KOCH MEMBRANE SYSTEMS

APPLICATION BULLETIN
Retrofit Existing MBR Plant

BUSINESS UNIT: INDUSTRIAL WATER & WASTEWATER TREATMENT

KMS' PURON® 1,500 m^2 module is designed for today's large-scale MBR installations. It is also designed in a manner that it can be used very simply to replace earlier MBR membrane technology while improving performance such as reduced fouling and lower energy consumption. The unique, free-floating fiber tips, combined with central aeration, ensure stable filtration during plant operation.

Application: Retrofitting An Existing MBR Plant

Overview

Membrane bioreactors (MBRs) with submerged membrane modules are an attractive choice for the next generation of wastewater treatment plants. The technology offers improved effluent quality and a substantially smaller footprint compared to the combination of a conventional wastewater treatment plant followed by filtration or ultrafiltration (UF).

Many MBR owners have become concerned with the membrane's proprietary nature, which is critically important to the MBR process. The membrane filtration modules used in MBR applications are typically designed with either hollow fibers or flat sheet panels and may not be compatible with other brands. Furthermore, electromechanical equipment supporting the membrane operation can take many forms and modes of operation, exacerbating compatibility issues between different membrane manufacturers.

The Challenge

To easily replace older membrane technology while improving performance through increased capacity and lower energy consumption, and to provide the freedom to choose any manufacturer to ensure competitive pricing and protect against product obsolescence.

The Solution

Koch Membrane Systems' (KMS) PURON® single header, submerged hollow fiber UF modules are ideal for retrofitting older MBR systems. KMS' PURON modules are designed to easily facilitate MBR retrofits. Features such as high packing density combined with the lowest energy demand for module air scouring make PURON modules the preferred choice for simple retrofits with minor changes to ancillary equipment. Optimized permeate extraction manifold and air supply lines reduce the number of piping connections during installation.

KMS' team of skilled field service and design engineers assist companies with module retrofitting.

Customer Benefits

- Easy replacement of older membrane modules
- Access to the latest technology
- Improved membrane performance
- Evaluate alternative membrane systems and suppliers
- Competitive pricing

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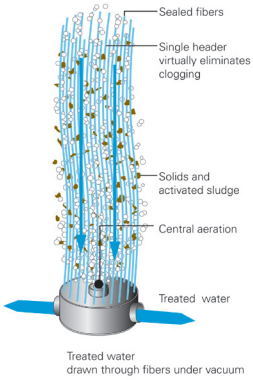
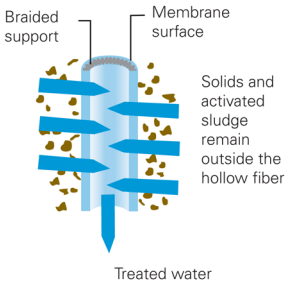
PURON® Membrane Element

Overview of the PURON Module

Fibers are sealed at the top. Filtrate is drawn through the membranes and flows down the inside of the fibers to the bottom header and is removed from the tank. Air bubbles rise from the center of the fiber bundle and scour the membrane surface to keep it free from a buildup of debris. The module design avoids the clogging and sludging that can be an issue with other MBR module designs.





Case Study: Municipal MBR

Monheim is a small city in Bavaria, Germany, about 100 km north of Munich. The city has been operating an MBR for their municipal wastewaters since 2003. The capacity of the treatment plant is 1,820 m^3/d. The plant was originally equipped with double-header hollow fiber modules, which were partially replaced by PURON PSH500 modules in 2008.

The total installation work was carried out in 4 days; the total amendment cost were less than 7.000€. The blower capacity of the PURON train was reduced from 1.200 to 900 Nm^3/h thanks to the reduced air demand. This was simply done by changing the pulley drive of the blower.

Why Retrofit?

A growing number of wastewater treatment plant operators are replacing their first generation MBR modules with newer products. The main drivers for undertaking a retrofit include:

- Technical issues with the existing membrane module (e.g. irreversible fouling, low chemical tolerance, high energy consumption)
- Dissatisfaction with membrane supplier support
- Product no longer available

The lack of standardization among membrane modules creates several technical issues that must be overcome for a successful retrofit. General considerations include MBR performance, physical module dimensions, tank intensity, module operation, ancillary equipment, and hydraulic design issues.

Simple MBR Retrofits

Simple Mixed Tank MBRs with any type of membrane module and MBRs with separate membrane tanks using hollow fiber modules are considered easy retrofits for the PURON module. In both cases the costs for onsite adaptation are outweighed by the potential savings in membrane replacement costs and future operating costs.

List of Retrofit Installations

Dekker, Belgium
Roedingen, Germany
Monheim, Germany
De Wierde, Netherlands

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