

# Membrane Bioreactors

Nviro's package Membrane Bioreactors (MBR) are designed to provide consistent high-quality effluent capable of meeting Title 22 reuse standards when combined with tertiary disinfection. Membrane systems accomplish this by providing a physical barrier, based on the pore size of the material, that prevents larger contaminants from passing through.

This physical barrier between the solids and the effluent allows membrane systems to operate at much higher MLSS concentrations (2–4x) compared to clarifier-based systems that rely on settling for solids separation, making membrane systems significantly smaller and less prone to process upsets from shock loading.

Nviro offers two types of membranes for its MBR systems, ceramic and polymeric, depending on your treatment goals.

## NVIRO'S MEMBRANE BIOREACTOR

Biological nutrient removal of BOD, nitrogen, and phosphorus is accomplished in anoxic and aerobic treatment zones ahead of the membrane tanks, reducing chemical needs to meet effluent targets. The entire system is constructed within corrugated stainless-steel tanks designed to use less steel material.



Figure 2: Membrane influent (left) compared to membrane effluent (right)

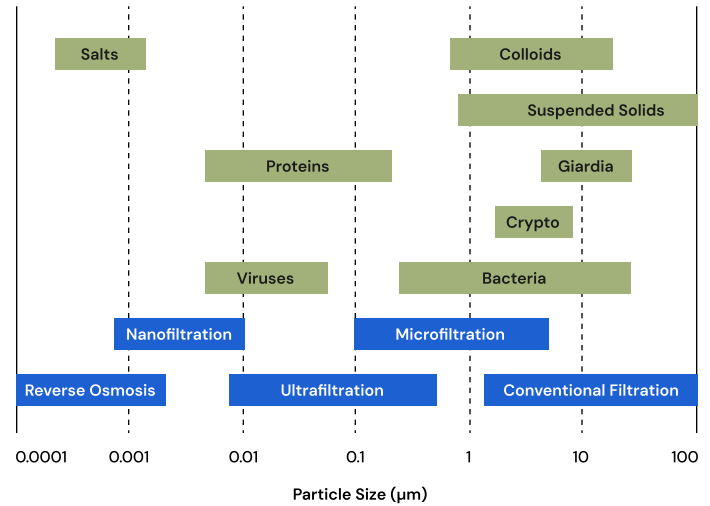


Figure 1: Filtration pore size comparison to typical wastewater constituents

Custom-built equipment skids house all the equipment needed to operate and maintain the system, including blowers, pumps, and valves, all controlled by Nviro's fully automated PLC-based control system.

### Key Features

- Compact, cost-effective stainless steel package system
- Physical membrane barrier provides high-quality effluent, even under shock loading
- Can be designed for Title 22 reuse when combined with disinfection
- Micro and ultrafiltration membranes available to suit your site's specific needs

## CERAMIC MEMBRANES

First used in the food and beverage sector in the 1980s, ceramic membranes have grown in their use thanks to their higher flux rates, longevity, and reliability compared to other membrane materials. Over their 20-year lifecycle, ceramic membranes can maintain their permeability through more aggressive physical and chemical cleaning.

Nviro uses ceramic membranes designed for modular construction, allowing for easy expansion as treatment needs increase.



Figure 3: CERAFILTEC's flat plate ceramic membranes

### Key Ceramic Features

- Pore sizes between 0.1–0.5  $\mu\text{m}$  produce a consistent high-quality effluent
- Modular design for easy expansion or retrofits into existing tanks
- Maintain their permeability over their 20-year lifecycle, reducing the need for costly membrane replacements
- Outside-to-inside flow path prevents membrane plugging



Figure 4: VEOLIA's hollow-fiber polymeric membranes

## POLYMERIC MEMBRANES

For over five decades, polymeric membranes have been a staple in wastewater treatment, providing a cost-effective option for high-quality effluent. Capable of handling high-solids spikes, polymeric membranes are less vulnerable to process upsets compared to secondary clarifiers.

Nviro uses polymeric membranes designed with reinforced membrane fibers to provide a durable and cost-effective filtration system.

### Key Polymeric Features

- Cost-effective filtration media
- Ultrafiltration with a nominal pore size of 0.04  $\mu\text{m}$
- Reinforced membrane fibers
- Capable of handling high levels of suspended solids
- Outside-in flow path prevents membrane plugging



info@nviro.com  
(888) 88 NVIRO