosphorus removal

Simultaneous nitrification and de-nitrification

### Benefits

Saves on energy and environmental footprint

Low chemicals consumption (Acetic acid)

Low chemicals consumption (alum), Smaller footprint

Cancels nitrate circulation  
Simple operation  
Low energy consumption  
Smaller footprint

## Scope of Supply

Aspiral reactor arrives assembled with MABR membrane modules and internal air and water piping

### Supplied in Standard Configuration

Fully equipped reactor

Blowers skid

Air piping

Remote control software

Detailed process and hydraulic design

### Optional

Feed pump(s)

Electricity and control unit

Distribution chamber

Pre-treatment screen

Clarifier (supplied standard in S and M units)

Tertiary filter skid including secondary and tertiary water tanks

Supervision on installation and commissioning

### Site requirements - not in scope

Collection pit

Equalization tank

Earthworks

Concrete works

Interconnecting water pipes and valves

Sludge tank