Toray MBR
Submerged PVDF Flat-Sheet Membrane Bioreactor Module
Toray Industries, Inc. has been developing water treatment membranes since 1968. Today, we offer a full lineup of membranes backed by our sixty years of experience. Our advanced membrane technologies and global operations ensure the success of any project.

At the Toray Group, we consider sustainability to be the most important global issue of the 21st century. Toray’s Sustainability Vision for water treatment aims to triple the water treated annually with our membranes by 2030 (compared to 2013). We will continue to provide advanced membrane technology such as RO membranes, further strengthen our technical services, and contribute to solving water problems worldwide.

Toray MBR accumulated plant capacity:
1,300,000 m³/day (March, 2024)

Why Flat Sheet MBR? Why Toray MBR?
Toray PVDF flat sheet membranes for MBR applications combine the best features of flat plate and hollow fiber technologies, such as durability, ease of use, less stringent screening requirement, small footprint, and low energy consumption.

The membrane's pores are small and uniform, resulting in increased smoothness of the membrane surface leading to excellent low fouling capabilities. Compared to conventional flat plate series, Toray’s NHP flat sheet technology has increased the normalized membrane area by 50%, reduced module weight by 70%, and reduced energy consumption by 30%.

**Why Flat Sheet MBR? Why Toray MBR?**

- Simple construction
- Low fouling potential
- Less Pretreatment Required
- Low chemical cleaning frequency
- No backwash, High Recovery
- Low O&M costs

**FE-SEM of Membrane Surface**

<table>
<thead>
<tr>
<th>Toray MBR</th>
<th>Competitor</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="FE-SEM of Toray MBR" /></td>
<td><img src="image2" alt="FE-SEM of Competitor" /></td>
</tr>
</tbody>
</table>

**Pore Size Distribution**

- Toray MBR
- Competitor

**Comparision of Membrane Thickness**

- NHP/ NHPA-series: 2mm
- Conventional series (TMR): 6mm

**Function Image of Membrane Element**

- Feed Water
- Membrane Module
- Membrane Element
- Diffuser Pipe
- Membrane Tank
- Manifold
- RO
- Sludge Floc
- Air Bubble
- Pump
- Blower
- Filtrate
- Effluent
- Reuse

**Filtering Process**

- Wastewater
- Filtrate
- RO
- Membrane Module
- Effluent
- Reuse

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**Toray MBR Characteristics**

Materials Change Our Lives
### Toray MBR Components

Toray MBR is comprised of a cassette containing 50 flat sheet MBR membrane elements and a module containing 1 to 12 sets of cassettes. The module consists of an element block containing a cassette and an aeration block that holds an air diffusion pipe. Once assembled, the module is submerged in the MBR tank.

![Diagram of Toray MBR Components](image)

**Product Offering**

Our broad lineup, now including the "NHPA-series", covers everything from small to large configurations to meet customer needs. Replacing the TMR series, or other flat plate products, is fast, easy, and significantly increases capacity within the same module volume. Please contact us for details!

### Materials Change Our Lives

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#### Toray MBR Components

<table>
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<th>MBR Components</th>
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#### Toray MBR Specifications

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<tr>
<th>Specifications</th>
<th>NHPA-series</th>
<th>NHP210-series</th>
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</thead>
<tbody>
<tr>
<td><strong>Module Model</strong></td>
<td>NHPA050-1C, NHPA100-1C, NHPA150-1C, NHPA150-2C, NHPA150-3C, NHPA150-4C, NHP210-300S, NHP210-600D</td>
<td></td>
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<tr>
<td><strong>Operating Temperature Range</strong></td>
<td>5°-40 (41-104°F)</td>
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</tr>
<tr>
<td><strong>MLSS (mg/L)</strong></td>
<td>Not higher than 18,000</td>
<td>Not higher than 20 (2.9)</td>
</tr>
<tr>
<td><strong>Transmembrane Pressure</strong></td>
<td>Not higher than 20 (2.9)</td>
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#### Toray MBR Design Tools

- **Toray MBR Components**
- **Product Offering**
- **Materials Change Our Lives**