

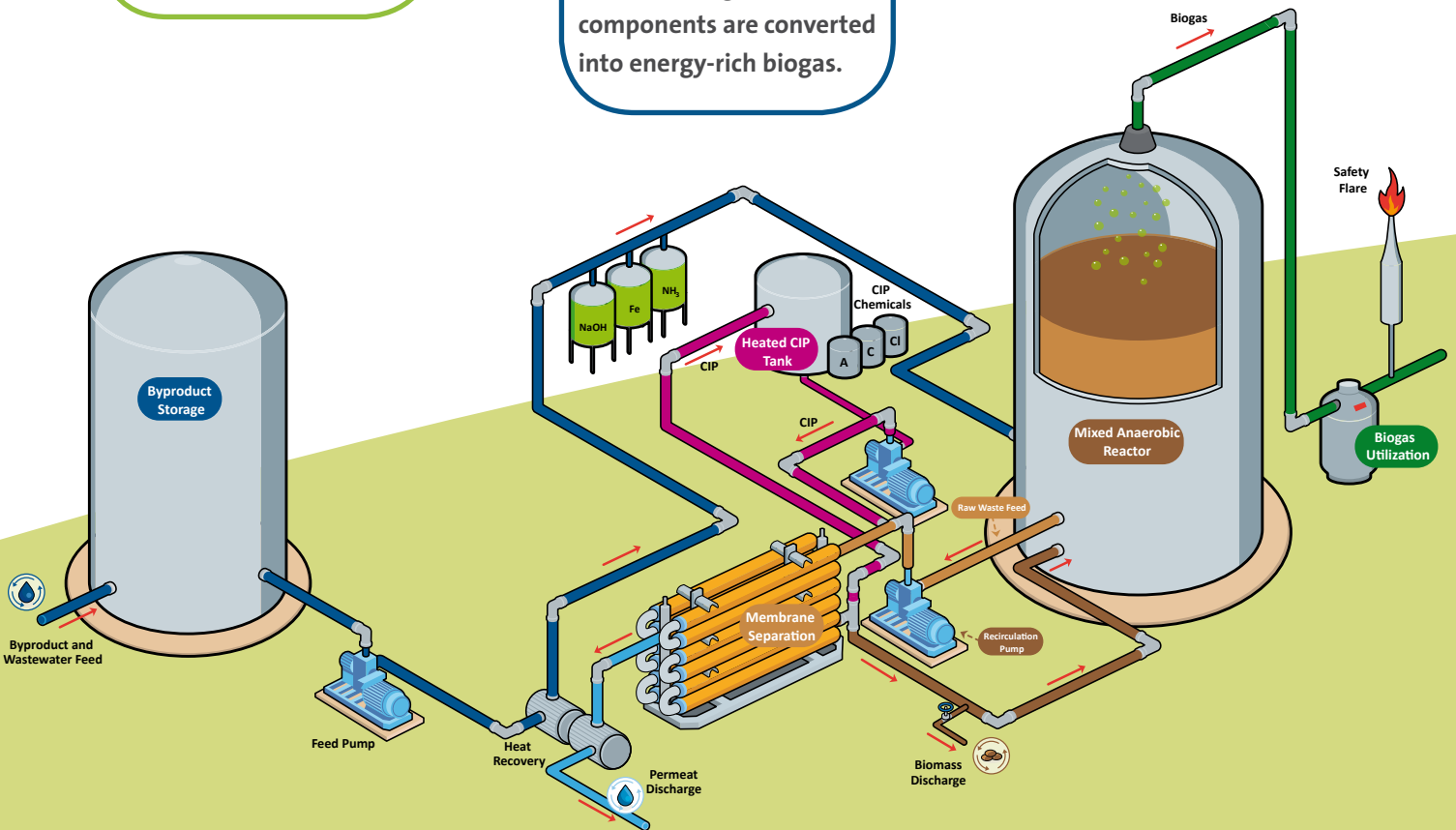
Memthane[®] step-by-step

Anaerobic digestion plus cross-flow membranes

Conditioning of the high-strength wastewaters

Influent is fed to the anaerobic bioreactor where the organic components are converted into energy-rich biogas.

Cleaning In Place (CIP)



If required, several polishing techniques are available to further treat the suspended free effluent for re-use or recover nutrients, while the low COD filtrate is often low enough for direct discharge to the sewer.

After anaerobic treatment, the UF membrane unit separates the 'clean' permeate from the biomass.

The biomass is returned to the bioreactor, while a small amount of biomass is removed from the system and discharged after dewatering.

“The manner in which the reactor is mixed and the preferential removal of inorganic solids optimize performance and are unique to the Memthane[®] technology.”

BIOTHANE

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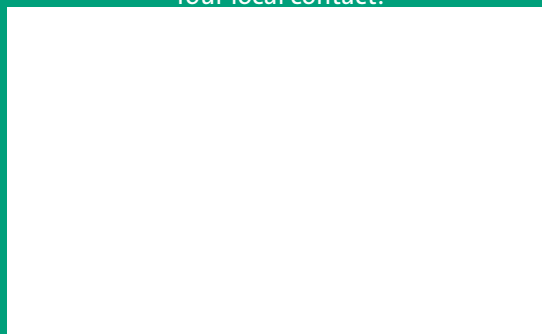
www.biothane.com

www.veoliawaterst.com



Veolia Water Solutions & Technologies and its 135 business units, including Biothane, offer turn-key solutions for anaerobic wastewater treatment, but also for process water make-up, biogas utilization, nutrient recovery and water recycling. Operational services and complete outsourcing can also be provided.

Your local contact:



BIOETHANE



Memthane®

The preferred solution for high-strength wastewaters resulting in crystal clear effluents



Solutions & Technologies

■ State-of-the-art solution

Memthane® is an Anaerobic Membrane Bio-Reactor (AnMBR) which **maximizes renewable energy production** while producing **superb quality effluent that can be reused** or discharged directly to the sewer.

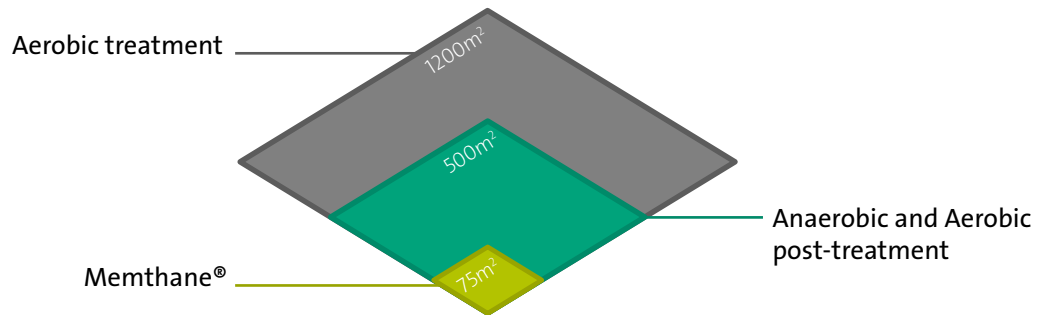
The new leading-edge technology, developed by Veolia Water Solutions & Technologies' subsidiary Biothane, delivers a unique, small footprint solution that offers **an array of benefits**, reducing disposal costs while generating valuable biogas.

COD removal:

>98%

Robust and high tolerance for complex organics

“ Replacing fossil fuels by generating biogas from wastewater treatment ”



■ Economical and easy to operate

In addition to its performance advantages, Memthane® delivers a significant total **operating costs reduction** compared to conventional technologies, taking into account all elements, including membranes,

chemicals, sludge disposal and overall energy savings. The **simple, single, fully automated reactor system** offers the possibility of remote control.

A world of advantages

- > Reduces costs
- > Superb effluent quality
- > Maximizes green biogas energy
- > Robust and easy to operate
- > Easy recovery of nutrients for fertilizers
- > Reduces carbon footprint
- > Proven track record
- > Avoids biogas scouring
- > Odour free

“ Easily scalable to meet individual plant characteristics and operating environments ”

Sustainable and profitable

Memthane® opens the door to treatment of high-strength and high-solid streams found in industries like **distilleries, dairies, bio-ethanol producers, instant coffee plants**, etc.

The suspended free effluent also **facilitates easy recovery of nutrients** for fertilizer production and water recycling to the plant.

The **valuable methane-rich biogas** produced can cover a significant part of the production plant's energy and heat demand, which can be as high as 100% in distilleries, for example.

Due to the favorable investment and operating costs and the system's simplicity in combination with robustness, **clients are increasingly choosing Memthane®** as their preferred wastewater treatment solution.



“ Memthane® treats high-strength streams previously considered economically untreatable through traditional wastewater processes alone.”

A proven track record

- › 6 full-scale contracts
- › 4 years of full-scale industrial operation
- › 14 pilot plant tests

- › Dairy industries in the U.S.
- › Bioethanol plant in Europe
- › Cellulosic Bioethanol plant in the U.S.
- › Biodiesel plant in the U.S.
- › Food processing in the UK

Memthane®, the perfect solution for:

- › High concentrated streams
 - COD 15,000 ~ 250,000 ppm such as Dairies whey
- › Ethanol Facilities
 - Stillage type streams: Pot Ale, Spent Wash, Thin Stillage and Vinasse
- › Fat Oil and Grease (FOG) containing streams
 - Ice cream and Biodiesel
- › Starch slurries
- › High COD chemical applications

Innovative and yet already proven

Memthane® combines two proven technologies: **Biothane's anaerobic biological wastewater treatment** and Pentair's X-Flow **ultrafiltration membrane** separation process.

Anaerobic biological treatment

Anaerobic treatment is the proven and energy efficient method to convert industrial wastewater into biogas. Low energy requirements, a smaller reactor footprint, lower chemical usage and reduced sludge handling costs are among the technology's advantages. Biogas produced through anaerobic treatment can make the plant energy neutral or even a renewable energy producer.

Membrane separation (UF)

The ultrafiltration membrane unit provides a solution that is robust, reliable and flexible. Memthane® minimizes the surplus sludge production by applying long sludge retention times. The membranes are placed outside the reactor, offering a simple and easily maintainable stand-alone system that is fully enclosed, preventing odor release.



2 proven technologies:

**Anaerobic
biological treatment**



Membrane separation



**1 innovative
solution**

- > Maximizes COD + TSS removal
- > Eliminates disposal costs
- > Generates methane-rich biogas

