Microfiltration Products
For the Microelectronics Industry

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Parker Hannifin
Leader in process filtration, separation and purification

With sales offices in 26 countries, distribution channels active in 63 countries, and manufacturing operations in 6 countries, Parker specializes in providing filtration and separation products to a wide variety of markets including the microelectronics, pharmaceutical, food and beverage, manufacturing, automotive, oil and gas, and defense industries.

Manufacturing Excellence
Parker Hannifin Corporation is committed to manufacturing excellence.

Our state-of-the-art manufacturing facility features:
• A fully equipped laboratory and testing center
• Certified controlled cleanroom environments

Quality Management and ISO 9001
Quality is of paramount importance to Parker Advanced Filtration. All products are manufactured under controlled environmental conditions and are subjected to demanding programs of quality assurance.

Parker Hannifin Corporation Filtration is ISO 9001 certified.

Outline History

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<td>1994</td>
<td>Hydrophobic PTFE membrane filters for general purpose gas and solvent purification</td>
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<td>1997</td>
<td>PTFE membrane filters with HDPE structure to maintain chemical purity</td>
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<td>1998</td>
<td>Encapsulated all-fluoropolymer cartridge for aggressive chemical filtration</td>
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<tr>
<td>2003</td>
<td>SELECT pleat technology: optimizing effective filtration area to provide doubled lifetime</td>
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<tr>
<td>2005</td>
<td>Ultraclean technology: leading the industry in cleanliness offering filtration products with &lt;5ppb metals extractables level</td>
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<td>2005</td>
<td>Acquired by Parker Hannifin Corporation</td>
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<td>2006</td>
<td>XF technology: provides superior flow rates</td>
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<tr>
<td>2007</td>
<td>XL technology: new standard for flow and lifetime</td>
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Microelectronics: A Core Expertise

The microelectronics industry is a rapidly growing world market that draws upon core areas of our filtration expertise. Included within this market are the broad range of electronics products that require highly effective filtration in their manufacturing processes.

These products include:
- semiconductors
- flat panel displays
- hard disk drives

Through our Technical, R&D and Customer Service teams we offer a wide range of services to ensure total customer satisfaction.

Technical Capabilities
Our Technical Services team is dedicated to the needs of the microelectronics industry. We have an extensive range of state-of-the-art analytical instrumentation and a highly qualified team of scientists and engineers generating innovative solutions to a wide variety of filtration needs. We strive to optimize our customers’ filtration applications by offering full technical support that includes:
- process failure analyses
- contamination analyses
- process and cost improvement audits
- on-site testing services

Research and Development
Our R&D teams are constantly working to innovate new products and discover technologies that will enhance the performance of process filtration, and thus keep us at the forefront of process filtration technology.

Customer Service
An experienced team of professionals dedicated to respond quickly and comprehensively to orders - both for standard and customized products – and ensure their on-time delivery worldwide.
In the microelectronics Industry, filter process fall into three categories:

**Chemical Filtration**
- Etching
  - Si etch (HF/HNO₃/Acetic Acid)
  - SiO₂ etch (BOE/BHF-HF/NH₄F)
  - Si₃N₄ etch (Hot H₃PO₄ up to 180°C)
  - Al etch (H₃PO₄/HNO₃/Acetic Acid)
- Stripping
  - Hydroxy/amino based
  - Glycol/NH₄F based
  - DMSO/amino based
- Cleaning
  - Piranha (hot H₂SO₄/H₂O₂ up to 150°C)
  - SC1 (NH₄OH/H₂O₂/H₂O up to 90°C)
  - SC2 (HCL/H₂O₂/H₂O up to 90°C)
- Bulk chemical distribution

**Photochemical Filtration**
- Photoresist applications l-line, g-line and DUV 248/193nm
- Anit-reflective coating applications (BARC/TARC)
- Solvent/Developing (<3% TMAH 97%H₂O)

**Chemical Mechanical Planarization (CMP)**
- Oxide
- Metal

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**Moore’s Law**

40 years ago, Intel co-founder Gordon Moore issued a famous analysis that proposed the number of transistors on an integrated circuit (IC) doubled every 18 months. This analysis (often referred to as Moore’s law) still holds true today. The number of transistors per chip now runs into the billions with line-widths <100 nanometers.

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**The Microelectronics Market**

Microelectronics are found everywhere from consumer electronics to satellites, from corporate data centers to microwave ovens.

The Microelectronics market is fast-paced and cyclical, driven by the constant demand to supply new products that are ever faster, with higher capacities and smaller footprints.

The manufacturing of the newest generations of IC chips would not be possible without effective filtration.
Semiconductors:

The filters used in semiconductor production processes need to provide the lowest possible levels of metals extractables and high particle retention efficiencies. However, since these processes combine the use of aggressive chemicals and high process temperatures, we have developed a wide range of fluoropolymer filters that possess high chemical and thermal resistance and are suited for all processes in the manufacturing of semiconductors.

Our fluoropolymer filters are available with the following options:

- XL: New standard for lifetime and flow rate
- XF: Dramatic flow rate advantages
- SELECT - high surface area and flow rates
- Ultraclean - <5ppb metals extractables
- Wet-packed
- Capsules
- High particle retention efficiencies
**Hard Disk Media**

Crucial to the manufacture of disk media is the nickel-plating of the disks. This process is highly sensitive to both chemistry changes and interactions, and to contamination from high metallic dirt loadings. Understanding the plating requirements in the different parts of this process, we offer various ranges of filters:

**Fluoroflow**: fluoropolymer filters suitable for the aggressive chemical environment found in the plating process

**Fluoroflow SELECT**: a high-flow version of Fluoroflow with longer life

**Clariflow**: polyethersulfone membrane filters that provide extremely high bath recovery rates during disk cleaning

**Clariflow SELECT**: a high-flow version of Clariflow with longer life. All products enable high product yields and low reject rates, allowing for the lowest CPU (cost per unit).

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**Flat Panel Displays**

In the production of flat panel displays, the highest priority is to remove particulate contamination from process chemicals, including a wide variety of photoresists, developers, etchants and other chemical strippers.

To ensure consistent chemistry across all these chemistries, we offer ranges of filters that combine high flow capacities with high particle reduction efficiencies:

**Polyflow**: polypropylene depth media

**Polyflow membrane**: polypropylene membrane

**Proflow**: PTFE membrane
Microfiltration Products
Engineered for Microelectronic Applications

At Parker we see every microelectronics application as an opportunity to provide a total filtration solution. We have this capability due to our constant drive to be at the leading edge of filtration technology. Our innovative engineering teams work closely with our dedicated worldwide support network resulting in unparalleled customer satisfaction.

FLUOROFLOW®
100% Fluoropolymer construction

FLUOROCAP®
100% Fluoropolymer capsules

CHEMFLOW® PE
PTFE Membrane / High Density Polyethylene construction

CLARIFLOW®
Polyethersulfone (PES) Membrane / Polypropylene construction

PROFLOW II®
PTFE Membrane / Polypropylene construction

POLYFLOW® MEMBRANE
Polypropylene Membrane / Polypropylene construction

POLYFLOW®
Polypropylene absolute – and nominal-rated depth media Polypropylene structure

A wide variety of housings is available. Contact your Parker Filtration Sales Representative for more details.

Parker offers a wide range of microfiltration products for critical liquid and gas applications, with particle removal ratings from 0.02 to 40 micron.

Our products will consistently meet your exacting performance and compatibility requirements – even in processes using aggressive chemicals. Our products can offer metal extractables <5ppb.
# Microfiltration Products

Engineered for Microelectronic Applications

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<th>Product line</th>
<th>Available Configurations</th>
<th>Filter Ratings (microns)</th>
<th>SELECT* and Ultraclean</th>
<th>Typical Applications</th>
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<tr>
<td>FLUOROFLOW® 100% Fluoropolymer Construction</td>
<td>Cartridge</td>
<td>0.03, 0.05, 0.1, 0.2, 0.45, 1</td>
<td>S, U</td>
<td>• Critical filtration of aggressive acids, bases, strippers, and solvents • Available for high temperature applications</td>
</tr>
<tr>
<td>FLUOROCAP® 100% Fluoropolymer Construction Capsules</td>
<td>Capsule</td>
<td>0.03, 0.05, 0.1, 0.2</td>
<td>S, U, XF</td>
<td>• Encapsulated filter for critical filtration of aggressive chemicals and process fluids under harsh conditions where the introduction of contamination during cartridge change out is a concern • Available for high temperature applications</td>
</tr>
<tr>
<td>CHEMFLOW® PE &amp; XF PTFE Membrane / High Density Polyethylene Structure</td>
<td>Cartridge</td>
<td>0.03, 0.05, 0.1, 0.2, 1</td>
<td>S, XF</td>
<td>• Purification of photoresists, chemicals and etch baths • Filtration of solvents, cleaning solutions</td>
</tr>
<tr>
<td>CLARIFLOW® Polyelectrolyte (PES) Membrane / Mini Polypropylene Structure</td>
<td>Cartridge, Mini-Capsule, Mini-Cartridge</td>
<td>0.02, 0.04, 0.1, 0.2, 0.45, 0.65, 0.8</td>
<td>S</td>
<td>• Aqueous based chemicals; recirculating etch baths; UPW systems</td>
</tr>
<tr>
<td>PROFLOW II® PTFE Membrane / Polypropylene / Mini Structure</td>
<td>Cartridge, Mini-Capsule, Mini-Cartridge</td>
<td>0.03, 0.05, 0.1, 0.2, 0.45, 1</td>
<td>S</td>
<td>• Ultrapure chemicals and gas processing; photochemical processing • Bulk chemical distribution</td>
</tr>
<tr>
<td>POLYFLOW® MEMBRANE Polypropylene Nominal Rated Membrane / Polypropylene Structure</td>
<td>Cartridge</td>
<td>0.04, 0.07, 0.1, 0.2</td>
<td>S</td>
<td>• Filtration of photochemicals and ultrapure chemicals • Gas filtration</td>
</tr>
<tr>
<td>POLYFLOW® Polypropylene Absolute Rated Depth Media / Polypropylene Structure</td>
<td>Cartridge, Mini-Capsule, Mini-Cartridge</td>
<td>0.6, 1.2, 2.5, 5, 10, 20, 40</td>
<td>S</td>
<td>• DI water prefiltration • Solvent and gas prefiltration • General filtration</td>
</tr>
</tbody>
</table>

**SELECT Technology**

The revolutionary SELECT technology filter cartridges can improve and lower the costs of wafer processing. Imagine: up to 80% more effective filtration area – with twice the throughput. All of this with a particle retention of >99.99% from a product that is cleanroom manufactured and tested.

**Ultraclean Technology**

Ultraclean technology leads the microelectronics industry in cleanliness. Ultraclean is a proprietary process applied to electronics grade products. It provides a total metals extractables level of <5ppb. Ultraclean’s low level of metals extractables provides users with a highly consistent manufacturing process and very low product reject rates.

**XF Technology**

XF is a revolutionary membrane technology. It provides superior flow over traditional cartridges by utilizing an asymmetric PTFE membrane. XF cartridges offer up to three times the flow rate and throughput at lower differential pressure.

**XL Technology**

XL technology provides maximum flow rate and lifetime. It combines SELECT technology with a larger diameter cartridge (3.25") for the highest flows in the industry.

Parker Hannifin Corporation is committed to provide the highest quality product to our customers. To this end, our ISO 9001:2000 certified Quality System ensures that this occurs. At Parker Hannifin Corporation, we do our best to resolve all quality issues in a quick and timely manner. In addition, we strive to eliminate problems before they are seen. By taking this continuously proactive approach to the quality of all of our products, Parker Hannifin Corporation has the best product on the market at all times.
Wet Etch and Clean
Fluoroflow®

All-fluoropolymer cartridge for aggressive applications

The Fluoroflow® filter cartridge is our standard product for aggressive wet etch and clean applications. It provides good flow rates and on-stream life at an economical cost. The all-fluoropolymer construction provides excellent chemical resistance for the most aggressive applications up to 150°C. It is available either ozone DI flushed and dried or wet-packed for quick installation.

Benefits
- Economical
- Wet-pack option for quick installation
- All-fluoropolymer for maximum chemical resistance
- 100% integrity tested for consistent quality

Applications
- Wet etch and clean
  - Phosphoric acid
  - Sulfuric acid
  - Hydrofluoric acid
  - Nitric acid
  - Piranha
  - SC1,SC2
  - NMP-based solvents
- Other high temperature or ozonated processes

Parker Hannifin Corporation provides our customers with unsurpassed product consistency and cost-efficiency. Our experienced professionals can help you select the right solution for your application. For more information or to place an order, contact your local distributor. Information on product specifications, applications and chemical compatibility can be found on our web site at www.parker.com or through your nearest Parker Hannifin Corporation office.

Parker Hannifin Corporation designs and manufactures an extensive line of innovative solutions for specific applications in the Microelectronics, Biopharmaceutical, Food and Beverage, Industrial and Chemical industries.
Fluoroflow®-HSA

Increased performance all-fluoropolymer cartridge for aggressive applications

The Fluoroflow®-HSA filter cartridge provides good flow rates and on-stream life. The enhanced pleating provides more than 40% more surface area than our standard Fluoroflow®. This results in increased bath turnover and longer filter lifetime demanded by today’s fabs. The all-fluoropolymer construction provides excellent chemical resistance for the most aggressive applications up to 180°C. Available wet-packed for quick installation or Ultraclean wet-packed which offers the lowest metals extractables in the industry.

Benefits
- Increased filtration area for longer life
- Higher flow rates for increased bath turn over
- Wet-pack option for quick installation
- Ultraclean wet-pack option for absolute cleanliness
- All-fluoropolymer for most maximum chemical resistance
- 100% integrity tested for consistent quality

Applications
- Wet etch and clean
  - Phosphoric acid
  - Sulfuric acid
  - Hydrofluoric acid
  - Nitric acid
  - Piranha
  - SC1,SC2
  - NMP-based solvents
- Other high temperature or ozonated processes

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Fluoroflow®-Select

High performance all-fluoropolymer cartridge for aggressive applications

The Fluoroflow®-SELECT filter cartridge provides exceptional flow rates and on-stream life. It utilizes our unique SELECT pleating technology that increases filtration area and flow rate by over 70% versus our standard Fluoroflow®. This results in increased bath turnover and longer filter lifetime demanded by today’s fabs. The all-fluoropolymer construction provides excellent chemical resistance for the most aggressive applications up to 180°C. Available wet-packed for quick installation or Ultraclean wet-packed which offers the lowest metals extractables in the industry.

Benefits

- Large filtration area for longer life
- High flow rates for increased bath turn over
- Wet-pack option for quick installation
- Ultraclean wet-pack option for absolute cleanliness
- All-fluoropolymer for maximum chemical resistance
- 100% integrity tested for consistent quality

Applications

- Wet etch and clean
  - Phosphoric acid
  - Sulfuric acid
  - Hydrofluoric acid
  - Nitric acid
  - Piranha
  - SC1,SC2
  - NMP-based solvents
- Other high temperature or ozonated processes

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Fluoroflow®-XF

Highest-flowing all-fluoropolymer cartridge for the most aggressive applications

The Fluoroflow®-XF filter cartridge uses a superior asymmetric PTFE membrane than provides unmatched flow rates and on-stream life. Customers using the cartridge for viscous fluids like phosphoric acid, have reported flow rates and lifetimes more than twice that of the leading competitor. The advantages of increased bath turnover and longer lifetime improve yields while decreasing filtration costs. In addition, the all-fluoropolymer construction provides excellent chemical resistance for the most aggressive applications up to 180°C. Available dry, wet-packed for quick installation or Ultraclean wet-packed which offers the lowest metals extractables in the industry.

Benefits
- Highest flow rates in the industry
- Longest lifetime
- Wet-pack option for quick installation
- Ultraclean option for absolute cleanliness
- All-fluoropolymer for maximum chemical resistance
- 100% integrity tested for consistent quality

Applications
- Wet etch and clean
  - Hot phosphoric acid
  - Sulfuric acid
  - Hydrofluoric acid
  - Nitric acid
  - Piranha
  - SC1,SC2
  - NMP-based solvents
- Other high temperature or ozonated processes

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Fluoroflow®-XL

Highest-performace all-fluoropolymer cartridge for aggressive applications

The Fluoroflow®-XL filter cartridge is setting the new standard for exceptional flow rates and on-stream life. It utilizes a larger diameter cartridge (3.25”) combined with our unique SELECT pleating technology that increases filtration area and flow rate by over 70%. This results in increased bath turnover and longer filter lifetime demanded by today’s advanced 300mm fabs. The all-fluoropolymer construction provides excellent chemical resistance for the most aggressive applications up to 180°C. Its integral filter design maximizes up-time with safe and simple change-outs. Available wet-packed for quick installation or Ultraclean wet-packed which offers the lowest metals extractables in the industry.

Benefits
• Extra large filtration area for longer life
• Highest flow rates for maximum bath turn over
• Wet-pack option for quick installation
• Ultraclean option for absolute cleanliness
• All-fluoropolymer for maximum chemical resistance
• 100% integrity tested for consistent quality

Applications
• Wet etch and clean
  – Phosphoric acid
  – Sulfuric acid
  – Hydrofluoric acid
  – Nitric acid
  – Piranha
  – SC1,SC2
  – NMP-based solvents
• Other high temperature or ozonated processes

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Fluorocap®

All-fluoropolymer capsule for the most aggressive applications

The Fluorocap® encapsulated filter cartridge is our standard product for aggressive wet etch and clean applications. It provides good flow rates and on-stream life at an economical price. The all-fluoropolymer construction provides excellent chemical resistance for the most aggressive applications up to 180°C. Its integral filter design maximizes up-time with safe and simple change-outs. Available wet-packed for quick installation or Ultraclean wet-packed which offers the lowest metals extractables in the industry.

Benefits

• Economical
• Wide range of configurations and ratings
• Wet-pack option for quick installation
• Ultraclean option for absolute cleanliness
• All-fluoropolymer for maximum chemical resistance
• 100% integrity tested for consistent quality

Applications

• Wet etch and clean
  – Hot phosphoric acid
  – Sulfuric acid
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The Fluorocap®-SELECT encapsulated filter cartridge provides exceptional flow rates and on-stream life. It utilizes our unique SELECT pleating that increases filtration area and flow by over 25% compared to our standard Fluorocap®. This results in increased bath turnover and longer filter lifetime demanded by today’s fabs. The all-fluoropolymer construction provides excellent chemical resistance for the most aggressive applications up to 180°C. Its integral filter design maximizes up-time with safe and simple change-outs. Available wet-packed for quick installation or Ultraclean wet-packed which offers the lowest metals extractables in the industry.

Benefits
• Large filtration area for longer life
• High flow rates for maximum bath turn over
• Wet-pack option for quick installation
• Ultraclean option for absolute cleanliness
• All-fluoropolymer for maximum chemical resistance
• 100% integrity tested for consistent quality

Applications
• Wet etch and clean
  – Hot phosphoric acid
  – Sulfuric acid
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Benefits
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- Longest lifetime
- Wet-pack option for quick installation
- Ultraclean option for absolute cleanliness
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Applications
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  - Hot phosphoric acid
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Benefits

• Extra large filtration area for longer life
• Highest flow rates for maximum bath turn over
• Wet-pack option for quick installation
• Ultraclean option for absolute cleanliness
• All-fluoropolymer for maximum chemical resistance
• 100% integrity tested for consistent quality

Applications

• Wet etch and clean
  – Hot phosphoric acid
  – Sulfuric acid
  – Hydrofluoric acid
  – Nitric acid
  – Piranha
  – SC1, SC2
  – NMP-based solvents
• Other high temperature or ozonated processes

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Chemflow®-PE

Chemically-resistant cartridge for bulk and lower temperature applications

The Chemflow®-PE filter cartridge uses a PTFE membrane along with HDPE supports that provide an economical alternative to all-fluoropolymer cartridges. It provides a high degree of retention and cleanliness along with good flow and lifetime. This filter is ideally suited for bulk chemical delivery and lower temperature wet processes (<60°C). It is available dry or wet-packed for quick installation.

Benefits
- Good flow rates
- Long lifetime
- Wet-pack option for quick installation
- PTFE/HDPE construction for chemical resistance
- 100% integrity tested in cleanroom environment

Applications
- Bulk chemical delivery
  - Acids, bases, solvents, photochemicals
  - Wet etch and clean (< 60°C)
  - Phosphoric acid
  - Hydrofluoric acid
  - Nitric acid
  - SC1,SC2
  - Solvents

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**Chemflow®-XF**

**Highest-flowing cartridge for bulk and lower temperature chemical applications**

The Chemflow®-XF filter cartridge uses a superior asymmetric PTFE membrane than provides unmatched flow rates and on-stream life. It is constructed with HDPE supports that provide an economical alternative to all fluoropolymer cartridges while still maintaining a high degree of retention and cleanliness. This filter is ideally suited for bulk chemical delivery and lower temperature wet processes (<60°C). Customers using the cartridge for viscous fluids like phosphoric acid, have reported flow rates and lifetimes more than twice that of the leading competitor. These advantages help improve yields while decreasing overall filtration costs. In bulk delivery applications, the high flow allows for reduced system sizing and associated savings. It is available dry or wet-packed for quick installation.

**Benefits**
- Highest flow rates in the industry
- Long lifetime
- Wet-pack option for quick installation
- PTFE/HDPE construction for chemical resistance
- 100% integrity tested in cleanroom environment

**Applications**
- Bulk chemical delivery
  - Acids, bases, solvents, photochemicals
- Wet etch and clean (< 60°C)
  - Phosphoric acid
  - Hydrofluoric acid
  - Nitric acid
  - SC1, SC2
  - Solvents

**Parker Hannifin Corporation** provides our customers with unsurpassed product consistency and cost-efficiency. Our experienced professionals can help you select the right solution for your application. For more information or to place an order, contact your local distributor. Information on product specifications, applications and chemical compatibility can be found on our web site at www.parker.com or through your nearest Parker Hannifin Corporation office.

**Parker Hannifin Corporation** designs and manufactures an extensive line of innovative solutions for specific applications in the Microelectronics, Biopharmaceutical, Food and Beverage, Industrial and Chemical industries.
Chemically-resistant cartridge for ultrapure microelectronics fluids and gases

The Proflow™ II-E filter cartridge uses a PTFE membrane along with high-purity polypropylene supports that provide an economical alternative to all-fluoropolymer cartridges. It provides a high degree of retention and cleanliness along with good flow and lifetime. This filter is ideally suited for ultrapure microelectronics fluids and gases. The hydrophobic PTFE membrane serves as a highly efficient barrier to insure low moisture content of gases. It is available dry or wet-packed for quick installation and lower extractables.

Benefits
- Good liquid and gas flow rates
- Wet-pack option for quick installation
- PTFE/PP construction for chemical resistance
- Wide variety of configurations and ratings
- 100% integrity tested in cleanroom environment

Applications
- Bulk chemical delivery
  – Acids, bases, solvents, photochemicals
- Wet etch and clean
  – Dilute acids
  – DI water (<80°C)
- Ultrapure electronics-grade gases

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Parker Hannifin Corporation designs and manufactures an extensive line of innovative solutions for specific applications in the Microelectronics, Biopharmaceutical, Food and Beverage, Industrial and Chemical industries.
High-performance cartridge for ultrapure microelectronics fluids and gases

The Proflow™II-E-SELECT filter cartridge provides exceptional flow rates and on-stream life. It uses a PTFE membrane along with high-purity polypropylene supports that provide an economical alternative to all fluoropolymer cartridges. With its unique SELECT pleating technology, the liquid flow rates are increased by up to 50% versus our standard Proflow®II-E. This filter is ideally suited for ultrapure microelectronics fluids and gases. It is available dry or wet-packed for quick installation and lower extractables.

Benefits
- Excellent liquid and gas flow rates
- Wet-pack option for quick installation
- PTFE/PP construction for chemical resistance
- 100% integrity tested in cleanroom environment

Applications
- Bulk chemical delivery
  - Acids, bases, solvents, photochemicals
  - Wet etch and clean
  - Dilute acids
  - DI water (<80°C)
- Ultrapure electronics-grade gases

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Proflow™ II-E Mini-Cartridges

Small-volume cartridge for ultrapure microelectronics fluids and gases

The Proflow™ II-E mini cartridge uses a PTFE membrane along with high-purity polypropylene supports that provide an economical alternative to all-fluoropolymer cartridges. It provides a high degree of retention and cleanliness along with good flow and lifetime. This filter is ideally suited for ultrapure microelectronics fluids and gases. The hydrophobic PTFE membrane serves as a highly efficient barrier to insure low moisture content of gases. Its design uses an internal 116 O-ring that is available in several materials.

Benefits

• Good liquid and gas flow rates
• PTFE/PP construction for chemical resistance
• Secure internal O-ring seal
• 100% integrity tested in cleanroom environment

Applications

• Wet etch and clean
  – Dilute acids
  – DI water (<80°C)
• Ultrapure electronics-grade gases
• Drying systems

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Parker Hannifin Corporation designs and manufactures an extensive line of innovative solutions for specific applications in the Microelectronics, Biopharmaceutical, Food and Beverage, Industrial and Chemical industries.
Proflow™ II-E Mini-Capsules

Small-volume capsule for ultrapure microelectronics fluids and gases

The Proflow™ II-E mini-capsule uses a PTFE membrane along with high-purity polypropylene supports that provide an economical alternative to all-fluoropolymer cartridges. It provides a high degree of retention and cleanliness along with good flow and lifetime. This filter is ideally suited for ultrapure microelectronics fluids and gases. The hydrophobic PTFE membrane serves as a highly efficient barrier to insure low moisture content of gases.

Fast and easy change-outs are assured with the encapsulated design. Three sizes are available to match the application and minimize hold-up volume.

Benefits
- Good liquid and gas flow rates
- PTFE/PP construction for chemical resistance
- Fast and easy change-out
- Three capsule sizes
- 100% integrity tested

Applications
- Wet etch and clean
  - Dilute acids
  - DI water (<80°C)
- Ultrapure electronics-grade gases
- Small-volume lab systems

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Parker Hannifin Corporation designs and manufactures an extensive line of innovative solutions for specific applications in the Microelectronics, Biopharmaceutical, Food and Beverage, Industrial and Chemical industries.
Clariflow®-WE

Economical hydrophilic PES membrane cartridges for aqueous applications

Clariflow®-WE cartridges provide an economical way to filter fluids used in microelectronics such as DI water and aqueous-based chemicals. Constructed of the same high-quality materials as Clariflow®-E or E-SELECT, these cartridges are suited to less demanding applications with respect to flow and lifetime.

The combination of hydrophilic PES membrane and a high-purity, all-polypropylene support structure results in a very low level of ionic and organic extractables, broad chemical compatibility, and resistance to particle shedding.

Every cartridge is fabricated in a clean room environment, pre-flushed with 18 megohm-cm ultrapure DI water, and 100% integrity tested in an ISO-certified facility.

Benefits

• Economical filtration
• High-retention hydrophilic membrane
• Broad chemical compatibility for multiple applications
• 100% integrity tested

Applications

• BOE
• Dilute HF
• POU DI rinse
• Bulk DI water systems
• Copper plating
• Ni plating
• Hard disk wash processes
• Other dilute acids and bases

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Parker Hannifin Corporation designs and manufactures an extensive line of innovative solutions for specific applications in the Microelectronics, Biopharmaceutical, Food and Beverage, Industrial and Chemical industries.
Clariflow®-E cartridges are optimized for use in microelectronics applications such as DI water and aqueous-based chemicals. The unique mirrored-anisotropic PES (Polyethersulfone) membrane has exceptionally high flow rates and on-stream lifetime while providing consistent removal of both organic and inorganic particulates.

The combination of hydrophilic PES membrane and a high-purity, all-propylene support structure results in a very low level of ionic and organic extractables, broad chemical compatibility, and resistance to particle shedding.

Every cartridge is fabricated in a clean room environment, pre-flushed with 18 megohm-cm ultrapure DI water, and 100% integrity tested in an ISO-certified facility.

Benefits
• High-retention hydrophilic membrane
• High flow rate
• Broad chemical compatibility for multiple applications
• Long on-stream life
• 100% integrity tested

Applications
• BOE
• Dilute HF
• POU DI rinse
• Bulk DI water systems
• Copper plating
• Ni plating
• Hard disk wash processes
• Other dilute acids and bases

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Parker Hannifin Corporation designs and manufactures an extensive line of innovative solutions for specific applications in the Microelectronics, Biopharmaceutical, Food and Beverage, Industrial and Chemical industries.
Clariflow®-E-Select

High-performance hydrophilic PES membrane cartridges for aqueous applications

Clariflow®-E-SELECT cartridges are optimized for use in microelectronics applications such as DI water and aqueous-based chemicals. The unique mirrored-anisotropic PES (Polyethersulfone) membrane has exceptionally high flow rates and on-stream lifetime while providing consistent removal of both organic and inorganic particulates.

The innovative SELECT pleating provides increased performance over competitive cartridges. Membrane area is increased by over 50% while flows are 40% higher within the same footprint. The result is one of the longest lasting cartridges on the market.

The combination of hydrophilic PES membrane and a high-purity, all-polypropylene support structure results in a very low level of ionic and organic extractables, broad chemical compatibility, and resistance to particle shedding.

Every cartridge is fabricated in a clean room environment, pre-flushed with 18 megohm-cm ultrapure DI water, and 100% integrity tested in an ISO-certified facility.

Benefits

• High-retention hydrophilic membrane
• Unique SELECT pleating technology
• High flow rates for increased bath turnover
• Broad chemical compatibility for multiple applications
• Wide range of configurations and ratings
• Reduced overall cost of filtration
• 100% integrity tested

Applications

• BOE
• Dilute HF
• POU DI rinse
• Bulk DI water systems
• Copper plating
• Ni plating
• Hard disk wash processes
• Other dilute acids and bases

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Clariflow®-E Mini-Cartridges

Small-volume Hydrophilic PES membrane cartridges for aqueous applications

Clariflow®-E mini-cartridges are optimized for use in small-volume microelectronics applications such as DI water and aqueous-based chemicals. The unique mirrored-anisotropic PES (Polyethersulfone) membrane has exceptionally high flow rates and on-stream lifetime while providing consistent removal of both organic and inorganic particulates.

The combination of hydrophilic PES membrane and a high-purity, all-polypropylene support structure results in a very low level of ionic and organic extractables, broad chemical compatibility, and resistance to particle shedding.

Its design uses an internal 116 O-ring available in several materials.

Benefits
- High-retention hydrophilic membrane
- High flow rate
- Broad chemical compatibility for multiple applications
- Secure internal O-ring seal
- 100% integrity tested

Applications
- Aqueous electronics chemicals
- Small-volume lab systems
- DI water

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Clariflow®-E Mini-Capsules

Encapsulated PES membrane filters for microelectronics applications

Clariflow®-E capsules filter high-quality water and solvents in semiconductor and microelectronics applications. The mirrored anisotropic polyethersulfone (PES) membrane provides superior fluid flow rates, extended on-stream life, and highly efficient removal of organic and inorganic particulates that can impact process quality. Clariflow-E capsules are available in a variety of sizes and endfitting combinations enabling users select the best configuration for their system requirements.

The encapsulated design maximizes efficiency by providing faster, easier change-out without laborious cleaning procedures. Eliminating the need to open reusable housings for cartridge replacement minimizes the chance of introducing contamination into the process, and promotes safety by reducing the risk of exposure to potentially hazardous fluids.

Benefits

• Reduce process down time, chance of contamination and risk of exposure to hazardous materials
• Low extractables shorten start-up time
• High flow rate reduces processing time
• Improved design prevents vent caps from disconnecting under pressure

Applications

• Deionized water at point-of-use
• Aqueous chemical fluids

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Clariflow®-E

Hydrophilic PES membrane cartridges for aqueous applications

Clariflow®-E cartridges are optimized for use in microelectronics applications such as DI water and aqueous-based chemicals. The unique mirrored-anisotropic PES (Polyethersulfone) membrane has exceptionally high flow rates and on-stream lifetime while providing consistent removal of both organic and inorganic particulates.

The combination of hydrophilic PES membrane and a high-purity, all-polypropylene support structure results in a very low level of ionic and organic extractables, broad chemical compatibility, and resistance to particle shedding.

Every cartridge is fabricated in a clean room environment, pre-flushed with 18 megohm-cm ultrapure DI water, and 100% integrity tested in an ISO-certified facility.

Benefits

- High-retention hydrophilic membrane
- High flow rate
- Broad chemical compatibility for multiple applications
- Long on-stream life
- 100% integrity tested

Applications

- BOE
- Dilute HF
- POU DI rinse
- Bulk DI water systems
- Copper plating
- Ni plating
- Hard disk wash processes
- Other dilute acids and bases

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Clariflow®-E-Select

High-performance hydrophilic PES membrane cartridges for aqueous applications

Clariflow®-E-SELECT cartridges are optimized for use in microelectronics applications such as DI water and aqueous-based chemicals. The unique mirrored-anisotropic PES (Polyethersulfone) membrane has exceptionally high flow rates and on-stream lifetime while providing consistent removal of both organic and inorganic particulates.

The innovative SELECT pleating provides increased performance over competitive cartridges. Membrane area is increased by over 50% while flows are 40% higher within the same footprint. The result is one of the longest lasting cartridges on the market.

The combination of hydrophilic PES membrane and a high-purity, all-polypropylene support structure results in a very low level of ionic and organic extractables, broad chemical compatibility, and resistance to particle shedding.

Every cartridge is fabricated in a clean room environment, pre-flushed with 18 megohm-cm ultrapure DI water, and 100% integrity tested in an ISO-certified facility.

Benefits
• High-retention hydrophilic membrane
• Unique SELECT pleating technology
• High flow rates for increased bath turnover
• Broad chemical compatibility for multiple applications
• Wide range of configurations and ratings
• Reduced overall cost of filtration
• 100% integrity tested

Applications
• BOE
• Dilute HF
• POU DI rinse
• Bulk DI water systems
• Copper plating
• Ni plating
• Hard disk wash processes
• Other dilute acids and bases

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Polyflow®

Absolute-rated polypropylene depth cartridges for electronics applications

Polyflow® cartridges are optimized for use in electronics applications. They feature a random-fiber polypropylene depth matrix that provides excellent retention efficiencies and onstream life. The unique calendering process produces depth media with an absolute rating and superior dirt-holding capacity.

These cartridges are thermally bonded from 100% virgin polypropylene to ensure a high level of cleanliness and chemical compatibility.

Benefits
- High-retention depth matrix
- High flow rate
- Wide variety of configurations and ratings
- Economical prefiltration

Applications
- Solder plating
- Prefiltration of electronics-grade chemicals
- DI water

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Polyflow®-CMP

All-polypropylene nominal-rated depth cartridges for CMP slurry filtration

Polyflow®-CMP depth cartridges have been developed to reduce post-CMP defectively by removing undesirable large particles and gels from a wide variety of CMP slurries. Its high dirt-loading, random-fiber depth media provides consistent particle retention in ratings from 0.2 μm to 30 μm without removing a significant amount of smaller ‘working particles’. The cartridges are thermally bonded from 100% virgin polypropylene to ensure low extractables and chemical compatibility with both acidic and alkaline slurries.

Configurations are available in lengths from 5” to 40” with 10 fitting options. The specially-designed depth media maximizes flow rate and service life to reduce downtime associated with change-outs.

Benefits
- Removes undesirable large particles while retaining working slurry particles
- Chemically compatible with both acidic and alkaline slurries
- High flow rate and long service life reduce system downtime
- Superior particle retention protects downstream filters and reduces overall filtration costs

Applications
- Colloidal silica CMP slurry
- POU, distribution loop and supply
  - Oxide
  - Copper
  - Polysilicon

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Lithography
Polypropylene membrane cartridges for microelectronics

Polyflow® Membrane cartridges are optimized for use in microelectronics applications such as bulk chemicals and photoresists. The all-polypropylene construction is an economical alternative to fluoropolymer-based cartridges.

Every cartridge is fabricated in a clean room environment, pre-flushed with 18 megohm-cm ultrapure DI water, and 100% integrity tested in an ISO-certified facility.

Benefits

• High-retention membrane
• Wide range of configurations and ratings
• 100% integrity tested

Applications

• Bulk photoresist
• Bulk electronics grade chemicals

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Polyflow® Membrane-Select

High-performance polypropylene membrane cartridges for microelectronics

Polyflow® MEMBRANE-SELECT cartridges are optimized for use in microelectronics applications such as bulk chemicals and photoresists. The all-polypropylene construction is an economical alternative to fluoropolymer-based cartridges.

The innovative SELECT pleating provides increased performance over competitive cartridges. Membrane area is increased by about 30% while flows are more than 50% higher within the same footprint. The result is one of the longest-lasting cartridges on the market.

Every cartridge is fabricated in a clean room environment, pre-flushed with 18 megohm-cm ultrapure DI water, and 100% integrity tested in an ISO-certified facility.

Benefits
• High-retention membrane
• Unique SELECT pleating technology
• High flow rates
• Wide range of configurations and ratings
• 100% integrity tested

Applications
• Bulk photoresist
• Bulk electronics grade chemicals

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Chemflow®-PE

Chemically-resistant cartridge for bulk and lower temperature applications

The Chemflow®-PE filter cartridge uses a PTFE membrane along with HDPE supports that provide an economical alternative to all-fluoropolymer cartridges. It provides a high degree of retention and cleanliness along with good flow and lifetime. This filter is ideally suited for bulk chemical delivery and lower temperature wet processes (<60°C). It is available dry or wet-packed for quick installation.

Benefits

- Good flow rates
- Long lifetime
- Wet-pack option for quick installation
- PTFE/HDPE construction for chemical resistance
- 100% integrity tested in cleanroom environment

Applications

- Bulk chemical delivery
  - Acids, bases, solvents, photochemicals
  - Wet etch and clean (< 60°C)
  - Phosphoric acid
  - Hydrofluoric acid
  - Nitric acid
  - SC1,SC2
  - Solvents

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Chemflow®-XF

Highest-flowing cartridge for bulk and lower temperature chemical applications

The Chemflow®-XF filter cartridge uses a superior asymmetric PTFE membrane than provides unmatched flow rates and on-stream life. It is constructed with HDPE supports that provide an economical alternative to all fluoropolymer cartridges while still maintaining a high degree of retention and cleanliness. This filter is ideally suited for bulk chemical delivery and lower temperature wet processes (<60°C). Customers using the cartridge for viscous fluids like phosphoric acid, have reported flow rates and lifetimes more than twice that of the leading competitor. These advantages help improve yields while decreasing overall filtration costs. In bulk delivery applications, the high flow allows for reduced system sizing and associated savings. It is available dry or wet-packed for quick installation.

Benefits

• Highest flow rates in the industry
• Long lifetime
• Wet-pack option for quick installation
• PTFE/HDPE construction for chemical resistance
• 100% integrity tested in cleanroom environment

Applications

• Bulk chemical delivery
  – Acids, bases, solvents, photochemicals
• Wet etch and clean (< 60°C)
  – Phosphoric acid
  – Hydrofluoric acid
  – Nitric acid
  – SC1,SC2
  – Solvents

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Proflow™ II-G

Hydrophobic PTFE membrane for general purpose gas and solvent purification

Proflow™ II-G cartridges provide an economic alternative for general applications where reliable gas and liquid flow rates are required. With 5.6 square feet of expanded PTFE membrane, Proflow II-G is a highly efficient hydrophobic barrier, for the production of dry gas, and will effectively purify aggressive liquids and organic solvents.

Proflow™ II-G cartridges are manufactured under cleanroom conditions and integrity tested before shipment to assure consistent performance and quality.

Benefits
- Reliable air and liquid flow rates for effective performance
- Broad chemical compatibility enables use in many applications
- Broad range of micron ratings for user convenience
- Superior hydrophobicity for long life in vent/air applications
- Integrity tested to ensure quality

Applications
- Photoresists
- Compressed gas
- Non-sterile venting
- Electronic grade solvents
- Hot deionized water (less than 80°C)

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Clariflow®-G

Hydrophilic Polyethersulfone (PES) membrane for aqueous liquid filtration applications

Clariflow®-G cartridges are designed for general-purpose use in the filtration of high-purity liquids and aqueous chemicals.

The mirrored-anisotropic Polyethersulfone (PES) membrane is inherently hydrophilic and has a pore morphology that delivers exceptionally high flow rates.

Because there are no added surfactants or wetting agents, and the support layers and structure are all-polypropylene, the filter exhibits low extractables, broad chemical compatibility and good resistance to hydrolysis.

Benefits

• High flow rate reduces processing time
• Broad chemical compatibility allows use in most applications
• Low differential pressure reduces system wear and tear
• Chemical filtration

Applications

• Chemical filtration
• Liquid clarification
• Recirculating fluids
• General use water filtration
• Deionized water systems

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Parker Hannifin Corporation designs and manufactures an extensive line of innovative solutions for specific applications in the Microelectronics, Biopharmaceutical, Food and Beverage, Industrial and Chemical industries.
Absolute-rated polypropylene depth cartridges for electronics applications

Polyflow® cartridges are optimized for use in electronics applications. They feature a random-fiber polypropylene depth matrix that provides excellent retention efficiencies and onstream life. The unique calendering process produces depth media with an absolute rating and superior dirt-holding capacity.

These cartridges are thermally bonded from 100% virgin polypropylene to ensure a high level of cleanliness and chemical compatibility.

Benefits
• High-retention depth matrix
• High flow rate
• Wide variety of configurations and ratings
• Economical prefiltration

Applications
• Solder plating
• Prefiltration of electronics-grade chemicals
• DI water

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Polyflow®-G

All-polypropylene nominal-rated depth cartridges for economical prefiltration

Polyflow®-G depth media has been developed for a wide variety of general process applications from fluid clarification to general prefiltration. Its high dirt-loading, random-fiber polypropylene depth media provides consistent particle retention. Polyflow®-G is thermally bonded from 100% virgin polypropylene to ensure clean filtrates and excellent chemical and thermal compatibility in the most demanding processing conditions. Polyflow®-G leads in overall reduction of filtration costs when compared to spunbonded, stringwound, and nominally-rated pleated prefiltro cartridges. Its longer filtration life reduces downtime due to fewer change-outs.

Benefits
- High flow rate and long service life reduce processing time
- Broad chemical compatibility allows use in most applications
- Thermally bonded construction minimizes extractables for cleaner filtrates

Applications
- Solvent filtration
- Liquid clarification
- Recirculating liquids
- General water filtration
- Reagent grade chemicals
- RO/DI prefiltration
- Waste water

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Parker Hannifin Corporation designs and manufactures an extensive line of innovative solutions for specific applications in the Microelectronics, Biopharmaceutical, Food and Beverage, Industrial and Chemical industries.
Polyflow® Mini-Cartridges

Small-volume polypropylene depth cartridges for electronics applications

Polyflow® mini-cartridges are optimized for use in small-volume applications such as DI water and aqueous-based chemicals. They feature a random-fiber polypropylene depth matrix that provides excellent retention efficiencies. The unique calendering process produces depth media with superior dirt-holding capacity that extends useful life.

Its design uses an internal 116 O-ring that is available in several materials.

Benefits
- High-retention depth matrix
- High flow rate
- Economical prefiltration
- Secure internal O-ring seal

Applications
- Prefiltration of electronics-grade chemicals
- Small-volume lab systems
- DI water

Parker Hannifin Corporation provides our customers with unsurpassed product consistency and cost-efficiency. Our experienced professionals can help you select the right solution for your application. For more information or to place an order, contact your local distributor. Information on product specifications, applications and chemical compatibility can be found on our web site at www.parker.com or through your nearest Parker Hannifin Corporation office.

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Polyflow®Mini-Capsules

Encapsulated filters with polypropylene depth matrix for small-volume prefiltration applications

Polyflow® Capsules feature a random-fiber polypropylene depth matrix that provides superior retention efficiencies. In addition, the unique calendering process produces depth media with unsurpassed dirt-holding capacity that extends filter service life. Longer life leads to increased savings by requiring fewer filter change-outs.

Polyflow® capsules are available in three sizes, enabling users to match the filters to actual batch sizes and minimize the hold-up volume. Cost savings result from the reduction of lost product, and by scaling the process properly to avoid excess filter capacity.

The encapsulated design maximizes efficiency by providing faster, easier change-out without laborious cleaning procedures. Eliminating the need to open reusable housings for cartridge replacement minimizes the chance of introducing contamination into the process, and promotes safety by reducing the risk of exposure to potentially hazardous fluids.

Benefits

- High flow rate reduces processing time
- Long service life minimizes change out frequency
- Broad chemical compatibility enables use in most applications
- High retention efficiency provides excellent protection for downstream filters

Applications

- Non-pyrogenic (per LAL test) for use in critical applications
- Custom ordering option allows different inlet/outlet fittings for specific needs

Applications

- Solvent and reagent grade chemicals
- Lab scale RO/DI pre-filtration
- Recirculating liquids
- General water filtration
- Vent filtration

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ENGINEERING YOUR SUCCESS.
High purity and rugged design for aggressive chemical filtration

The simple, yet rugged design of the TruFluor filtration housing is an excellent solution to any aggressive chemical filtration problem. The two-piece design allows for ease of installation and a positive seal.

Benefits

• High purity PFA construction
• Also available in PVDF
• Broad chemical compatibility
• Extremely low extractables
• Available in 4” and 10” versions
• Standard ¼” gauge connections upstream and downstream

Applications

• High purity acids and bases
• Aggressive chemical filtration
• Acid etch and BOE
• Photomask and Photoresist
  – Chemicals
  – Solvents
  – Developers

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High purity PFA filter housing

The Trufluor +™ filter housing is designed for maximum chemical resistance and high purity for microelectronics applications. Constructed of PFA (wetted parts) and PVDF (non-wetted parts), this housing is compatible with the most aggressive chemistries. The high-purity materials of construction and cleanroom packaging insure a high level of cleanliness. The housing consists of a stationary bowl and locking ring that provides a positive seal and easy filter replacement. It is compatible with our Fluoroflow® line of all-fluoropolymer cartridges including the large-diameter Fluoroflow®-XL in lengths of 10, 20 and 30 inches.

Benefits
- Excellent chemical resistance
- High-purity construction
- Packaged in cleanroom
- High flow rates
- Compatible with 2.75" and 3.25" diameter cartridges

Applications
- Wet etch and clean (90°C or less)
- Photochemicals
- DI water

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Fulflo® NP

Natural Polypropylene filter housings for electronics-grade chemicals

The Fulflo® filter housings are designed for high purity electronics applications. Its natural polypropylene construction provides good chemical compatibility and cleanliness. These housings offer an economical alternative to stainless steel or PFA for less aggressive chemistries. They are available in both 10- and 20-inch lengths and both single- and double-open end designs. A secure head-to-shell O-ring ensures effective sealing while a positive ‘stop’ design prevents overtightening.

Benefits

- High-purity construction
- Versatile design
- Economical
- Good flow rates

Applications

- Bulk chemical delivery of electronics-grade chemicals
- CMP slurries
- Plating solutions
- DI water

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Parker Hannifin Corporation designs and manufactures an extensive line of innovative solutions for specific applications in the Microelectronics, Biopharmaceutical, Food and Beverage, Industrial and Chemical industries.
This chemical compatibility chart uses a rating system: A, B, C and F (most compatible to least) and is an easy way of rating a filter based solely on its chemical compatibility. However, all chemical compatibility guides are intended as general reference documents. By their nature, they cannot address the wide ranges of process parameters and their interactions. These include variations in temperature, pressure, chemical concentration, solid or liquid phase, pH level, and solubility. As each of these parameters is changed, so a material's resistance to chemical attack can be affected.

Due to this variability, we recommend that users contact our Technical Services team in order to confirm the suitability and chemical resistance of a proposed filter material for each application. Our Technical Services team will undertake a compatibility evaluation and provide a product recommendation.

<table>
<thead>
<tr>
<th>FILTERS</th>
<th>O-RINGS</th>
<th>HOUSINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic Acid (5-80%)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Acetic Acid Glacial</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Acetone (Dimethylketone)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Ammonium Fluoride</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Ammonium Hydroxide</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Aquasol</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>BOE; NH4F-HF</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Carbon Tetrachloride</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Citric Acid</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Chrom Phos; (32:10:1) H2O:H3PO4:CrO2</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Coating Aquator AZ</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Copper Sulfate</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Dimethyl Sulfoxide (DMSO)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>EGMEA</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>EKC (Strip) Pyrrolidone, n-methyl (NMP) to 40°C</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>EKC (Strip) Pyrrolidone, n-methyl (NMP) 40-50°C</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Ethanol</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Freon TF</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Hexamethyldisilazane (HMDS)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Hydrochloric Acid (5-30%)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Hydrofluoric Acid (10-49%)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Hydrofluoric Acid 50%</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Hydrofluoric Acid (conc.) cold</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Hydrogen Peroxide (3-10%)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Hydrogen Peroxide (11-30%)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Hydrogen Peroxide (31-90%)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Isopropyl Alcohol (IPA)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Methanol</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Methylene Chloride</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Methyl Ethyl Ketone (MEK)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Mixed Acid Etch; (HNO3&gt;20%;HF;CH3:CO2H)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Negative Resist</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Nitric Acid (10-35%)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Nitric Acid (50-70%)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Nitric Acid (conc.)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>NOE; NH4F:H2O: Ethylene Glycol/Surfactant</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>P-Etch; (92:5:3) DI H2O:HF:HNO3</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>
# Chemical Compatibility Chart

## Microelectronics Industry

<table>
<thead>
<tr>
<th>FILTERS</th>
<th>O-RINGS</th>
<th>HOUSINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEGMEA</strong></td>
<td>A A B A C C F</td>
<td>A A F F F F F</td>
</tr>
<tr>
<td><strong>Petroleum Ether</strong></td>
<td>A A F C C C C</td>
<td>A A B F F F B</td>
</tr>
<tr>
<td><strong>Perna; (H2SO4:H2O2)</strong></td>
<td>A A F F F F F</td>
<td>A A F F F F F</td>
</tr>
<tr>
<td><strong>Phosphoric Acid (10-19%) to 65°C</strong></td>
<td>A A A A A A A C</td>
<td>A A A A A B B</td>
</tr>
<tr>
<td><strong>Phosphoric Acid (20-50%) to 65°C</strong></td>
<td>A A A A A A A C</td>
<td>A A A A A F F</td>
</tr>
<tr>
<td><strong>Phosphoric Acid (51-80%) to 65°C</strong></td>
<td>A A F C A A F</td>
<td>A A A A B F F</td>
</tr>
<tr>
<td><strong>Phosphoric Acid (conc.) to 65°C</strong></td>
<td>A A A F A A F</td>
<td>A A A B F F F</td>
</tr>
<tr>
<td><strong>Phosphoric Acid 65-150°C</strong></td>
<td>A A F F F F F</td>
<td>A A F F F F F</td>
</tr>
<tr>
<td><strong>PMMA Developer</strong></td>
<td>A A A B C C F</td>
<td>A A F A F F F</td>
</tr>
<tr>
<td><strong>PMMA Rinse</strong></td>
<td>A A A B C C F</td>
<td>A A F B F F F</td>
</tr>
<tr>
<td><strong>Positive Resist AZ 4330</strong></td>
<td>A A A B C C F</td>
<td>A A F C F F F</td>
</tr>
<tr>
<td><strong>Positive Resist</strong></td>
<td>A A A B C C F</td>
<td>A A F C F F F</td>
</tr>
<tr>
<td><strong>Positive Resist, Shipley S 1800</strong></td>
<td>A A A B C C F</td>
<td>A A F A F F F</td>
</tr>
<tr>
<td><strong>Positive Resist, Shipley S 1400</strong></td>
<td>A A A B C C F</td>
<td>A A F A F F F</td>
</tr>
<tr>
<td><strong>Positive Resist, Shipley System 8</strong></td>
<td>A A A B C C F</td>
<td>A A F A F F F</td>
</tr>
<tr>
<td><strong>Positive Resist, Shipley 1300 series</strong></td>
<td>A A A B C C F</td>
<td>A A F A F F F</td>
</tr>
<tr>
<td><strong>Positive Resist, AZ 5200 series</strong></td>
<td>A A A B C C F</td>
<td>A A F A F F F</td>
</tr>
<tr>
<td><strong>Potassium Hydroxide 10%</strong></td>
<td>A A A B A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Potassium Hydroxide 30%</strong></td>
<td>A A A B A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>PR-3000 (Strip) see Pyralldione</strong></td>
<td>A A A B A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Pyralldione, n-methyl (NMP) to 40°C</strong></td>
<td>A A A B A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>RCA Etch; (75:15:5:5); H3PO4:CH3CO2H:HNO3:DI H2O</strong></td>
<td>A A A B A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>SC1; (RCA Clean) NH4OH:H2O2:DI H2O</strong></td>
<td>A A A B A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>SC2; HCl:H2O2:DI H2O</strong></td>
<td>A A A B A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Sodium Hydroxide 5%</strong></td>
<td>A A A B A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Sodium Hydroxide (20-40%)</strong></td>
<td>A A A B A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Sulfuric Acid (5-25%) to 65°C</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Sulfuric Acid (50-60%) to 65°C</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Sulfuric Acid (75-98%) to 65°C</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Sulfuric Acid (conc.) to 65°C</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Sulfuric Acid 65-150°C</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Sulfuric Acid 65-150°C</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Tetramethyl Ammonium Hydroxide (TMAH 5%)</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Water, Deionized to 65°C</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Water, Deionized 65-95°C</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Water, Ozonated</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
<tr>
<td><strong>Xylene (Xylol)</strong></td>
<td>A A A A A A A A</td>
<td>A A B A B B</td>
</tr>
</tbody>
</table>
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