

ITOB – Izmir Tekeli Organized Industrial Zone



Site is situated in Tekeli near Izmir.

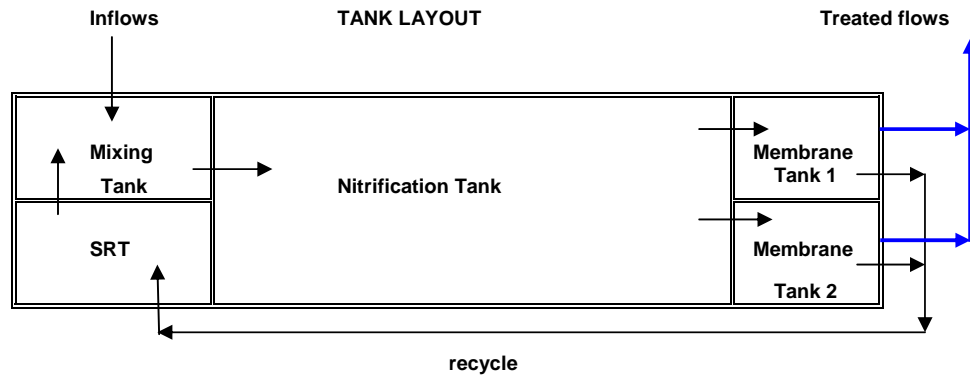
Description

- The first flat sheet membrane plant for an industrial zone in Turkey.
- Stage 1 of 4 planned to meet loads as new factories are constructed.
- Effluent quality achieved meets the most stringent requirements.
- The MBR contract agreement provided for the process design, specification and supply of membrane units.
- Additional services provided were M&E design assistance, inspections during installation, assistance to start-up, commissioning and membrane maintenance advice plus operator and management training.

Status as at Feb 2010	Operating at reduced flows & unusual effluent analysis, because of low factory output due to economic crisis
Client:	Egeşis, end client ITOB
Commissioned:	November 2008
Discharge Consent:	30mg/l BOD, 1 mg/l total P, <10 mg/l SS
Performance:	Achieving discharge consent despite effluent analysis greatly different for specification
Brief Description:	Single stream with two membrane tanks of 10 x EK400 for each stage

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Plant Description

Tanks are of concrete construction.

Balance tank feeds process via fine 3mm bi-directional screen into mixing tank.

The single stream treatment process has an aeration tank and two membrane tanks.

Treated effluent flows by gravity to the Sludge Return Tank.

Finally into mixing tank to combine with effluent and without any dosing required.

Plant designed to operate automatically with minimal supervision.

Design Requirements

Influent average loadings:

BOD	1,200 mg/l
COD	2,000 mg/l
TKN	61 mg/l
NH ₃ – N	55 mg/l
SS	450 mg/l
TDS	5,000 mg/l

Effluent standards

BOD	30 mg/l
Total N	15 mg/l
Total P	1 mg/l
NH ₃ – N	1 mg/l
SS	10 mg/l

Plant Data – stage 1

Maximum daily volume	2,200 m ³ /d
Average Daily flow	2,000 m ³ /d
Peak flow	69 l/sec
MLSS membrane tank	15,000 mg/l
MLSS aeration tank	11,250 mg/l
Membrane units	10 x EK400
Membrane surface area	3,200 m ²
Sludge age	36 days
Sludge produced	69 m ³ /d

Current performance during start up

BOD	<30 mg/l
Ammonia	<0.1 mg/l
TKN	<15 mg/l

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Process Description

MBR Atıksu Aritma Sistemleri (MBR) were contracted to supply the process design and membranes plus general assistance to the project contractors selected by the industrial zone via their tendering procedures.

The process chosen by MBR to meet the required effluent standards was conventional biological reduction with liquid/solid separation by membranes thus enabling re-use for irrigation or factory.) Flat sheet membranes were selected for the membrane duty as these perform best on waste liquids with less blockages.

The process is in three stages:-

1. Pre treatment: grit removal and screening:

3mm bidirectional screens were specified after standard bar screens to ensure no particulates potentially damaging to membranes were passed into the biological stage, similarly grit removal of >95% particle 0.2mm and above was specified.

2. Biological treatment:

The reduction of BOD, N and P biologically was achieved by conventional nitrification/denitrification process but with f:m ratio set at 0.05 to ensure >99% BOD removal and MLSS at 12,000mg/l to minimise tank sizes.

3. Liquid solid separation by membranes:

Membranes are specified to ensure quality and clarity of treated effluent. Typically membrane plants provide treated effluents with Turbidity lower than drinking water (>0.5NTU), also TSS, BOD and NH₃-N<5mg/l.

The membrane pore size also guarantees a clarity and consistent quality which means the treated effluent meets all local standards for industrial reuse or environmental discharge.

The role of MBR

For the ITOB project MBR co-tendered with a number of contractors as the process design company with responsibility for specifying and supplying the membranes.

MBR are able to offer these services without conflict to a range of M&E contractors as MBR does not M&E contracting.

Additionally MBR provided support and advice to the selected contractor to assist with installation and commissioning.

Post commissioning both the effluent analysis and daily flow changed dramatically as several factories shut down due to economic climate and others changed their production mix.

MBR advised how to reconfigure the plant to accommodate the low flows and adjust the recycle volumes for the increase BOD:N ratio.

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