
memcon
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customised
NEXT GENERATION WASTE WATER TREATMENT PROCESSES...
MEMBRANE BIO-REACTORS
MICROFILTRATION | ULTRAFILTRATION | NANOFILTRATION | REVERSE OSMOSIS | MBR

INTRODUCTION TO MEMBRANE BIO-REACTOR TECHNOLOGY

BACKGROUND

During our everyday activities we have a serious responsibility not only on an industrial level towards compliance but also towards humanity. Clean and safe water is our most valuable resource today. Our global water resources are limited. With a steadily rising population, access to drinking water - especially in water scarce geographic areas - is now at a critical level. All efforts must be made to conserve, recycle and re-use our water resources.

Membrane Bio-Reactor Technology (MBR) provides the perfect solution to these challenges. MBR is the latest hybrid process for water treatment which utilizes a combination of Bio and Membrane Technology. This efficient and reliable process allows us to convert the polluted waste water streams from municipal or industrial sources into water of potable quality.

APPLICATIONS

- Reduction of COD / BOD matter (soluble and insoluble)
- Removal of Fats / Oils / Greases
- Removal of Suspended Solids
- Removal of Dissolved Solids

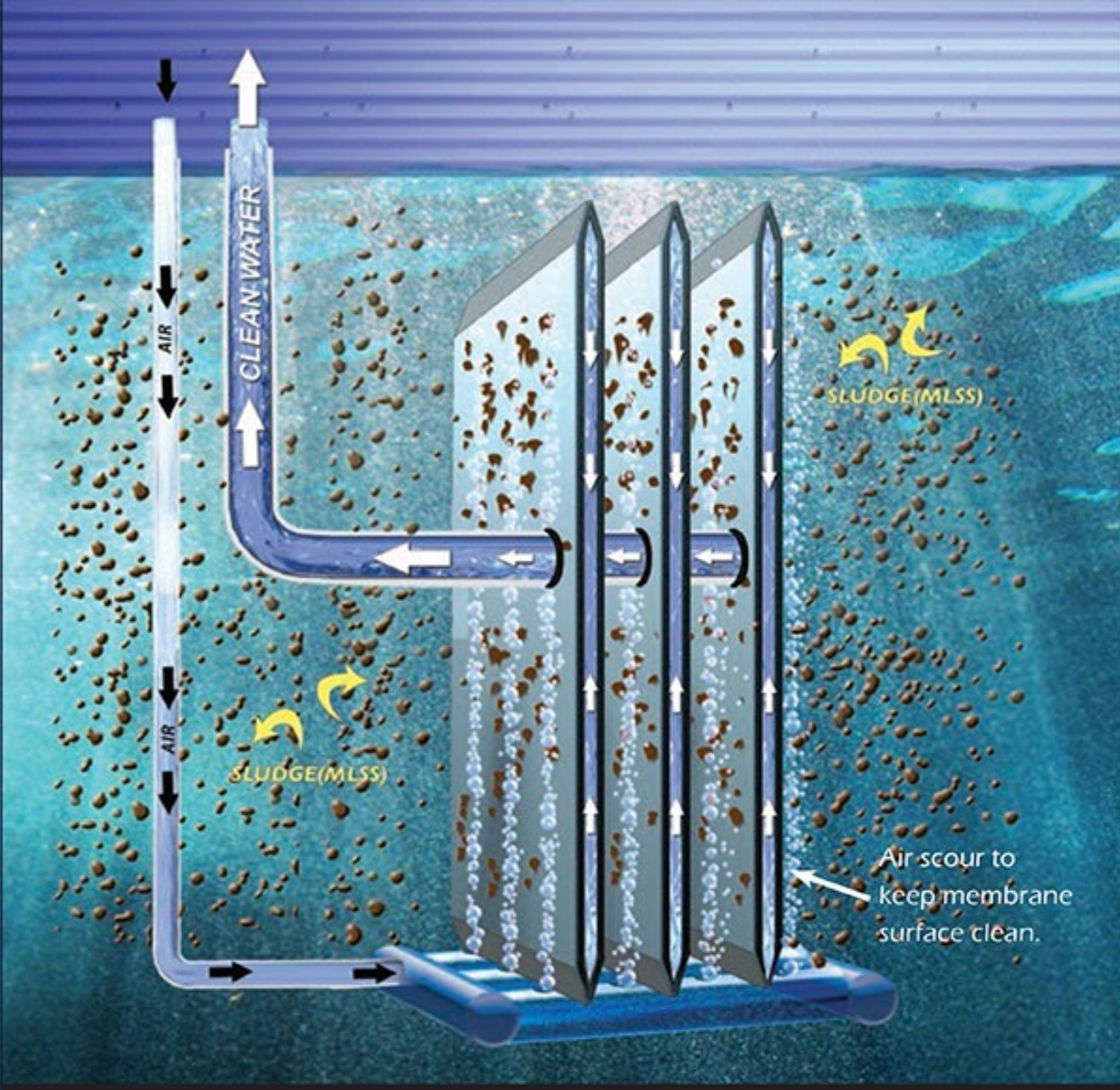
Recovery of high quality water

STATIC SCREEN

MLSS
(Mixed Liquid Suspended Solids)

BLOWER

EXTRACTION PUMPS



MBR PROCESS

The entire treatment process comprises 2 steps:

1) Activated Sludge Process

Like in conventional aerobic processes the waste water gets exposed to MLSS (Mixed Liquid Suspended Solids). The active bacteria convert the organic load into biomass and CO2. Due to MLSS concentrations up to 12 g/l the efficiency is extremely high compared to conventional systems running at 3 g/l. The high concentration of the MLSS reduces the size of the aerobic reactor.

2) Extraction of clean water

The self-supporting Membrane Modules get submerged into the activated sludge. The high turbulence in the reactor results in an even biomass concentration on the membrane surface. The treated water gets extracted through the membrane either by applying a vacuum to the filtrate side or more simply through the force of gravity. To keep the active membrane surface clean fine air bubbles are injected through diffusers at the bottom of the membrane modules. This scouring effect along the flat membrane sheets ensures a high permeability of the membrane. To enhance the surface cleaning a periodic backwash of the membrane modules is done.

With a membrane selectivity of 0.04 micron a high filtrate quality at any time is ensured – regardless of variations in feed qualities. The fine membrane pores are also a safe barrier for bacteria and any insoluble inert COD matter. A high packing density of these MBR modules allows a compact and easy to handle installation.

TECHNICAL SPECIFICATIONS

THE MODULES

ADVANTAGES

- Generates high quality water for re-use from almost any waste water source
- Treated water is free of bacteria and suspended solids
- Reliable, fully automated process
- Clean and easy operation
- Low running cost
- Compact design, small footprint of plant
- Plant capacities can easily get increased at later stage by installing more membrane modules
- Variations of incoming waste water composition negligible
- Back-flushable membranes (also enhanced with chemicals)
- High recovery rates of fresh water (> 99 %)
- MCP (Mechanical Cleaning Process)
  - Reduced energy costs
  - Enhanced flux rates
  - Low/zero demand for chemical cleaning

Membrane bioreactors are the next generation of activated sludge waste water treatment processes. The BIO-CEL module replaces the conventional clarifyer for the treated water from biomass.

The BIO-CEL Membrane Module is the effecient, reliable and future oriented solution, which significantly increases the purification rate, creates a discharge absolutely free of solids and thanks to an ultrafiltration membrane, the best discharge values.

BIO-CEL combines the advantages of classical plate and frame and hollow fibre modules without the disadvantages. It has the packing density of a hollow fibre module, is backflushable like a hollow fibre module and has the defined channels of a plate and frame module. This new development consists of a backflushable membrane pocket, where the backflushabilty is reached by a laminated construction of the membrane support material to the spacer material, creating a self supporting membrane sandwich of only 2 mm in thickness. An extremely high packing density is achieved with very low weight, as is normally possible only when using hollow fibres.

The optimised membrane sandwich allows for a constant permeable flow and a highly effective backflush over the entire membrane surface. By using a flat sheet membrane, braiding is avoided and also due to the open channel construction, sludge deposition and amassing of fibres has been reduced to a minimum.

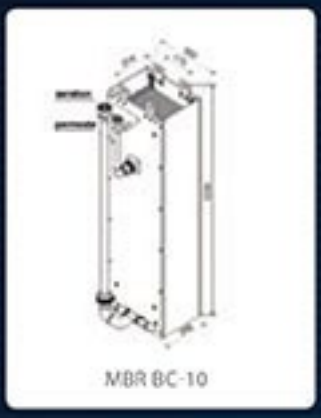
Untreated Waste Water (here Dairy)

Aerobic Reactor MLSS

Treated Water (after extraction through membranes)

DIFFERENT MODULE DESIGNS

CUSTOMIZED SOLUTIONS


MBR BC-10


MBR BC-50


MBR BC-100


MBR BC-400

MEMBRANE FEATURES

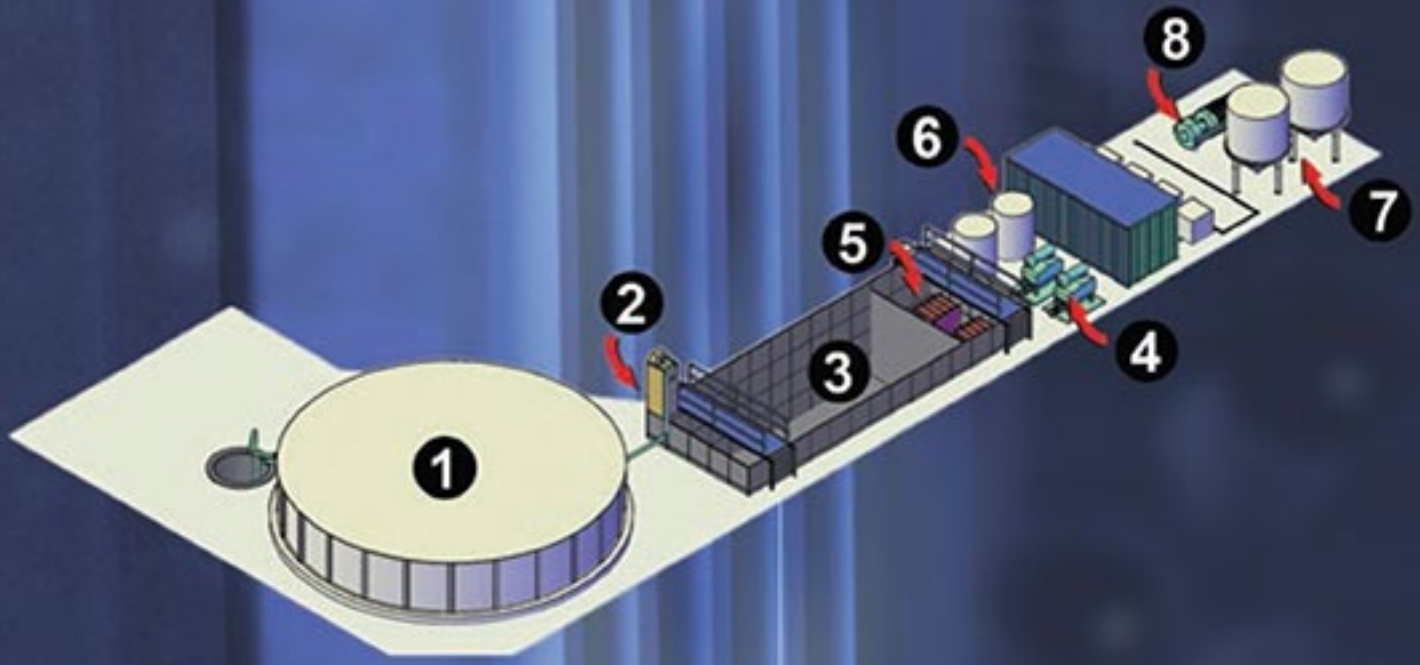
Polymer	MWCO	Pore size	Support layer	Drainage	Chlorine resistance
Polyethersulfone (PES)	150 kDa	0.04 µm	Polyester	Polyester	100 000 ppmh

MODULE AND OPERATING DATA

Parameters	BC10-10	BC50F - C25 - UP150	BC100F - C25 - UP150	BC400F - C25 - UP150
Membrane surface	10 m^2	50 m^2	100 m^2	400 m^2
Frame material	PVC	PE	PE	PE
Cassette material	-	PVC	PVC	PVC
Dimensions (mm)	256 x 350 x 1230	2740 x 714 x 1585	1385 x 714 x 1585	1440 x 1152 x 2722
Operating pressure	30 - 400 mbar	30 - 400 mbar	30 - 400 mbar	30 - 400 mbar
Backwash pressure	max. 150 mbar	max. 150 mbar	max. 150 mbar	max. 150 mbar
Max. operating temperature	40 °C	40 °C	40 °C	40 °C
ph-range	2 - 11	2 - 11	2 - 11	2 - 11
Max. air flow rate	6 m^3/h	30 m^3/h	60 m^3/h	140 m^3/h
Max. content suspended solids	12 g/l	12 g/l	12 g/l	12 g/l

MEMCON IS YOUR QUALIFIED PARTNER FOR

TURNKEY SOLUTIONS



1 – Holding reservoir
2 – Static Screen
3 – Aerobic Reactor (with MLSS)
4 – Extraction pumps and blowers
5 – Submerged membrane modules
6 – Treated water outlet
7 – Settling tanks
8 – Filter press

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Atech Innovations GmbH (Germany)

- Polymeric MF / UF / NF / MBR membrane modules
- Membrane Contactors for Gas transfer
- Ceramic Membrane Modules

WISA MEMBER