



**epecouSA**

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**WASTEWATER TREATMENT SYSTEMS**  
*Upflow Anaerobic Sludge Blanket Bioreactors*

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**EP.UASB**

*up to 500 m<sup>3</sup>/day....in one tank*

## **EP.UASB ,.....the process**

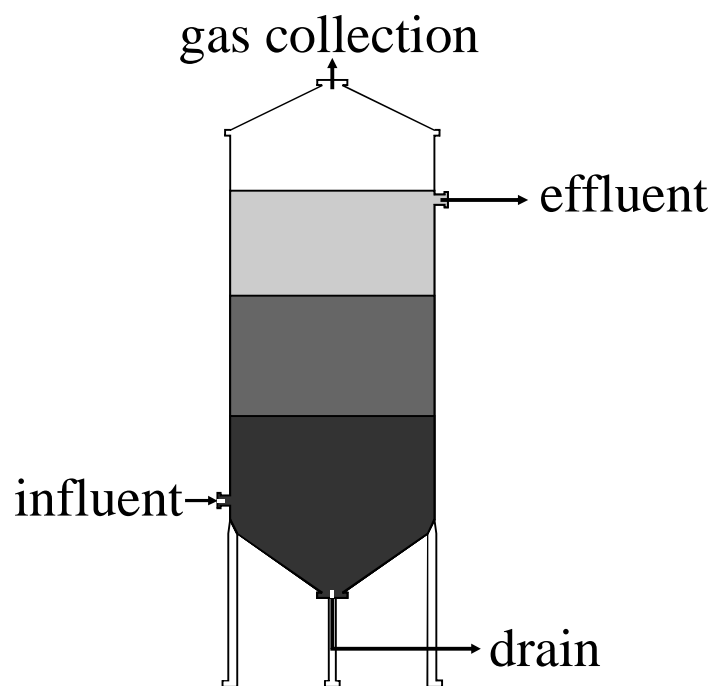
Industrial wastewater or blackwater flows into the bottom of an anaerobic upflow tank. Accumulated sludge forms granules. Microorganisms living in the granules degrade organic pollutants by anaerobic digestion. The sludge blanket is kept in suspension by the flow regime and formed gas bubbles.

A separator at the top of the reactor allows to recover biogas for energy production (optional),

**EP.UASB** is reducing the biological loads to a level to be either discharged to the municipal wastewater networks or to be polished by additional aerobic process.

## **EP.UASB,.....the Technology**

**EP.UASB**, the upflow anaerobic sludge blanket reactor is a single tank process in an anaerobic industrial wastewater or blackwater treatment system achieving high removal of organic pollutants. Wastewater enters the reactor from the bottom, and flows upward. A suspended sludge blanket filters and treats the wastewater as the wastewater flows through it. Bacteria living in the sludge break down organic matter by anaerobic digestion, transforming it into biogas. Solids are also retained by a filtration effect of the blanket. The upflow regime and the motion of the gas bubbles allow mixing without mechanical assistance. Baffles at the top of the reactor allow gases to escape and prevent an outflow of the sludge blanket.



## **EP.UASB ,.....why**

- High treatment efficiency, including Biological Nutrient Removal.
- Modular, expandable, compact.
- No odor, no noise.
- Minimal amount of moving parts, gravity flow.
- Low cost of installation, operation.
- Fluidized bed filtration.
- Self-regulating hydraulic flexibility
- Handles highly fluctuating flows.

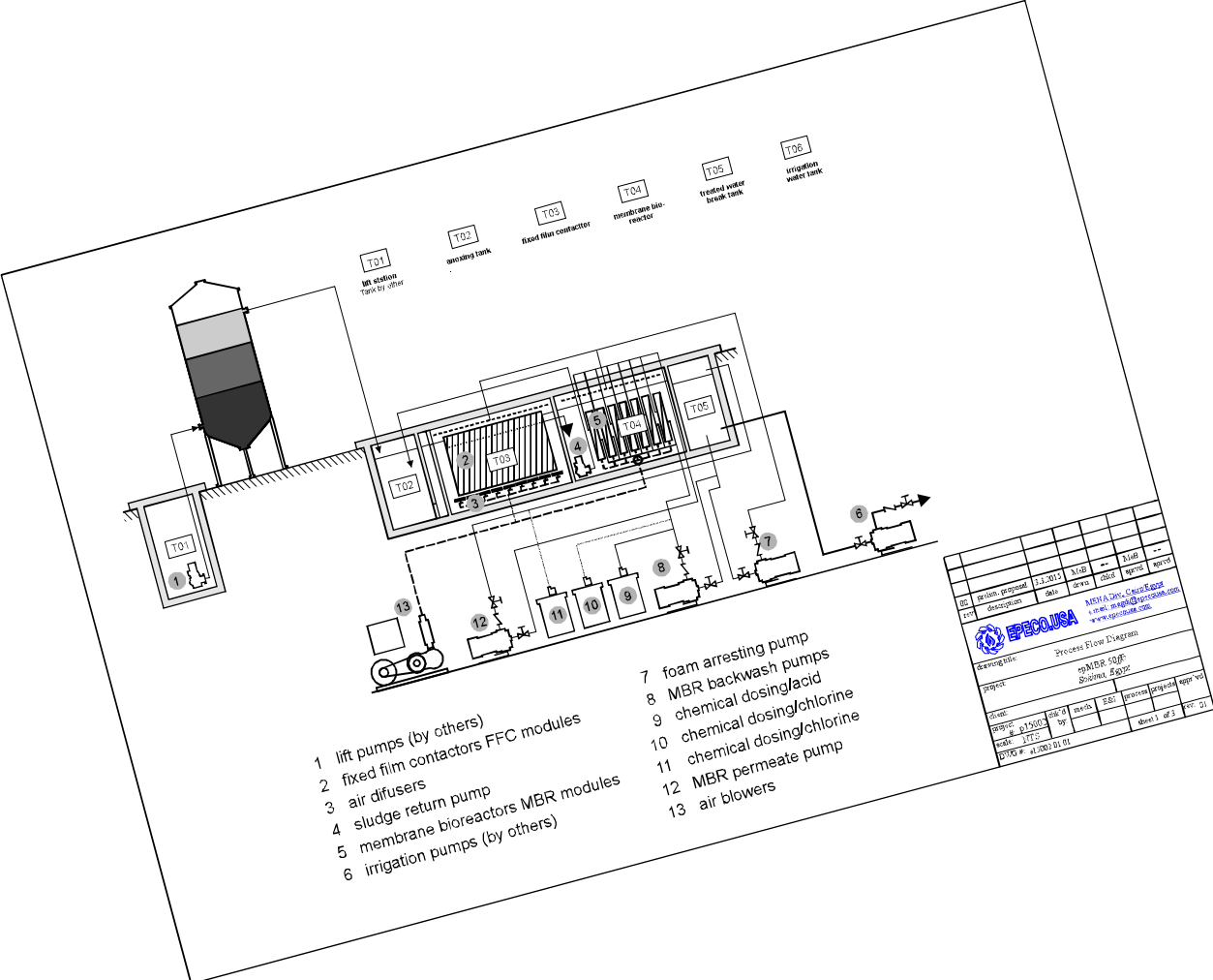
## **EP.UASB ,.....the performance**

**EP.UASB** systems require several months to start up. The sludge not only needs to form but also needs to adapt to the characteristics of the specific wastewater. As domestic or municipal wastewater already contains the composition of nutrients and micronutrients required for bacterial activity and growth, they are generally less problematic than industrial wastewaters. High organic loading in connection with lower hydraulic loading rates quicken the granulation process in the starting phase. To keep the blanket in proper position, the hydraulic load must correspond to the upstream velocity and must correspond to the organic load. The latter is responsible for development of new sludge. This means that the flow rate must be controlled and properly geared in accordance with fluctuation of the organic load. Sludge production is relatively low. Desludging is infrequent and only excess sludges removed every 1-2 years.

## **combined EP.UASB+EP.MBR ,.....performance**

			influent	effluent
Biochemical Oxygen Demand	BOD	mg/l	250	<5
Chemical Oxygen Demand	COD	mg/l	400	<10
Total Suspended Solids	TSS	mg/l	250	<1
Total Nitrogen	TN	mg/l	80	<2
Total Phosphorous	TP	mg/l	20	<1

**EP.UASB+EP.MBR ,.....the combined process**



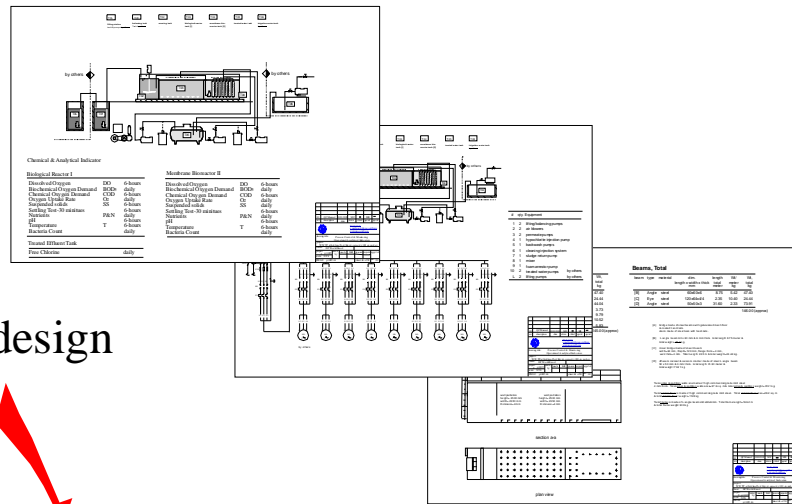
Industrial wastewater or blackwater flows with medium to high biological contamination strength can be easily treated up to a high standard recycled water quality by implementing the **EP.UASB** as a pretreatment process. In **EP.UASB** plant, wastewater as high as 5000 mg/l of biological Oxygen Demand BOD and Chemical Oxygen Demand COD=7000 can be easily treated to BOD=400 mg/l and COD=700 mg/l. In the following **EP.MBR**, wastewater can be further treated up to BOD & COD = 5 & 10 mg/l respectively.

## **EP.UASB ,.....configuration**

- **EP.UASB** systems are constructed out of steel or another watertight material for above ground installation.
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- **EP.UASB** systems are constructed out of concrete for under ground installation.



# EPECO.USA total capabilities



from .....design



to.....fabrication



up to.....  
.....final inastallation



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