Ceramic NF membranes

Inopor ® is currently the only supplier who is able to deliver ceramic nanofiltration membranes with a cut-off down to 450 Dalton in large-scale production. The ceramic NF membranes can be delivered in various shapes, from a single-channel shape to a 31-channel shape. The available cut-offs are 750Da, 600Da and 450Da. A new optimized prototype membrane (“NF new”) can be delivered in small lots.

Overview of available NF membrane geometries and the required flows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Type EKR</th>
<th>Type EKR-L</th>
<th>Type VKR</th>
<th>Type SKR</th>
<th>Type NKR</th>
<th>Type NKR-L</th>
<th>Type 31KR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer diameter</td>
<td>10 mm</td>
<td>20 mm</td>
<td>20 mm</td>
<td>25 mm</td>
<td>25 mm</td>
<td>41 mm</td>
<td>25 mm</td>
</tr>
<tr>
<td>Channel diameter</td>
<td>7,0 mm</td>
<td>15,5 mm</td>
<td>6,1 mm</td>
<td>6,0 mm</td>
<td>3,5 mm</td>
<td>6,0 mm</td>
<td>3,0 mm</td>
</tr>
<tr>
<td>Number of channels</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>7</td>
<td>19</td>
<td>19</td>
<td>31</td>
</tr>
<tr>
<td>Specific membrane area</td>
<td>0,0220 m²/m</td>
<td>0,0487 m²/m</td>
<td>0,0767 m²/m</td>
<td>0,1320 m²/m</td>
<td>0,2089 m²/m</td>
<td>0,3581 m²/m</td>
<td>0,3146 m²/m</td>
</tr>
<tr>
<td>Membrane area at 1200 mm length</td>
<td>0,0264 m²</td>
<td>0,0584 m²</td>
<td>0,0920 m²</td>
<td>0,1583 m²</td>
<td>0,2507 m²</td>
<td>0,4298 m²</td>
<td>0,3775 m²</td>
</tr>
<tr>
<td>Specific cross-flow velocity</td>
<td>0,14 m³/h m/s</td>
<td>0,66 m³/h m/s</td>
<td>0,42 m³/h m/s</td>
<td>0,71 m³/h m/s</td>
<td>0,66 m³/h m/s</td>
<td>1,93 m³/h m/s</td>
<td>0,55 m³/h m/s</td>
</tr>
</tbody>
</table>

For lab trials, also ceramic flat sheet membranes in disc shape are available.

Membrane materials:

The supports of the ceramic membranes are made of Al₂O₃. The membrane layers are made of TiO₂ (450 Dalton, 750 Dalton and NF-new) or SiO₂ (600 Dalton). The front-side sealing of the membranes is typically made of silica glass.
Ceramic NF membranes

Retention of the membranes:

All retention rates are measured with polyetherglycole (PEG) in an aqueous system. These curves do not describe the retention properties in other solvents than water.

Chemical resistance:

For the operation of our ceramic nanofiltration membranes, we recommend the following conditions:

- pH 0 – 14: temperatures < 20°C
- pH 1 – 13: temperatures 20 – 40°C
- pH 2 – 12: temperatures > 40°C

The maximum operation temperature for ceramic nanofiltration membranes is 200°C. These membranes are not suitable for the filtration of HF, concentrated H₂SO₄ (>20%), H₃PO₄ (>10%), HNO₃ (>15%) and NaOH (>15%).

Depending on the application, we recommend to clean the ceramic NF membranes with C₆H₈O₇ or H₃PO₄ at minimum recommended pH-value, with NaOH at maximum recommended pH-value, with EDTA in case of biological blocking and with NaOCl (up to 5%) or H₂O₂ (up to 3%) for desinfection.

Inopor GmbH
Industriestrasse 1
98669 Veilsdorf
Germany
Phone: +49 (0) 3685 / 685 – 257
Fax: +49 (0) 3685 / 685 – 230
Email: contact@inopor.com
Internet: www.inopor.com

Management board
Dr. Richard Metzler
Roland P. Rauschert
Volker Prehn