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Serenambiente®

SERENACEL®

MBR membrane modules

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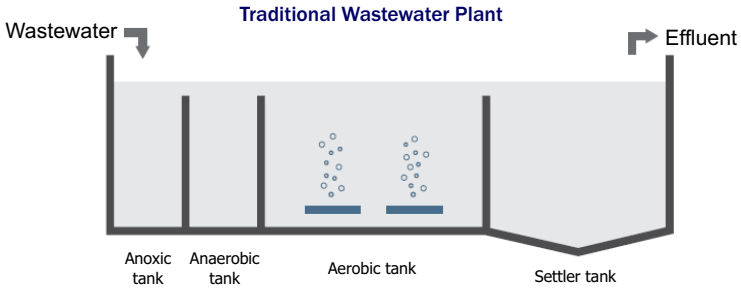
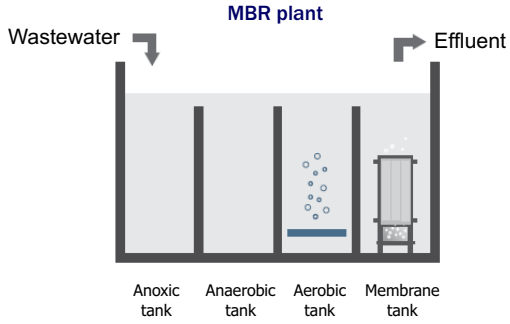
MBR PLANTS

Membrane bioreactors (MBR) are the next generation of waste water treatment process, thanks to the use of submerged membrane modules successfully replacing the conventional sedimentation tank in the activated sludge treatment process for the separation of solid/liquid (biomass/treated water) with the result of having a more compact and efficient plant.



ADVANTAGE OF THE MBR PLANTS

- No settlers (no problems of bulking and rising)
- Smaller volumes for the biologic treatment (high MLSS concentration in the tank)
- High quality of the water discharge
- Average excess sludge production lower than 25% if compared to a Traditional Active Sludge Plant



SERENACEL®

The SERENACEL module consists of a skid made up of several elements containing hollow fiber membranes STERAPORE™ 5600-5700 Series.

The Ultrafiltration membranes STERAPORE™ 5600-5700 Series are made by MITSUBISHI RAYON AQUA SOLUTIONS.

COMPONENTS

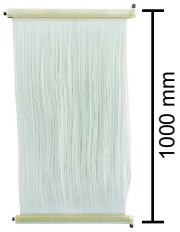
Hollow fiber membrane

The membranes are grouped in elements each of 5 or 40 m^2

Air diffusers inside module in Stainless Steel AISI304 or AISI316

Stainless steel AISI304 or AISI316 frame

STERAPORE™ 5600-5700 Series: Elements

	5600 Series	5700 Series
Membrane Material	PVDF	
Membrane Type / Pore Size	UF / 0.05 µm	
Application	MBR, Tertiary Treatment	
Membrane Surface Area	40 m^2/element	5 m^2/element
	400-2400 m^2/module	50-200 m^2/module
Flux*	up to 33 LMH	up to 40 LMH
Outer Diameter	1.65 mm	
SADm	0.11 $m^3/m^2/h$	0.27 $m^3/m^2/h$
Storage Condition	Dry	
Photo		

STERAPORE™ 5600-5700 Series: Benefits

EASY STORAGE

- Hydrophilic membrane surface under dry condition
- Easy handling and system start-up
- Stored up to 36 months

NO NEED DRAIN MEMBRANE TANK

- High permeate structure for back pulse chemical solution
- Only CIP without drain membrane tank

NO NEED BACKWASH

- Low fouling structure
- Only filtration and relaxation
- Simple system and high recovery rate

AVAILABLE INTEGRATED MBR SYSTEM

- Separated MBR System and Integrated MBR System is available
- Simple system and reduce aeration demand and RAS pump

SERENACEL MODULE SPECIFICATIONS

Model	SC-50	SC-100	SC-150	SC-200	SC-400	SC-800	SC-1200	SC-1600	SC-2400
Membrane surface [m^2]	50	100	150	200	400	800	1200	1600	2400
Number of elements	10	20	30	40	10	20	30	40	60
Lenght [mm]	675	970	1245	1520	940	1390	1870	2320	3420
Width [mm]	670	670	670	670	1525	1525	1525	1525	1525
Height [mm]	1600	1600	1630	1630	2800	2800	2800	2800	2800
Dry weight [kg]	80	110	145	175	400	600	800	1000	1550
Permeate connection	Rc 1"	Rc 1"¼	Rc 2"	Rc 2"	2 x 65A	2 x 65A	2 x 65A	2 x 65A	2 x 65A
Air connection	80A	80A	80A	80A	80A	80A	80A	80A	80A
Min. water height [mm]	1700	1700	1700	1700	3000	3000	3000	3000	3000

GENERAL FEATURES

Pore size	0,05 µm
Membrane type	hollow fiber
Max Temperature	< +40°C
pH range	5 - 9
Max content of TSS	3 - 15 g/l

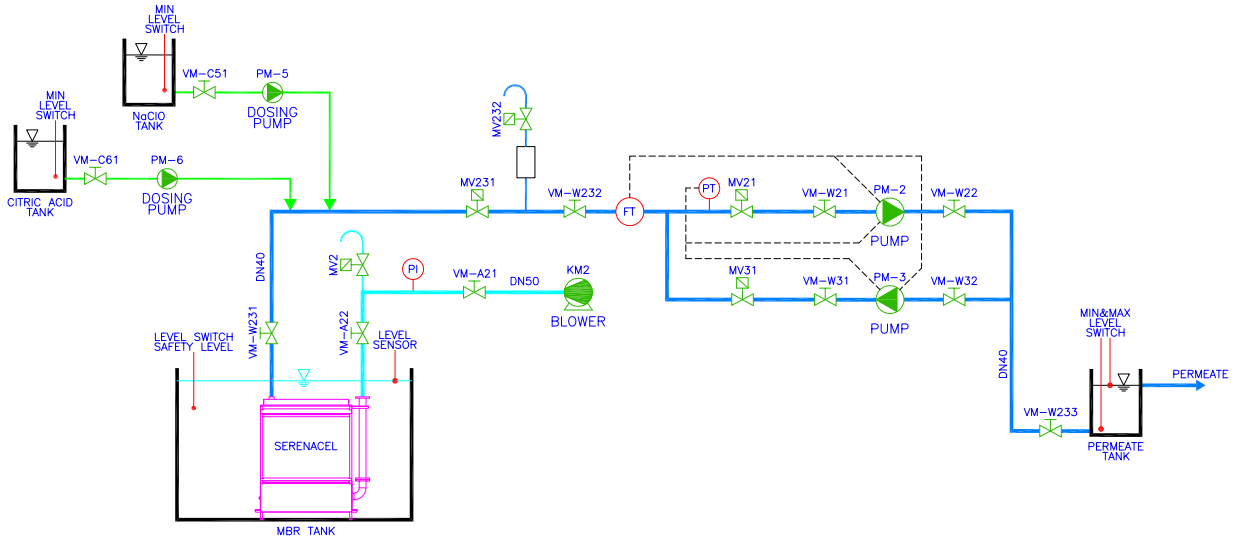
MATERIALS

Module frame	AISI 304 - 316
Elements	ABS - AISI 304
Membrane polymer	PVDF
Permeate pipe	SS / PVC
Air pipe	SS / PVC

DESIGN AND OPERATE PARAMETERS

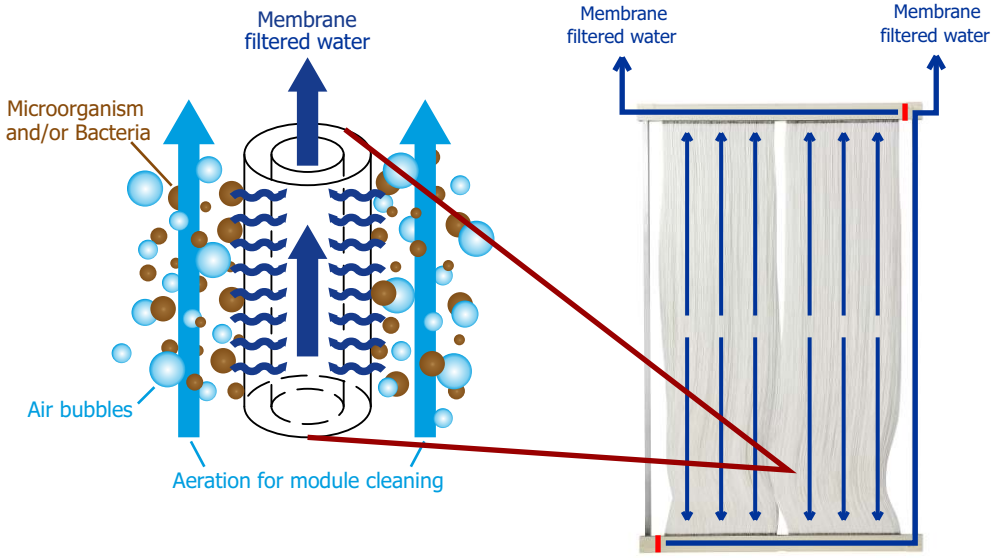
Average permeate flux [l/m^2h]	8.3 ÷ 41.7
Filtration cycle / Pause [min]	7 / 1
Air flow rate per module [$Nm^3/h/m^2_{proiez}$]	75 ÷ 150
Operation TMP [mbar]	50 ÷ 300
Operation Temperature [°C / °F]	5 ÷ 40 / 41 ÷ 104
Max. oil and grease concentration [mg/l]	150

Schematic Diagram Example



Filtration and Relaxation Mode

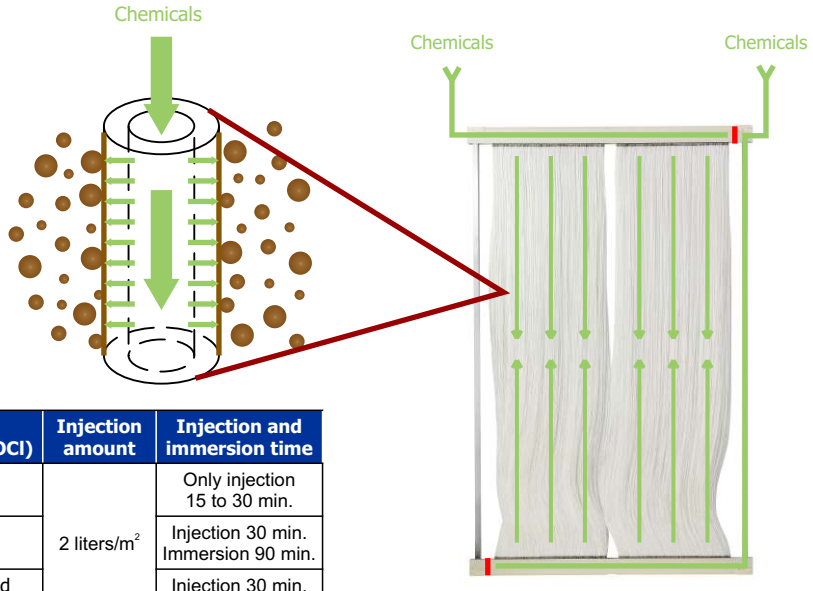
- Membrane surface is cleaned by the flow of water and impact caused by bubbles
- The thin and wide bundle of fibers with slack moves laterally in the scoring air flow for effective membrane surface cleaning



CIP Mode

Normally, NaClO is used as the chemical solution for cleaning MBR systems, as clogging is primarily caused by organic matter.

However, as clogging caused by inorganic matter increases gradually when the system is used for long periods, acid cleaning using acidic chemicals should be performed when necessary.



Type of cleaning	Cleaning frequency	Effective chlorine Concentration (for NaOCl)	Injection amount	Injection and immersion time
Maintenance cleaning (NaOCl)	Every week (flux>0.4 m/d)	NaOCl 300 to 500 mg/l	2 liters/m^2	Only injection 15 to 30 min.
Recovery cleaning (NaOCl)	Every 3 months	NaOCl 3000 mg/l		Injection 30 min. Immersion 90 min.
Recovery cleaning (Acid)	Every 1 year	Oxalic Acid or Citric Acid 1 to 2 %wt		Injection 30 min. Immersion 90 min.

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