WIE DESIGN FOR SMALLER PACKAGE PLANTS 1-20 M3 PER HOUR.

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WIE HS BIOT - MODEL 1-20

(1 – 20 m3 per day)

These plants are designed on the following inlet sewage characteristics.

Characteristics	Unit	Value
BOD	mg/l	300
COD	mg/l	590
Suspended Solids	mg/l	300
PH	----	Around 7
Oil and Grease	mg/l	Less than 20

The expected treated water characteristics.

Characteristics	Unit	Value
BOD	mg/l	30
COD	mg/l	60
Suspended Solids	mg/l	30
PH	----	Around 7
Oil and Grease	mg/l	Less than 10

WIE MOVING BED BIO REACTOR (MBBR) DESCRIPTION

The basic process is based on MBBR technology using AMB Bio Media. There are many plants installed and satisfactorily operating on MBBR principle. MBBR has following advantages over other competing technologies.

A reduction in the volume of the biological reactor because it uses a_ support or carrier that gives a high specific surface.

They are very flexible processes since they are based on the percentage of plastic support used in the reactor (recommended that it is not greater than 70%), the surface can be modified as a consequence the efficiency of the process.

It does not require reactor biomass recirculation – This gives rise to the fact that the biomass does not depend on the final separation of the sludge and as a consequence typical problems found in conventional activated *sludge* processes related to the sedimentation properties of the sludge (filamentous bulking, etc.) do not occur.

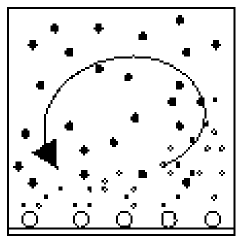
The operation and control is simple for this type of processes.- the process avoids blockage problems and consequently regular cleaning periods. In addition it is not necessary to control the sludge purging since the system keeps the biomass in the reactor until it comes off the support.

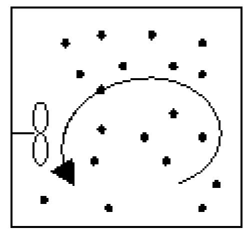
It allows the generation of a characteristic biomass for each type of reactor (aerobic, anoxic or anaerobic) bringing about the creation of a biofilm with a high level of activity. Experimentally it has been confirmed that the levels of nitrification and denitrification in this type of processes are greater than those obtained in conventional processes.

MBBR PROCESS

The basic principal of the **moving bed** process is the growth of the biomass on plastic supports that move in the biological reactor via agitation generated by aeration systems (aerobic reactors) or by mechanical systems (in anoxic or anaerobic reactors). The supports are made from plastic with a density close to 1 g/cm^3 letting them move easily in the reactor even when the capacity reaches 70%.

The **moving bed** processes come from the current trend in wastewater treatment from the use of systems that offer an increased specific surface in the reactor for the growth of the biomass, achieving significant reductions in the biological reactor volume.





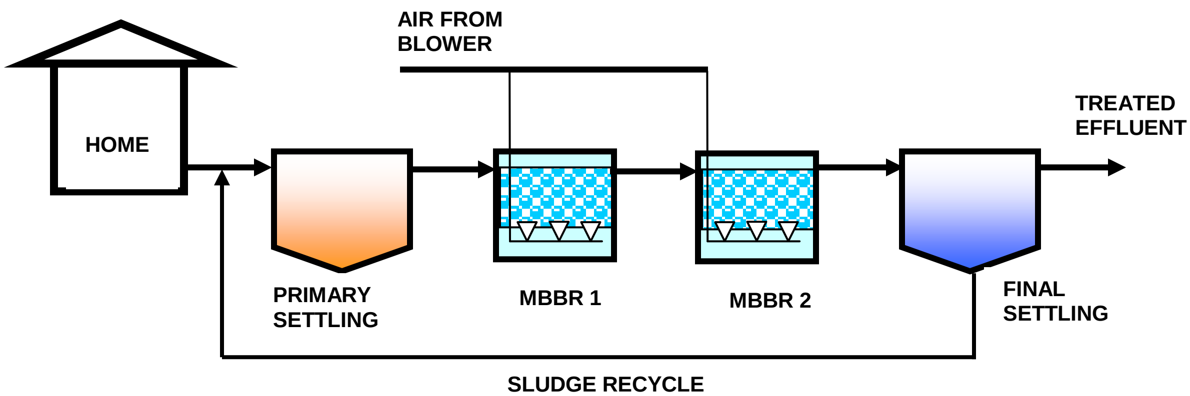
Initially fixed bed systems were used, however it was discovered that this type of process show a series of operational inconveniences such as the blocking of the bed because of the excessive growth of the biomass. This makes periodical cleaning obligatory. These drawbacks have caused the need for the creation of simple biofilm processes that eliminate them and that ease their operation; these are the moving bed processes.

This type of process can be applied both to treatment plants for the biodegradation of organic material as well as for installations with nutrient elimination, in urban and industrial wastewaters

PURIFICATION STAGES

Preliminary clarification and sludge storage.
Biological purification through bio media stage 1
Biological purification through bio media stage 2
Final clarification.

MBBR PURIFICATION FLOW SCHEME



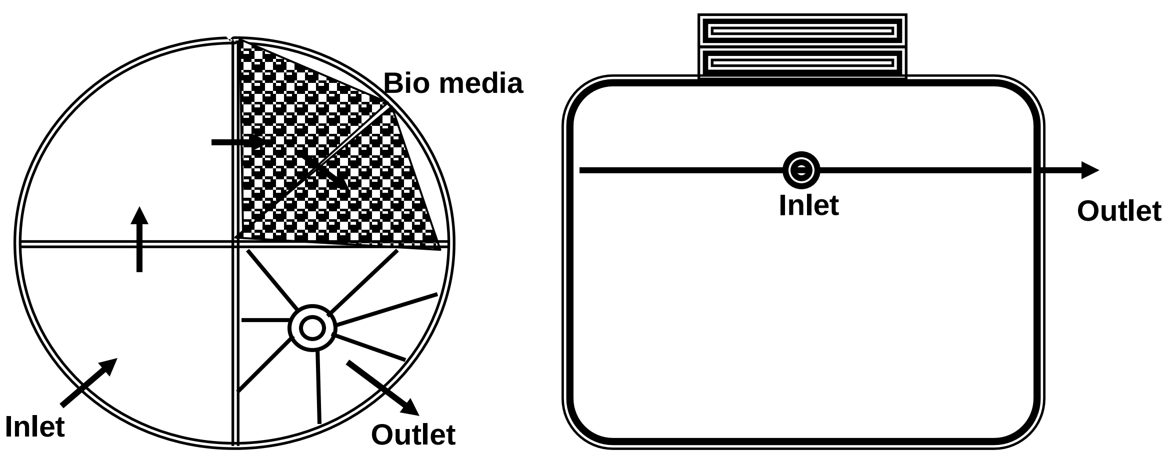
DESCRIPTION OF FLOW SCHEME

Domestic wastewater flows by gravity to the primary settling tank. In this tank the heavier waste material settles down by gravity and lighter material such as oil and grease floats on the top. The pre-clarified wastewater then is transferred to the MBBR 1 1through a dip pipe. The AMB bio media serves as growing area for aerobic microorganisms. Wastewater then flows to MBBR 2 as a second stage polishing of organic material.

The aeration is based on **Moving Bed Bioreactor Reactor (MBBR),** which incorporates the latest technology for compact treatment systems. The system is based on bio media, which is placed in the aeration tank. In the Aeration tank the majority of pollutants
are removed. This treatment phase utilizes microorganisms to remove the food and nutrients (pollutants) that are present in wastewater. As the wastewater enters this particular phase of treatment, the microorganisms are introduced. The aeration tank is agitated with diffused air that is fed by an air blower, and dispersed in the tank with coarse air diffusers. Air maintains an aerobic environment (dissolved oxygen present) in a mixed liquor of wastewater and an activated sludge, which contains microorganisms that upon contact will absorb organic matter from the waste water and convert it to additional biological cells (activated sludge) and respiration products CO_2 and H_2O. The activated sludge developed in the aeration tank is flocculated and settles. It readily separates from treated wastewater. After the aeration tank, the sewage is directed to final settler.

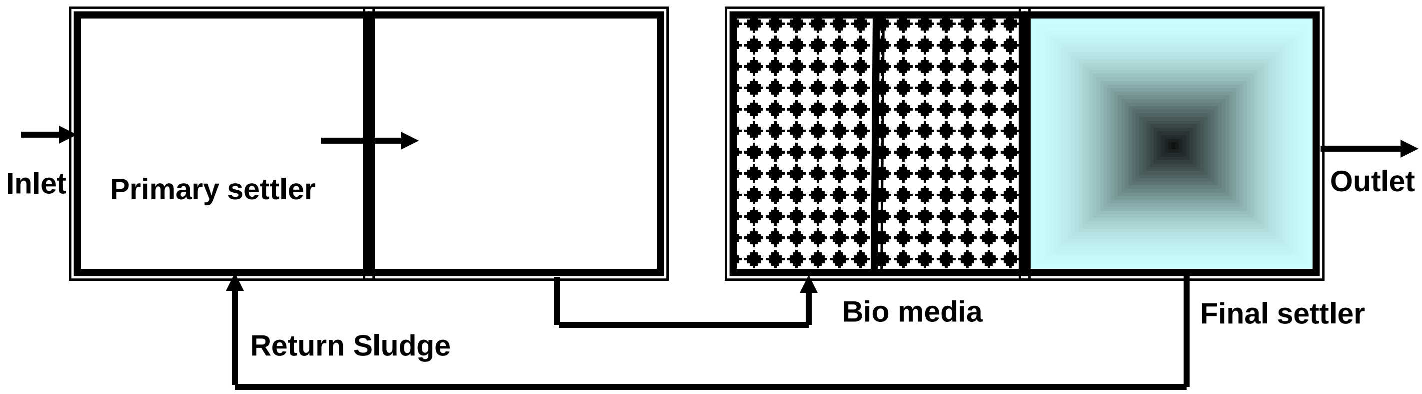
After the aeration stage, the Mixed Liquor (microorganism and wastewater) enters the final settler. Here the velocity of the wastewater is slowed to allow for the biomass to clump together and settle to the bottom while allowing the clear water to flow to drain. Sludge transfer pump returns the settled sludge from the bottom of the settler to the primary settler where it is stored until ready for disposal.

PLANTS LAYOUT.

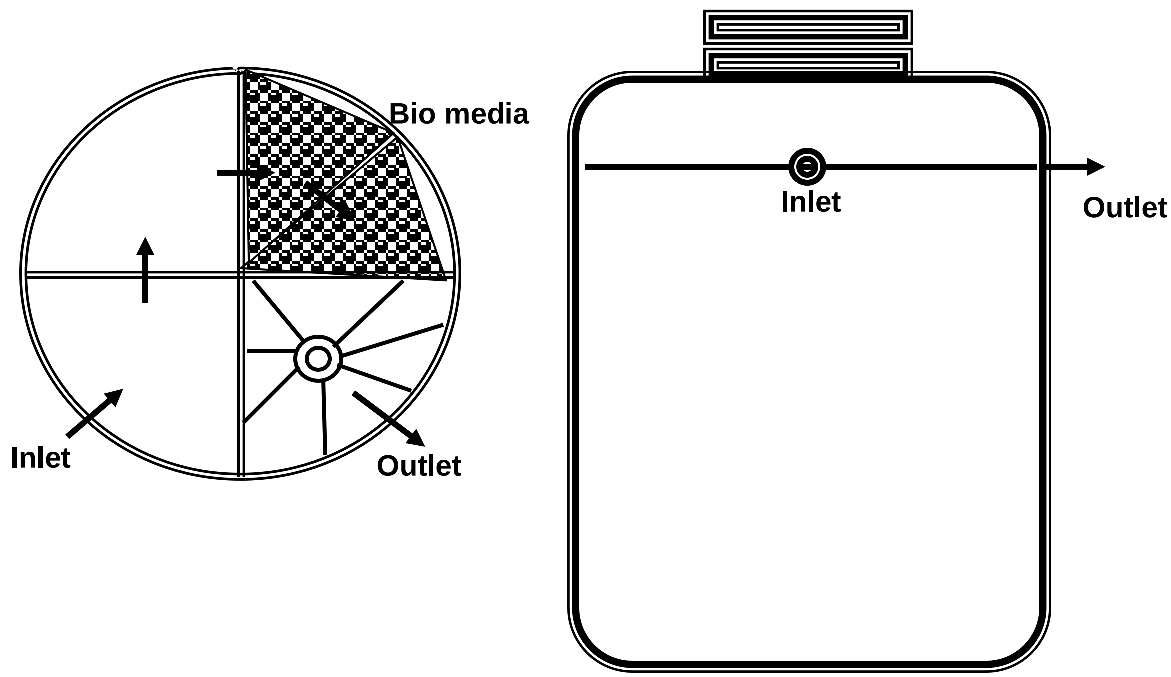


Sewage Treatment Plant Capacity 1 m3/day

MODEL A



Sewage Treatment Plant Capacity 2 m3
MODEL B



Sewage Treatment Plant Capacity 3 m3/day
MODELC

WIE TECHNICAL PARAMETERS

Equipment	Specifications	Unit	A	B	C	D	E	F	G
Flow		m3/d	1	2	3	6	10	15	20
Tank Size	Overall Length	mm	2000	3600	2000	4500	6500	12000	6000
	Overall Width	mm	2000	1450	2000	2000	2000	2000	4500
	Overall Height	mm	1600	1600	2250	2250	2250	2250	2250
Bio media	Proprietary	lts	60	120	180	360	600	900	1200
Settling area	Surface Area	M2	0.5	0.7	0.5	1.0	2.0	3.14	4.0
Rotary Blower	Quantity	1	1	1	1	1	1	1	2
	Capacity	M3/h	20	20	30	30	30	40	30
	Pressure	800	800	1500	1500	1500	1500	1600	1500
	Motor watts	200	200	550	550	550	550	750	550
Transfer Pump	Quantity	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	Capacity	M3/h	NA	NA	NA	NA	NA	NA	NA
	Head	M	NA	NA	NA	NA	NA	NA	NA
	Motor HP	Watt	NA	NA	NA	NA	NA	NA	NA
Sludge Pump #	Quantity		1	1	1	1	1	1	2
	Capacity	M3/h	0.05	0.1	0.15	0.3	0.5	0.75	0.5
	Head	M	0.8	0.8	1.5	1.5	1.5	1.5	1.5
	Type	Air	Air	Air	Air	Air	Air	Air	Air
Shipping Wt.		kg							
Operating Wt.		Kg							

Sludge pump is air lift pump.
NA means Not Applicable
Sewage flows by gravity to the treatment plant.

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