PRODUCT DATA SHEET

Membrane Bioreactor (MBR)

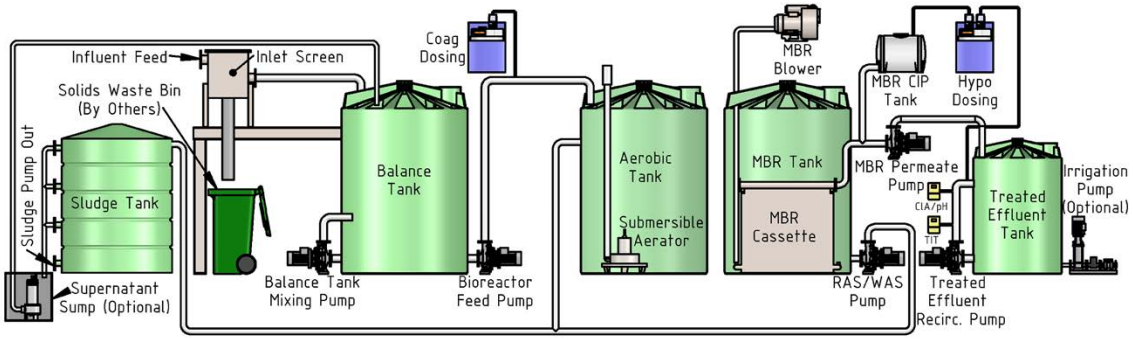
water | wastewater | sewage

OVERVIEW

MAK Water's Membrane Bioreactor (MBR) packaged sewage treatment plants are designed to treat domestic strength sewage, to achieve "Class A+" treated effluent, suitable for reuse in "risk category high" applications or for discharge to sensitive environments.

The standard treatment process includes influent screening, balance tank mixing, anoxic & aerobic treatment, flat sheet membrane filtration with air scouring and CIP system, and effluent disinfection (hypochlorite dosing). MAK Water's MBR bioreactor sewage treatment systems are corrosion resistant, self-contained, modular systems for easy deployment to remote locations.

STANDARD (PRODUCT / SYSTEM TYPE) PROCESS



STANDARD SPECIFICATIONS

Parameter		Units	MBR-020	MBR-045	MBR-060	MBR-075	MBR-155	MBR-225	MBR-315
Treatment capacity (min/max)		m^3/day	10 / 20	22.5 / 45	30 / 60	37.5 / 75	77.5 / 155	112.5 / 225	157.5 / 315
*[1]Balance tank volume (recommended)		m^3	21	47.1	62.9	78.6	162.4	235.7	330
*[1]Treated effluent tank volume (recommended)		m^3	20	45	60	75	155	225	315
Sludge tank volume		m^3	3.5	9.5	13.5	22.5	32	46	64
Sludge waste volume (max)		m^3/month	5.3	13.2	17.5	21.9	45.3	65.8	92.1
*[2]Irrigation pump duty		m^3/hr @ 350 kPa	2.5	5.6	7.5	9.4	19.4	28.1	39.4
Screen wash water supply		m^3/hr @ 500 kPa	1.1	2.2	2.2	2.2	5.5	7.5	11
Ambient temperature (min/max)		°C	1 / 43						
Power supply		-	AC 415V, 3 Phase, 50 Hz (other voltages and frequencies available on request)						
Power consumption	MBR plant	kW	9	19	26	36	42	65	83
	*[2], *[3]Recirculation pump		0.75	1.1	1.1	1.5	2.2	3	4
	*[2]Irrigation pump		0.75	1.5	2.2	2.2	7.5	7.5	11
Footprint	Bioreactor(s) & access platform(s)	m	6 x 3.2	9 x 3.2	12 x 3.2	12 x 3.2	12 x 5.6	12 x 8.8	12 x 12
	Containerised plant room	m	N/A*[4]			6 x 2.4			
	Sludge tank(s)	m	Ø1.6	Ø2.6	Ø2.97	Ø3.57	Ø3.95	7.7 x 3.55	8.5 x 3.95

Characteristics	Units	Influent	Effluent
Temperature	°C	15~35	-
*[5]pH	pH units	6.5~8.5	6.5~8.5
*[6]Biological oxygen demand (BOD)	mg/L	*[7]≤350	<10
Suspended solids (TSS)	mg/L	*[7]≤350	<10
Emulsified oil and grease	mg/L	<2.0	-
Free oil & grease	mg/L	<0.1	-
Total nitrogen (T-N)	mg/L	<50	<40 (or <10 mg/L reduction from influent value)
Total phosphorus (T-P)	mg/L	<16	4~12 (variable according to coagulant dose rate)
Total dissolved solids (TDS)	mg/L	<2,000	-
Turbidity	NTU	-	<2 (95%ile)
E.Coli	cfu/100 mL	-	<1
Coliphages	pfu/100 mL	-	<1
Clostridia	cfu/100 mL	-	<1
Free chlorine	mg/L	-	0.2~2
*[2]UV dose	mJ/cm^2 @ 70% UVT		40
Bacteria removal (membrane only)	Log		*[8]≥4
Virus removal (membrane only)	Log		*[8]≥1

*[1] Sold separately, *[2] Optional equipment, *[3] Sizing based on recommend treated effluent tank volume, *[4] Plant room integral to bioreactor, *[5] Caustic dosing may be required where influent alkalinity is inadequate, *[6] Sucrose dosing may be required where ratio of BOD to TKN is ≤5, *[7] Referenced from Metcalf & Eddy (5th edition, 2014), Typical composition of untreated domestic wastewater; higher/lower design values available on request, *[8] Additional log credits are available with UV and chlorination; consult MAK Water.

STANDARD SPECIFICATIONS

✓ = Standard Supply, o = Optional Supply, - = Not Available

Equipment			MBR-020	MBR-045	MBR-060	MBR-075	MBR-155	MBR-225	MBR-315
Automatic inlet screen (2 mm in two dimensions)			✓	✓	✓	✓	✓	✓	✓
Influent mixing pump			✓	✓	✓	✓	✓	✓	✓
Influent feed pump			✓	✓	✓	✓	✓	✓	✓
FRP bioreactor(s) with aluminium access platform(s) & ladder(s)	Aerobic zone with submersible aerator & MLR pump		✓	✓	✓	✓	✓	✓	✓
	MBR zone with flat sheet membranes and submersible RAS/WAS pump		✓	✓	✓	✓	✓	✓	✓
	CIP/membrane flush tank		✓	✓	✓	✓	✓	✓	✓
	Bioreactor roofing (COLORBOND® steel sheeting)		o	o	o	o	o	o	o
Plant room with air conditioning, overhead lighting & GPOs for maintenance	Chemical dosing	Coagulant	✓	✓	✓	✓	✓	✓	✓
		Hypochlorite	✓	✓	✓	✓	✓	✓	✓
		Sucrose	o	o	o	o	o	o	o
		Caustic	o	o	o	o	o	o	o
	MBR permeate pump		✓	✓	✓	✓	✓	✓	✓
	Treated effluent tank recirculation pump		o	o	o	o	o	o	o
	Pressurized UV reactor (non-validated*1)		o	o	o	o	o	o	o
	PLC control system with touch screen HMI		✓	✓	✓	✓	✓	✓	✓
Externally mounted MBR air scour blower			✓	✓	✓	✓	✓	✓	✓
Sludge tank with supernatant sampling points & discharge valves			✓	✓	✓	✓	✓	✓	✓
Supernatant sump with submersible pump & level control			o	o	o	o	o	o	o
Irrigation pump with level control & mechanical flow totaliser / flow transmitter			o	o	o	o	o	o	o
Instrumentation	Standard package		✓	✓	✓	✓	✓	✓	✓
	Premium package with ClearAccess™ remote monitoring		o	o	o	o	o	o	o

Instrumentation & Controls		Standard package	Premium package
Level switches	Balance, bioreactor and treated effluent tank	✓	–
	Chemical dosing & sludge tank float level switches	✓	✓
Level transmitters	Balance, bioreactor and treated effluent tank	–	✓
Pressure transmitters	Membrane differential pressure	✓	✓
Pressure switches and gauges		✓	✓
Flow transmitters	Influent feed, MLR and RAS/WAS	✓	✓
	Permeate and irrigation pump (with optional irrigation pump)	–	✓
Flow indicator	Permeate flow	✓	–
Mechanical flow totaliser	Irrigation pump (with optional irrigation pump)	✓	–
Analysers	Aerobic zone dissolved oxygen	✓	✓
	Aerobic zone pH analyser	–	✓
	MBR zone mixed liquor suspended solids	–	✓
	Permeate turbidity	–	✓
	Permeate pH and free chlorine	–	✓
UV intensity sensor (with optional UV steriliser)		–	✓
Variable speed drives	Influent feed pump	–	✓
	Submersible aerator	✓	✓
	MLR pump	–	✓
	RAS/WAS pump	–	✓
	MBR permeate pump	–	✓
ClearAccess™ remote monitoring & control capabilities		–	✓

*1 Validated systems available on request

MODEL SELECTION

MBR- ___ _ _ _ _ _ _ _ _

- **20** Capacity – 20 m³/day
- **45** Capacity – 45 m³/day
- **60** Capacity – 60 m³/day
- **75** Capacity – 75 m³/day
- **155** Capacity – 155 m³/day
- **225** Capacity – 225 m³/day
- **315** Capacity – 315 m³/day
- **XXX** Capacity – specify m³/day (max)
  - **X** Roofed bioreactor – without
  - **R** Roofed bioreactor – included
    - **X** Dosing systems – standard
    - **C** Dosing systems – custom (specify)
      - **X** Treated effluent tank recirculation pump - without
      - **E** Treated effluent tank recirculation pump - included
        - **X** Pressurised UV reactor – without
        - **U** Pressurised UV reactor – included
          - **X** Supernatant sump – without
          - **S** Supernatant sump – included
            - **X** Irrigation pump – without
            - **I** Irrigation pump – included
              - **X** Standard instrument package
              - **P** Premium instrumentation package
              - **C** Custom instrumentation (specify)
                - **X** Specifications – standard
                - **C** Specification – custom

NEED A QUOTE?

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