**SPECIFICATIONS**

**ABSOLUTE MICRON RATING**
- 0.04, 0.1, 0.2, 0.45, 0.65, 0.8 & 1.2 micron
- Note: 0.04 micron is available for Grade BM & PB only.

**FILTRATION AREA / 10” FILTER CARTRIDGE**
- i) Grade S : 0.58 m²
- ii) Grade BM : 0.60 m²
- iii) Grade PB : 0.55 to 0.60 m²

**NOMINAL LENGTH**
- 125, 250, 500, 750, 1000 mm or
- 127, 254, 508, 762, 1016 mm

**NOMINAL INNER/OUTER DIAMETER (ID/OD)**
- Standard : 30/ 68 mm or BB : 28/ 114 mm
- Note: 28mm inner diameter is available upon request.

**MEDIA MATERIAL**
- Hydrophilic High Asymmetric Polyether-Sulfone Membrane

**SUPPORTING MATERIAL**
- Polypropylene Micro-Denier Fibers

**INNER CORE, CAGE AND END ADAPTOR MATERIAL**
- Standard : High Strength Pure Polypropylene
- RPG : Reinforced Polypropylene With Glass
- HPE : High Density Polyethylene

**SEALING TECHNIQUE**
- Thermal Bonding

**END STYLE**
- 1) DOE : Double Opened End
- 2) SOE : Single Opened End
  - i) S2C : SOE, 222 O-Ring With Closed End
  - ii) S2F : SOE, 222 O-Ring With Finned End
  - iii) S6C : SOE, 226 O-Ring With Closed End
  - iv) S6F : SOE, 226 O-Ring With Finned End
- Note: Extended adaptor for SOE filter cartridge is available upon request.

**GASKET AND O-RING MATERIAL**
- 1) Standard : EPDM
- 2) V : Viton
- 3) S : Silicone
- 4) T : Teflon
- 5) FEP : Teflon Encapsulated Viton

**OPERATING CONDITIONS**

- **MAX. FORWARD DIFFERENTIAL PRESSURE**
  - 4.1 Bar (60 PSI) at 25°C

- **MAX. REVERSE DIFFERENTIAL PRESSURE**
  - 2.1 Bar (30 PSI) At 25°C

- **MAX. OPERATING TEMPERATURE**
  - 80°C at 4.1 Bar (60 PSI)

- **CHANGE OUT DIFFERENTIAL PRESSURE**
  - 2.4 Bar (35 PSID)

- **TYPICAL NON-VOLATILE RESIDUE (NVR):**
  - Less than 40 ppm per 10" cartridge.

- **TYPICAL 18MΩ-cm (BACKGROUND) RESISTIVITY RECOVERY:**
  - Less than 120 Liter.

---

**DESCRIPTIONS**

**PES** cartridges are made of casted Sulfonated PES (Polyether-Sulfone from Germany) polymers. It offers an absolute membrane filtration ($\beta=5,000$) with fixed absolute pore size from 0.04 to 1.2 um.

Meet USP Class VI-121°C Plastic reactivity test for Biosafety and comply with FDA Code Of Federal Regulation Title 21 for food and beverage use.

**PES** is designed for final filtration where absolute retention is required or pre-filtration to remove extremely fine particles and removal of bacteria desires to protect downstream system.

Highly recommended quality product for various applications including Food & Beverage Industries, Process water treatment and parts washing in Micro-Electronic & Hard disc, Bio-Technology and Pharmaceutical Plants, etc.

Inherently hydrophilic and the high asymmetrical fixed pore structure of PES membrane offers absolute filtration, high dirt holding capacity, lower pressure drop and increasing the filtration performance to give higher filtrate throughputs and higher flow rates than symmetrical membrane.

PES and PP construction provides excellent chemical compatibility, pH 1-14.

Thermally bonded without surfactants, adhesives and binders eliminate extractable.

Low protein binding and minimizes valuable product absorption.

Available in 3 grades: Standard Industries (S), Beverage & Micro-Electronic Industries (BM) & Pharmaceutical & Biological Industries (PB). (Double layer and sterilized)

Pre-rinsed with 18MΩ-cm D.I. water (BM & PB grades) and

Pre-rinsed with 18MΩ-cm D.I. water (BM & PB grades)
TYPICAL APPLICATIONS

- **General Industries**
  - Inks And Dyes.
  - Process Water.
  - Serums And Tissue Culture Media.
  - Acids, Bases And Oxidants.
  - Pharmaceutical preparation.

- **Beverage & Micro-Electronic Industries**
  - Wine, Juices, Potable liquid, Alcohols, Mineral water, Edible oils, Syrups, etc.
  - Final filtration in DI and RO water treatment, Etching Solution, Acids, Etchants, Oxidants, Bases, Solvents. Tray and parts washing.

- **Pharmaceutical & Biological Industries**
  - Final Filtration Of Drugs, Biological And Pure Water For Dialysis.
  - Final Filtration Of Water For Injection.
  - LVPs, SVPs.
  - Tissue Culture Media.

STERILIZATION AND SANITIZATION METHODS

- **Peracetic acid, chlorinated alkaline products, bleach, sulfur dioxide (SO2) and hydrogen peroxide at typical sanitization temperatures and concentrations.**

- **Autoclave**
  - 125°C (257°F) for 30-45 minutes at maximum differential pressure of 7 PSI (0.5 Bar).

- **In-line Stream**
  - 140°C (284°F) for 45-60 minutes at 2 PSID (0.14 Bar) ∆P.

- **Hot Water**
  - 88°C (190°F) at 5 PSI (0.3 Bar) up to 50 minutes.

*KAREI-PES* can be subjected to multiple sterilization cycles while maintain its integrity.

**TYPICAL APPLICATIONS**

**STERILIZATION AND SANITIZATION METHODS**

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Peracetic acid, chlorinated alkaline products, bleach, sulfur dioxide (SO2) and hydrogen peroxide at typical sanitization temperatures and concentrations.</th>
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</thead>
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**KAREI-PES** can be subjected to multiple sterilization cycles while maintain its integrity.

**TYPICAL APPLICATIONS**

<table>
<thead>
<tr>
<th>General Industries</th>
<th>Beverage &amp; Micro-Electronic Industries</th>
<th>Pharmaceutical &amp; Biological Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inks And Dyes.</td>
<td>Wine, Juices, Potable liquid, Alcohols, Mineral water, Edible oils, Syrups, etc.</td>
<td>Final Filtration Of Drugs, Biological And Pure Water For Dialysis.</td>
</tr>
<tr>
<td>Serums And Tissue Culture Media.</td>
<td></td>
<td>LVPs, SVPs.</td>
</tr>
<tr>
<td>Acids, Bases And Oxidants.</td>
<td></td>
<td>Tissue Culture Media.</td>
</tr>
<tr>
<td>Pharmaceutical preparation.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**INTEGRITY TEST – MINIMUM BUBBLE POINT**

<table>
<thead>
<tr>
<th>Micron</th>
<th>Measured</th>
<th>Bar</th>
<th>Range (±)</th>
<th>PSI</th>
<th>Range (±)</th>
<th>Minimum Water Flux (mL/Min cm² bar)</th>
<th>Typical Water Flux mL/Min cm² bar</th>
<th>Log Retention Value Of Bacteria</th>
<th>Bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.04</td>
<td>Mean</td>
<td>2.80</td>
<td>0.45</td>
<td>40.6</td>
<td>6.5</td>
<td>&gt;4.0</td>
<td>13.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.1</td>
<td>Mean</td>
<td>2.06</td>
<td>0.21</td>
<td>29.9</td>
<td>3.0</td>
<td>&gt;10</td>
<td>21.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.2</td>
<td>Mean</td>
<td>4.30</td>
<td>0.54</td>
<td>62.4</td>
<td>7.8</td>
<td>&gt;35</td>
<td>42.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.45</td>
<td>Mean</td>
<td>3.00</td>
<td>0.25</td>
<td>43.5</td>
<td>3.6</td>
<td>&gt;60</td>
<td>80</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.65</td>
<td>Mean</td>
<td>1.90</td>
<td>0.42</td>
<td>27.6</td>
<td>6.1</td>
<td>&gt;90</td>
<td>140</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.8</td>
<td>Mean</td>
<td>1.45</td>
<td>0.25</td>
<td>21.0</td>
<td>3.6</td>
<td>&gt;180</td>
<td>270</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1.2</td>
<td>Mean</td>
<td>1.05</td>
<td>0.25</td>
<td>15.2</td>
<td>3.6</td>
<td>&gt;260</td>
<td>360</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Air Temperature: 24°C, Inlet Pressure: 15 PSID (1 Bar)**
# CHEMICAL COMPATIBILITY GUIDE

<table>
<thead>
<tr>
<th>Acids</th>
<th>Glycol</th>
<th>Hydrocarbons</th>
<th>Bases</th>
<th>Ketones</th>
<th>Oils</th>
<th>Organic Solvents</th>
<th>Esters</th>
<th>Alcohols</th>
<th>Ethers</th>
<th>Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic Acid, Glacial</td>
<td>Ethylene Glycol</td>
<td>Ammonium Hydroxide, 3N.</td>
<td>Ammonium Hydroxide, 6N.</td>
<td>Acetone</td>
<td>Dimethyl Formamide</td>
<td>Amyl Acetate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetic Acid, 90%</td>
<td>Glycerine</td>
<td>Ammonium Hydroxide, 3N.</td>
<td>Ammonium Hydroxide, 6N.</td>
<td>Cyclohexanone</td>
<td>Dimethyl Sulfide</td>
<td>Butyl Acetate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetic Acid, 30%</td>
<td>Propylene Glycol</td>
<td>Potassium Hydroxide, 3N.</td>
<td>Potassium Hydroxide, 3N.</td>
<td>Methyl Ethyl Ketone</td>
<td>Methanol</td>
<td>Ethyl Acetate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boric Acid</td>
<td>Benzene</td>
<td>Sodium Hydroxide, 3N.</td>
<td>Sodium Hydroxide, 3N.</td>
<td>Methyl Isobutyl Ketone</td>
<td>Methyl Alcohol</td>
<td>Methyl Acetate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chromic Acid, Conc.</td>
<td>Toluene</td>
<td>Sulfuric Acid, 3N.</td>
<td>Sulfuric Acid, 3N.</td>
<td>Lubrication Oil</td>
<td>Pine Oil</td>
<td>Diethyl Ether</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrochloric Acid, Conc.</td>
<td>Xylene</td>
<td>Sulfuric Acid, 6N.</td>
<td>Sulfuric Acid, 6N.</td>
<td>Cottonseed Oil</td>
<td>Peanut Oil</td>
<td>Dioxane</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrochloric Acid, 6N</td>
<td>Carbon Tetrachloride</td>
<td>Ammonium Hydroxide, 6N.</td>
<td></td>
<td></td>
<td>Sesame oil</td>
<td>Dioxane</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrofluoric Acid, 6N</td>
<td>Chloroform</td>
<td>Potassium Hydroxide, 3N.</td>
<td></td>
<td></td>
<td>White Petroleum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitric Acid, Conc.</td>
<td>Freon</td>
<td>Sodium Hydroxide, 3N.</td>
<td></td>
<td></td>
<td>Dimethyl Formamide</td>
<td>Amyl Acetate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphoric Acid, Conc.</td>
<td>Methylene Chloride</td>
<td>Hydrochloric Acid, 3N.</td>
<td></td>
<td></td>
<td>Dimethyl Sulfide</td>
<td>Butyl Acetate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfuric Acid, Conc.</td>
<td>Tetrachloroethylene (Perchloroethylene)</td>
<td>Hydrochloric Acid, 6N.</td>
<td></td>
<td></td>
<td>Methanol</td>
<td>Ethyl Acetate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfuric Acid, 6N.</td>
<td>Trichloroethylene</td>
<td>Hydrofluoric Acid</td>
<td></td>
<td></td>
<td>Nitrogen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R—Recommended  L—Limited Recommended  N—Not Recommended  –Insufficient

This chemical compatibility table is intended for use as a guide only. Recommendations are based upon static condition of 48 hours at 25°C and 1.0 atmosphere pressure.

## ORDERING GUIDE

KAREI—PES—(A)—(B)—(C)—(D)—(E)—(F)

<table>
<thead>
<tr>
<th>(A) MICRON LENGTH</th>
<th>(B) END STYLE</th>
<th>(C) GASKET, O-RING MATERIAL</th>
<th>(D) PARTS MATERIAL</th>
<th>(F) TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>004 0.04</td>
<td>None : DOE</td>
<td>None : EPDM</td>
<td>None : PP</td>
<td>None : Standard</td>
</tr>
<tr>
<td>01 0.1</td>
<td>S2C : 222 &amp; Closed End</td>
<td>Y : Viton</td>
<td>RPG : Reinforced PP With Glass</td>
<td>BP : 28/114 mm</td>
</tr>
<tr>
<td>02 0.2</td>
<td>S2F : 222 &amp; Finned End</td>
<td>S : Silicone</td>
<td>HPE : High Density PE</td>
<td></td>
</tr>
<tr>
<td>04 0.45</td>
<td>S6C : 226 &amp; Closed End</td>
<td>T : Teflon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 0.65</td>
<td>S6F : 226 &amp; Finned End</td>
<td>FEP : Teflon Encapsulated Viton</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08 0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 1.2</td>
<td>None : DOE</td>
<td>None : EPDM</td>
<td>None : PP</td>
<td>None : Standard</td>
</tr>
</tbody>
</table>

**EXAMPLE:**
1) KAREI-PES-01-250-DOE (PES, 0.1 um, 250mm, DOE, EPDM Gasket, PP Parts Material)
2) KAREI-PES-01-250-S2C-EX-VR-RPG (PES, 0.1 um, 250mm, SOE, 222 Viton O-Ring With Extended Adaptor and Stainless Steel Reinforcement Ring, Closed End, Reinforced PP With Glass Parts Material)

Note: We cannot anticipate all conditions under which this information and our products, or the products of other manufacturers in combination with our products, may be used. We accept no responsibility for results obtained by the applications. Users are advised to make their own testing under actual condition to determine the safety and suitability of each product or product combination for their own purposes and applications. Buyers and users assume all responsibility for liability performance or damage. We reserve the entire right to modify the information without prior notice due to continuous R & D.