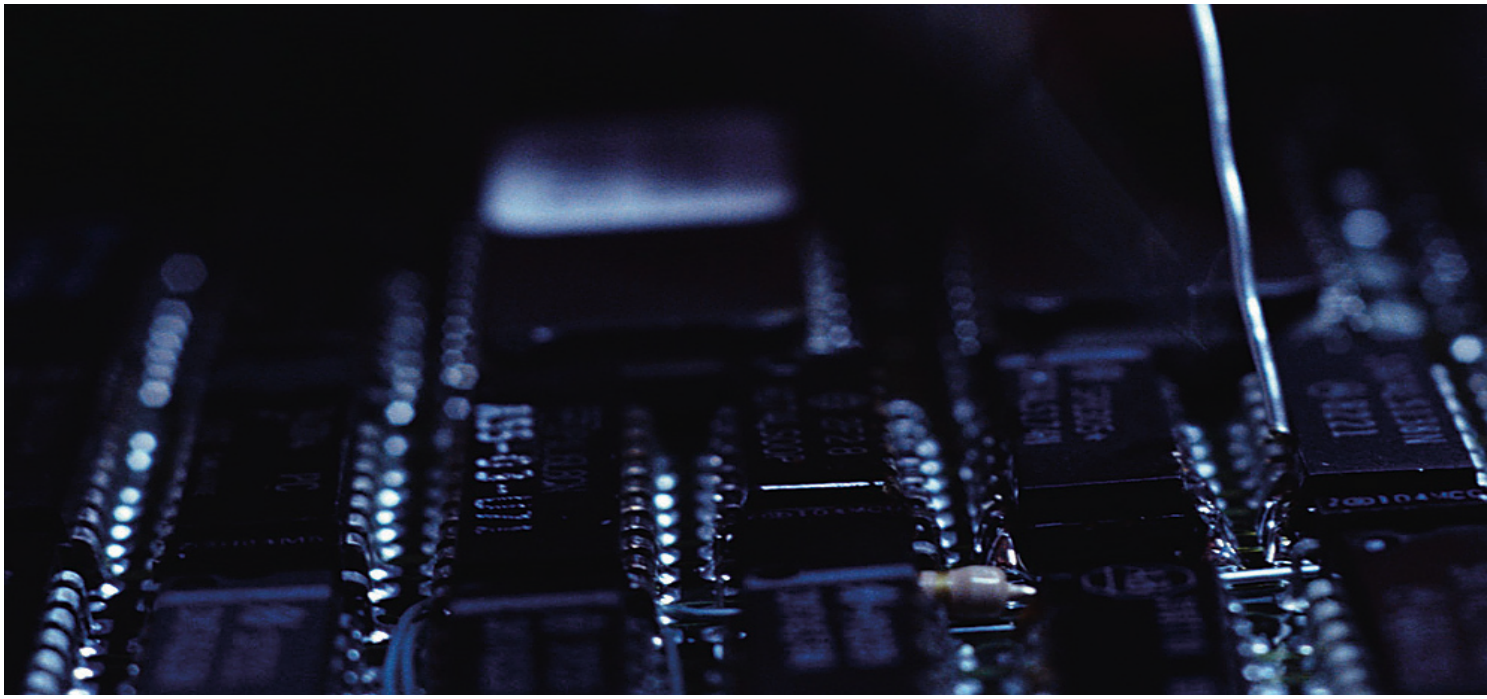
3M Purification Inc.

Electronics

Innovative Filtration Solutions

Quality. Consistency. Performance.

3M Purification is a world leader in advanced filtration systems and purification for the semiconductor and electronics industry.



Quality

3M Purification filtration and purification systems deliver worldwide QUALITY for consistent operation.

- ISO certified quality systems
- Global manufacturing and distribution
- Rigorous in-house validation and qualification of all products
- Customer support labs

Performance

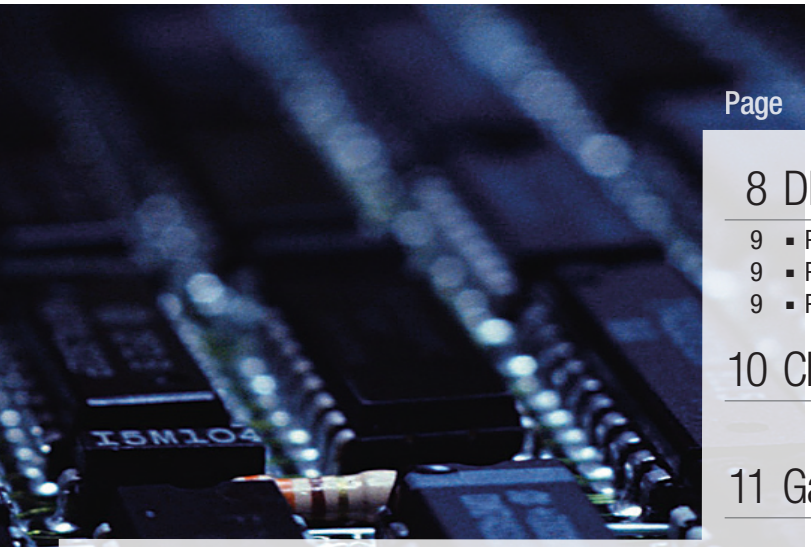
3M Purification filtration and purification solutions offer peak PERFORMANCE.

- Superior flow rates for enhanced process efficiencies and lower cost of ownership
- Industry leading classifying depth filters for CMP applications
- Broad range of filtration and housing products for optimizing customer process performance

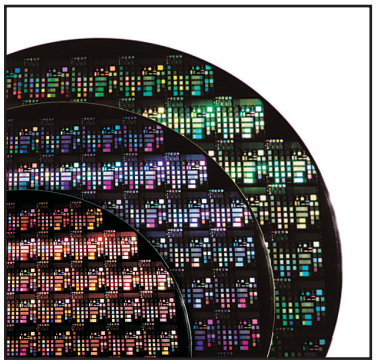
Innovation

3M Purification filtration and purification systems provide INNOVATION and state-of-the-art filtration technology.

- Advanced Pleat Technology (APT) manufacturing
- Continuously refining contaminant removal capabilities
- Zeta Plus™ Trace Metals Purifier
- Enhanced surface finish technology for metal housings



Contents



Investing Now to Grow With You In The Future

For more than 100 years, 3M Purification has developed innovative filtration and purification products by partnering with our customers to solve their critical contamination problems.

This partnership allows 3M Purification to evaluate future trends and technology requirements early in the process allowing us to deliver customized new products when you need them. This rapid delivery of new products is accomplished by utilizing a phase-gated product life cycle management process. Furthermore, 3M Purification maintains its technology leadership position by investing heavily in research and development year after year. 3M Purification offers some of the most advanced and novel products available to the semiconductor and electronics industries.

Enabling Semiconductor and Electronics Processes

3M Purification is an industry leader with a wide breadth of products, advanced manufacturing capabilities, global infrastructure, technical expertise, and customer support. 3M Purification has delivered innovative solutions that meet the needs of our customers, while continuously developing better ways to protect their manufacturing process from contamination. Identification of niche markets and development of novel specialty applications are principal to maintaining and expanding market share. 3M Purification technology is used for a wide range of applications, from DI Water to Photoresist to Chemical Mechanical Planarization (CMP). Recent new products include LifeASSURE™ PSN series Nylon Filter Cartridges and Capsules for photoresist and ancillary chemicals applications, and Betapure™ CMP Filter Cartridges and Capsules for CMP applications. 3M Purification filtration and purification systems are the preferred choice for DI water applications where critical cleaning of wafers, integrated circuits, video displays, and data storage devices is essential.

Photoresists, wet etch chemicals, and anti-reflective coatings are some of the most expensive materials used to manufacture electronics components. These chemicals demand the ultimate in purity and quality and for that reason 3M Purification filters and purifiers are the products of choice in fabs worldwide. 3M Purification has maintained its leadership in fluid filtration and purification by continually providing superior products and technical support. Our filtration and purification systems are designed and manufactured to the most stringent standards assuring repeatable and reliable performance in your application.

Quality Management & ISO Certified Quality Systems

3M Purification has established a global Quality Management (QM) Program which encompasses all facets of its operation. An essential part of the 3M Purification QM Program is the creation of cross-functional teams whose combined expertise is devoted to continuous improvement of processes, procedures, and quality systems. In addition, the 3M Purification QM Program ensures the active support and participation of senior management. 3M Purification is fully committed to the tenets of the QM Program and provides a support system for the quality process. 3M Purification's major manufacturing plants have ISO certified quality systems providing a consistent and verified method to manage its worldwide manufacturing processes.

At 3M Purification, Quality is defined by the never-ending pursuit for continuous improvement in products, services, support, and personnel.

Scientific Applications Support Services (SASS)

3M Purification's Scientific Applications Support Services (SASS) works closely with our customers' scientific and engineering staffs to solve difficult filtration and purification challenges and to recommend the most efficient, cost effective solutions. SASS routinely provides technical expertise, on-site support, and extensive testing in our laboratories throughout Asia, Europe, and the Americas. The SASS group is organized by market in order to create technical specialists who are aware of the application requirements of the semiconductor and electronics industries. SASS consists of more than 50 scientists and engineers from a wide range of scientific and technical disciplines, of which many hold Ph.D. degrees. As a result, 3M Purification is able to resolve difficult filtration and purification problems promptly and efficiently in a cost-effective, confidential manner by combining technical expertise with advanced analytical and particle counting equipment.

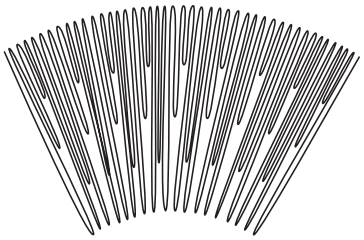
The cornerstone of 3M Purification's philosophy is service to customers, not only in product quality and prompt delivery, but also in application support and the sharing of scientific information.

Filtration & Purification Solutions for the Semiconductor & Electronics Industry

The semiconductor and electronics industry continues to improve the performance of integrated circuits by increasing speeds and reducing power consumption. Manufacturers of integrated circuits have been able to achieve these efficiencies by repeatedly shrinking linewidths. The trend towards smaller linewidths has increased the importance of contamination control for every step of the semiconductor process. The removal of contaminants that are smaller than the linewidth is critical in preventing circuit defects and maximizing yields. The semiconductor industry has traditionally focused on the removal of hard particles, however, removing other kinds of contaminants, such as gel particles, microbubbles, and ionic contaminants, is just as important. Even filters can add contaminants to the process if it is not properly cleaned during its manufacture, or if non-compatible materials of construction are selected.

3M Purification's filtration and purification products have been shown to provide the following benefits:

- Superior removal of hard and soft gel contaminants
- Increased filter life, lowering cost-of-ownership (CoO)
- Higher flow rates
- Lower pressure drop
- Reduced defectivity and improved yields
- Increased overall equipment effectiveness (OEE)
- Excellent chemical and thermal compatibility over a wide range of fluids
- Rapid installation that reduces handling of hazardous chemicals
- A consistent level of filtration allowing repeatability of the process
- Removal of trace metal



3M Purification's Technology

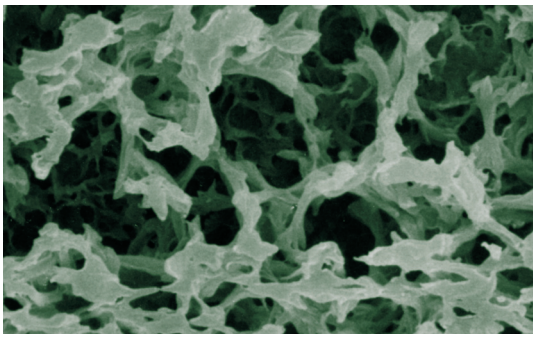
3M Purification has developed many innovative design and manufacturing technologies. All address the filtration customer's current and future needs, while many have direct application in the semiconductor and electronics industries. These include:

- Advanced Pleat Technology (APT) manufacturing,
- FlexN Multi-Zone Membrane,
- Zeta Plus™ Purifiers, and
- Charge Modified Membranes

Advanced Pleat Technology Manufacturing

Normally a small amount of gel particles can be found in photoresists and chemicals. Their removal from photoresists and chemicals is highly dependent on differential pressure across the filtration system. Since these gels are deformable, they can extrude through a filter at high differential pressures. At low differential pressures, the forces that would deform gels are correspondingly lower and the gels are retained by the membrane media. 3M Purification has been able to maximize filtration surface area, which ensures both a low inlet pressure to the pump, and low differential pressure, which is optimal for gel removal. The increase in filtration surface area is achieved by using Advanced Pleat Technology.

The service life of a pleated filter cartridge is often dictated by the accessible surface area. Conventional pleated filters may offer a large gross surface area, but when the media is packed into the cartridge, only part of the surface area is used, resulting in both flow restrictions and limited contaminant holding capacity. The "blind" or unused area commonly occurs near the inside diameter where the pleats are most tightly compressed. An APT cartridge filter is manufactured using a staggered and stepped configuration, which reduces open space between the outside pleats. This novel technology maximizes capacity by increasing the open area which allows for greater particle loading at the inside diameter, while the shorter stepped pleats take advantage of existing open space closer to the outside diameter of the cartridge. The result is a fully used surface area that provides superior life.



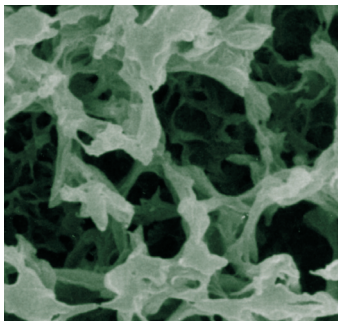
FlexN Multi-Zone Membrane

FlexN membrane creates a multi-zone membrane that consists of an "open" zone on the upstream side of the membrane and a "tighter" zone on the downstream side. In effect, the open zone acts as a pre-filter by capturing large particles while the tighter zone provides the retention of smaller contaminants. As shown in the scanning electron microscope (SEM) photograph (left), the multi-zone structure eliminates a dual-layer membrane construction providing larger surface area, significantly increased contaminant holding capacity, longer service life, and lower pressure drop.

Zeta Plus™ Trace Metal Purifiers

Ion Exchange Columns are commonly used to reduce trace metal or ionic contaminants from photoresists, solvents and ancillary chemicals. While this technology is effective at reducing trace metal and ionic contaminants it lacks the throughput that material suppliers and semiconductor processes require. It is well understood that a fluid will take the path of least resistance and that Ion Exchange Columns contain spaces or voids between resin beads. For this reason, a low flow rate is needed to assure contact between the fluid and resin beads for maximum removal of metallic or ionic contaminants.

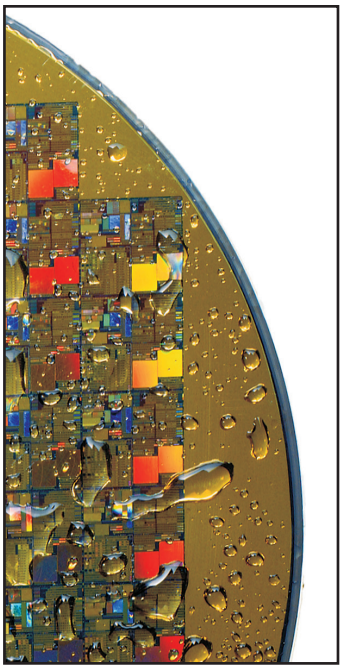
3M Purification has developed a purifier that is capable of removing metallic or ionic contaminants from photoresists, solvents, and ancillary chemicals while not sacrificing flow and improving throughput. Zeta Plus Purifiers contain multiple high capacity ion exchange technologies that reduce trace metals such as Na, Fe, K, and Ca to single digit parts per billion levels in single pass or recirculation mode applications. Unlike competitive purifiers that only contain ion exchange technologies on the surface of the media, Zeta Plus Purifiers are able to purify ionic contaminants throughout the entire depth of the media. This novel design provides a more efficient means of purification per surface area while delivering superior flow characteristics and a lower cost-of-ownership.



Charge Modified Membranes

3M Purification was one of the first companies to offer a charge-modified nylon 6,6 membrane for filtration of DI Water. Our charged-modified nylon 6,6 membrane provides superior particle removal as compared to traditional mechanical sieving (pore size) filters.

The SEM photograph (left) shows an LifeASSURE™ EF series charge-modified nylon 6,6 membrane with captured 0.021 micron mono-dispersed latex beads. The combination of Electrokinetic adsorption (positive charge) and mechanical sieving (pore size) provides for enhanced particle removal capability of submicron contaminants like colloidal silica and bacteria fragments.



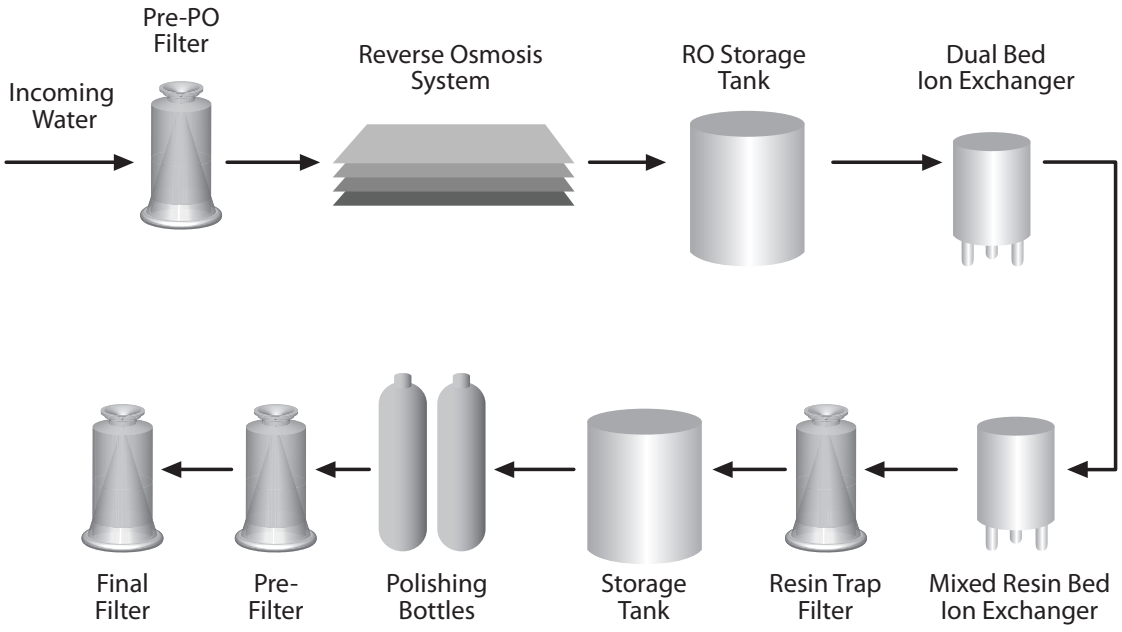
DI Water Applications

As wafer sizes increase and linewidths decrease the demand for higher purity and larger volumes of Ultrapure Water (UPW) will increase at dramatic rates. Cleaning operations precede and follow many process steps and as a result a single wafer can be exposed to UPW as many as fifty times during the manufacturing cycle of a semiconductor device. UPW is mainly used to remove defect-causing contaminants from the wafer surface and to rinse or clean wafers after they have been exposed to chemicals during the wet etch process.

In order to meet the needs of the electronics industry, a filter must be able to deliver high flow rates with minimal pressure drop, effective during a wide range of operating conditions, have enhanced particle removal capabilities, be able to rinse-up quickly for resistivity, have low ionic and metals extractables, and low Total Organic Carbon (TOC) levels, be cost-effective, and simple to install and service.

A typical UPW system schematic is shown below. Each filtration point in the system has an attribute requiring critically designed filtration and housing solutions. 3M Purification filter systems offer the most technically advanced, cost-effective solutions from Pre-RO to Point-Of-Use (POU) for water applications. 3M Purification filtration products provide superior flow characteristics while meeting the strict particle, TOC, and resistivity requirements of semiconductor and electronics manufacturers.

Typical Ultrapure Water System



Pre-RO Filtration Requirements

In order to achieve the ultimate DI water purities required at point-of-use and also to reduce the contaminant burden on downstream purification processes, an appropriate Pre-RO filtration system is essential. The filtration systems that protect expensive Reverse Osmosis membranes are the work horses of any DI Water system. These systems are the front line defenses to frequent or seasonal variations with incoming feed sources. Pre-RO filtration must be robust enough to endure operating pressure and flow fluctuations without adverse effect on filtrate quality.

Post-RO Resin Trap Filtration Requirements

During bed regeneration, system upsets and the day-to-day wear and tear on ion exchange resins, fine particulate matter is generated. Resin trap filters, strategically placed, protect both the efficiency and the life of critical downstream components and membranes.

Point of Distribution & Point of Use Filtration

Requirements at this stage in the DI water distribution system call for the finest level of filtration. Filter systems at this juncture must not only stand up to the task of removing harmful contaminants, but also must be clean and inert so as not to contribute harmful contaminants, such as particles, organics, or ionic extractables.

In summary, the more efficient the filter system, the higher the purity of the water. Extremely low filter media extractables reduce the time to achieve baseline cleanliness of the DI water system after filter change out. These attributes are paramount in selecting the best suited final filter system for the DI Water system.

Table 1 - Recommended 3M Purification Filters for Water Applications

Application	Recommended 3M Purification Filter	Literature Reference #	Refer to Page
Pre-RO	3M™ DF	LITCDUOF1	19
	Micro-Klean™ RT	LITCPOLYKLN	20
	Betapure™ AU	LITCBP001	19
Resin Trap	Betapure™ NT-T	LITCPN1	18
	Betafine™ XL	LITCBFXL	18
	Betafine™ PEG	LITPXLEL	17
Point of Distribution Pre Filter	LifeASSURE™ EMC	LITZRLAEMC1	17
Point of Distribution Final Filter	LifeASSURE™ EF	LITZREL02	16
Point-of-Use	LifeASSURE EF	LITZREL02	16
Cooling Towers	3M™ DF	LITCDUOF1	19
	Micro-Klean™ RT	LITCPOLYKLN	20

This listing is intended as a guide for selecting the appropriate 3M Purification filter based on compatibility with most common chemicals.This information is based on technical publications, laboratory experiments, data from material suppliers, and field tests. It is recommended that compatibility of these chemicals be established in the specific application because actual performance may differ as a result of variations in temperature, concentration, exposure time, or other factors. Consideration must also be given in selection of a suitable "O" ring material to assure complete compatibility.

Chemical Applications

During wet processing, semiconductor devices are repeatedly dipped, immersed, or sprayed with solutions to minimize the risk of contamination. Even when these cleaning steps are performed, the primary reason for device failure is ionic, organic, and metallic contamination of the wafer surface. As device features continue to shrink, ensuring the purity of acids, bases, and solvents used in the manufacture process will remain critical.

Chemical filters not only need to remove particulate contamination, but must also be free of dissolved contaminants. Dissolved contaminants are materials that have leached or extracted from components in the chemical delivery system. A filter that is not thermally or chemically compatible with the process chemical or has not been cleaned properly during the manufacturing process can leach organic and inorganic extractables onto the wafer surface. As a result wafer defectivity can increase and process yields decrease.

In chemical applications, where gaseous solutions like Ammonium Fluoride, BOE, Hydrogen Peroxide, SC1, and SC2 are used, filter dewetting is common for hydrophobic filters. As ammonia, oxygen, and hydrogen gas come out of solution (outgas) from those process chemicals micro-bubbles are formed. Certain membranes allow the micro-bubbles to stick to the membrane surface and leads to the pores filling with gas. Eventually, the pore will completely fill with gas, blocking the pore and rendering it unusable. Once a filter has de-wet, particle counts rise, pressure drop increases, and flow rates decrease which necessitates a changeout or re-wetting of the filter. A hydrophilic membrane is recommended for these types of chemicals.

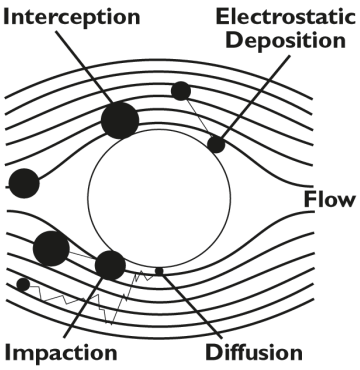
Important factors to consider when selecting the appropriate filter for your chemical application are:

- Particle retention efficiency
- Flow rate required for that specific process
- Pressure drop required for that specific process
- Viscosity of the chemical
- Thermal and chemical compatibility

Table 2 - Recommended 3M Purification Filters for Chemical Applications

Application	Recommended 3M Purification Filter	Literature Reference #	Refer to Page
Acids	Betafine™ XL	LITCBFXL	18
	Betafine™ PEG	LITPXLEL	17
	LifeASSURE™ PFS	LITMRFA3	16
Bases	Betafine™ XL	LITCBFXL	18
	Betafine™ PEG	LITPXLEL	17
	LifeASSURE™ PFS	LITMRFA3	16
Alcohols	Betafine™ XL	LITCBFXL	18
	Betafine™ PEG	LITPXLEL	17
	LifeASSURE™ EMC	LITZRLAEMC1	17
	LifeASSURE™ PFS	LITCPSLD1	16
	LifeASSURE™ PSN	LITMRFA3	16
Etchants / Strippers	LifeASSURE™ PSN	LITCPSLD1	16
	LifeASSURE™ PFS	LITMRFA3	16

This listing is intended as a guide for selecting the appropriate 3M Purification filter based on compatibility with most common chemicals. This information is based on technical publications, laboratory experiments, data from material suppliers, and field tests. It is recommended that compatibility of these chemicals be established in the specific application because actual performance may differ as a result of variations in temperature, concentration, exposure time, or other factors. Consideration must also be given in selection of a suitable "O" ring material to assure complete compatibility.



Gas Applications

While gas filters differ in materials of construction, from one supplier to the next, the mechanisms for capturing particles are the same. The particle removal efficiency of a membrane filter used in gas service is substantially different from one used in liquid service. Particles are captured on the membrane by mechanisms such as interception, diffusion, impaction, and electrostatic deposition for gas service. Each of these particle capture mechanisms is strongly influenced by particle size and flow rate (see figure at left).

As the demand for dry processing steps has increased, so has the importance of contamination control for CVD, Etch, Epitaxial, Ion Implant, and PVD gases used during the manufacture of semiconductor devices. While material suppliers provide ultra high purity gases, the end user must be able to maintain that purity level while eliminating any contamination from the gas delivery system. Proper filtration for bulk, point-at-distribution, and point-of-use applications is absolutely critical in maintaining an ultra high purity gas system.

Utilizing 3M Purification filters with Advanced Pleat Technology (APT) provides superior flow characteristics with minimal pressure drop as compared to competitive filters. Increasing flow while maintaining pressure drop and filter efficiency results in lower total filtration costs– reduced filter change-outs, reduced labor, reduced exposure to the atmosphere, and smaller housings required.

Table 3 - Recommended 3M Purification Filters for Gas Applications

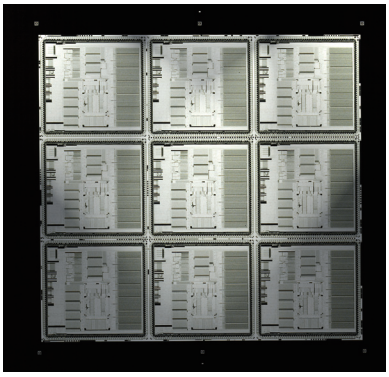
Application	Recommended 3M Purification Filter	Literature Reference #	Refer to Page
CDA	LifeASSURE™ EMC	LITZRLAEMC1	17
	LifeASSURE™ PFS	LITCMR2	16
Bulk	LifeASSURE™ PFS	LITCMR2	16
Point-at-Distribution	LifeASSURE™ PFS	LITCMR2	16
Point-of-Use	LifeASSURE™ PFS	LITCMR2	16

This listing is intended as a guide for selecting the appropriate 3M Purification filter based on compatibility with most common chemicals. This information is based on technical publications, laboratory experiments, data from material suppliers, and field tests. It is recommended that compatibility of these chemicals be established in the specific application because actual performance may differ as a result of variations in temperature, concentration, exposure time, or other factors. Consideration must also be given in selection of a suitable "O" ring material to assure complete compatibility.

Photolithography Applications

It is important to recognize that photolithography processes and materials vary greatly from one manufacturer to another, and therefore a customized solution may be required. Several factors are important in selecting the appropriate photoresist filter of which contaminant removal, differential pressure, flow rate, material compatibility, cartridge extractables, membrane wettability, and filter lifetime are some of the most important.

A small amount of gel particles can normally be found in photoresists. These gels can form during the manufacturing and storage of photoresists. Their removal from photoresists is highly dependent on differential pressure across the filtration system. Since, these gels are deformable they can extrude through a filter at high differential pressures. At low differential pressures, the forces that would deform gel particles are lower; therefore they are not extruded through the membrane. 3M Purification has been able to maximize filtration surface area to assure a low inlet pressure to the pump/dispense system as well as a low filter differential pressure, which is optimal for gel removal. The increase in filtration surface area is achieved by utilizing 3M Purification's Advanced Pleat Technology.



Several high viscosity chemicals are used during the manufacturing of photoresists and ancillary chemicals which can create challenges for a filter due to the inverse relationship between viscosity and flow (viscosity rises, flow rate decreases). These chemicals are typically re-circulated through the filter to ensure maximum contaminant removal in a chemical distribution loop and bulk chemical production. Utilizing 3M Purification's filters with Advanced Pleat Technology provides superior flow characteristics with minimal pressure drop. Increasing flow while maintaining filter efficiency results in particle specifications being achieved in less time. This decrease in processing time results in lower total filtration costs– reduced energy consumption, pump wear, and labor.

Table 4 - Recommended 3M Purification Filters for Photolithography Applications

Application	Recommended 3M Purification Filter	Literature Reference #	Refer to Page
Photoresists	Betafine™ PEG	LITPXLEL	17
	LifeASSURE™ PSN	LITCPSLD1	16
	LifeASSURE™ PFS	LITMRFA3	16
Ancillary Chemicals	Betafine™ PEG	LITPXLEL	17
	LifeASSURE™ EMC	LITZRLAEMC1	17
	LifeASSURE™ PSN	LITCPSLD1	16
	LifeASSURE™ PFS	LITMRFA3	16
ARC, BARC, TARC	Betafine™ PEG	LITPXLEL	17
	LifeASSURE EMC	LITZRLAEMC1	17
	LifeASSURE™ PSN	LITCPSLD1	16
	LifeASSURE™ PFS	LITMRFA3	16

This listing is intended as a guide for selecting the appropriate 3M Purification filter based on compatibility with most common chemicals. This information is based on technical publications, laboratory experiments, data from material suppliers, and field tests. It is recommended that compatibility of these chemicals be established in the specific application because actual performance may differ as a result of variations in temperature, concentration, exposure time, or other factors. Consideration must also be given in selection of a suitable "O" ring material to assure complete compatibility.

Zeta Plus™ Filter Scale-Up for Photoresist & Chemical Manufacturing

3M Purification offers a wide breadth of Zeta Plus™ products that have been specifically designed to meet the exacting requirements of materials suppliers from laboratory scale testing through full scale production.

For laboratory scale and pilot scale testing, 3M Purification offers low hold-up volume disk filters, capsules, and housings to allow end users to assess parameters such as material compatibility, photo-speed, trace metals removal, and particle retention testing in a rapid and cost effective manner. The compact size also allows for easy replacement and installation of filtration and purification media while reducing the waste of expensive chemicals. Zeta Plus Filter Disks and Capsules contain the same filter media as full size Zeta Plus Filter and Purifier Cartridges, ensuring a consistent level of membrane quality throughout laboratory, pilot, and full-scale production testing. This makes the scale-up process simple, linear, and predictable.

In full scale production, Zeta Plus is offered in cartridge diameter sizes of 8", 12", and 16" providing up to 37 ft2 of surface area in a single cartridge. Zeta Plus Housings can vertically accommodate 1, 2, 3, or 4 Zeta Plus Cartridges, allowing the end user to tailor the filtration system to their required flow and pressure drop.

Scale-Up with Zeta Plus™ Filters

From the Laboratory

To Pilot Production

To Full Production

Chemical Mechanical Planarization (CMP) Applications

Chemical Mechanical Planarization was introduced into semiconductor manufacturing in the 1980's as a way to reduce uneven surface topography during the manufacturing of integrated circuits on the wafer. The process has been adopted by virtually all semiconductor fabrication facilities producing feature sizes below 0.35µm.

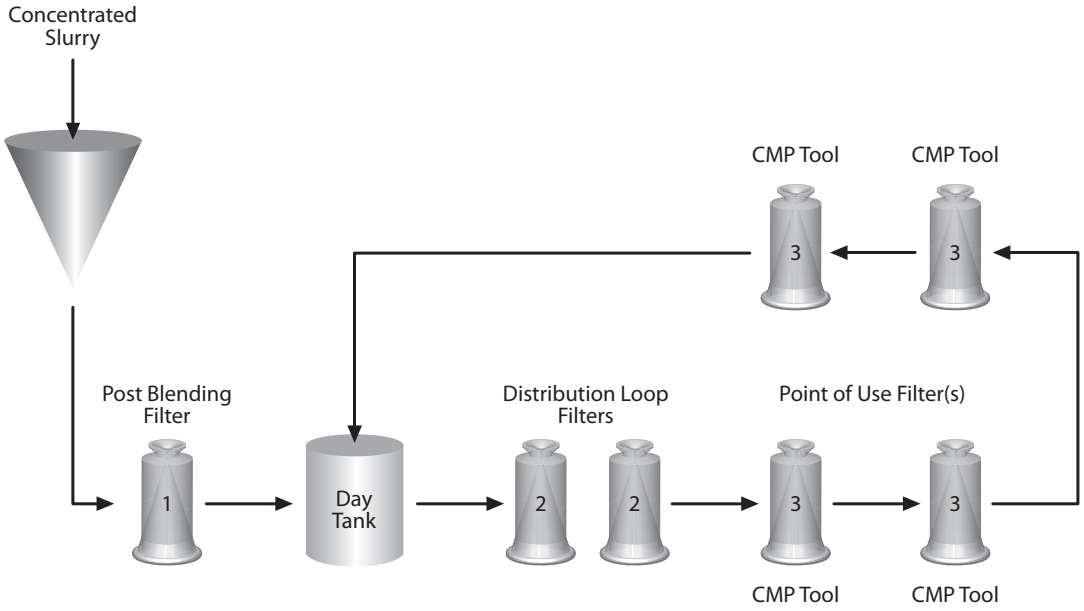
Multilevel metallization layers reproduce up areas and down areas from one level to the next. As each new metal layer gets added it magnifies the imperfections in the layer just below it. CMP flattens out these uneven areas by combining a wet chemical (acidic or basic) slurry containing micro-abrasives with the mechanical effect provided by polishing. This allows subsequent photolithography to take place with greater accuracy, and allows film layers to be built up with minimal height variations. CMP enables chipmakers to continue shrinking circuits and extends the performance of lithography tools.

Unlike traditional filtration, the objective of a slurry filter is for the majority of particles to pass through it unchanged, while only removing the undesired or "oversized" particles. These oversized particles are commonly referred to as large particle counts (LPC) and they typically form over time when the suspended particles in the slurry settle forming aggregates, agglomerates, and gels. Large particle counts can also occur due to shipping conditions, shearing, slurry drying, and interaction with other components in the distribution loop like fittings, valves, pumps, and piping. These large particles can scratch inter-level dielectrics and metal layers potentially causing wafer defects.

It is important to recognize that slurries vary greatly from one manufacturer to another, and therefore a customized solution is required. Several factors are important in selecting the appropriate slurry filter of which particle classification, retention efficiency, flow rate, differential pressure, contaminant holding capacity, and filter lifetime are some of the most important.

The CMP Slurry Distribution System contains three important points of filtration (see figure below and Table 5).

Chemical Mechanical Planarization Slurry Distribution System



Location 1: The post-blending filter ensures that no oversized particles get into the day tank. Large particle counts like gels and agglomerates often stick to the tank bottom and wall. These oversized particles break free during mixing/blending with RODI water and must be removed. It is recommended that Betapure™ CMP560 Filters be installed at this location to remove large particles and prevent frequent plugging of the distribution and dispense filters downstream.

Location 2: The distribution loop filter acts as a roughing stage for the point-of-use filters. It remains on line filtering and re-circulating slurry back to the day tank when the CMP tool is not in use. This filter will remove large particles that are formed in the distribution loop and day tank. Since, flow rates are higher at this location, a more open or porous grade filter like Betapure CMP550, CMP560, and CMP570 are recommended for maximum filter life. Proper filtration at the distribution loop will extend the life of the point-of-use filters and reduce their change-out frequency.

Location 3: The point-of-use filter is the most critical, capturing unwanted oversized particles upstream of the CMP tool. A consistent quality of slurry at point-of-use enables repeatability of the planarization process and ensures that defect causing large particles are not allowed to enter the CMP tool and potentially cause micro-scratches. For superior particle removal in metal slurries, Betapure CMP510 and CMP520 Filters are recommended. In oxide slurries Betapure CMP520, CMP530, and CMP540 Filters are recommended.

Table 5 - Recommended 3M Purification Filters for CMP Applications

(Filter Location) Application	Recommended 3M Purification Filter	Literature Reference #	Refer to Page
1 Post Blending	Betapure™ CMP570	LITCCMPCTG1 & LITCCMPCAP1	18
	Betapure™ CMP560		
2 Slurry Distribution Loop	Betapure™ CMP580	LITCCMPCTG1 & LITCCMPCAP1	18
	Betapure™ CMP570		
	Betapure™ CMP560		
	Betapure™ CMP550		
3 Point-Of-Use	Betapure™ CMP540	LITCCMPCTG1 & LITCCMPCAP1	18
	Betapure™ CMP530	LITPXLEL	
	Betapure™ CMP520	LITZRLAEMC1	
	Betapure™ CMP510	LITCPSLD1	
Point-of-Use DI Water	LifeASSURE™ EF	LITZREL02	16
Post CMP Clean	LifeASSURE™ PSN	LITCPSLD1	16
	LifeASSURE™ PFS	LITMRFA3	16
CMP Slurry Wastewater	Micro-Klean™ RT	LITCPOLYKLN	20

This listing is intended as a guide for selecting the appropriate 3M Purification filter based on compatibility with most common chemicals. This information is based on technical publications, laboratory experiments, data from material suppliers, and field tests. It is recommended that compatibility of these chemicals be established in the specific application because actual performance may differ as a result of variations in temperature, concentration, exposure time, or other factors. Consideration must also be given in selection of a suitable "O" ring material to assure complete compatibility.

3M Purification Products for Semiconductor & Electronics Manufacturing

3M Purification offers a comprehensive range of filtration products from ultra-inert PTFE and charge modified nylon membrane filters to high efficiency depth filters for prefiltration and clarification. All filter cartridges are available in a variety of industry standard configurations; 3M Purification's broad line of housing products ensures complete filtration system compatability.

Products recommended for the previously discussed applications include:

3M Purification Membrane Cartridge and Capsule Filtration

- LifeASSURE™ EF Filters
- LifeASSURE™ PFS Filters
- LifeASSURE™ PSN Filters
- LifeASSURE™ IMC Filters
- LifeASSURE™ EMC Filters
- SCF Capsule Filters

3M Purification Pleated Media Cartridge and Capsule Filtration

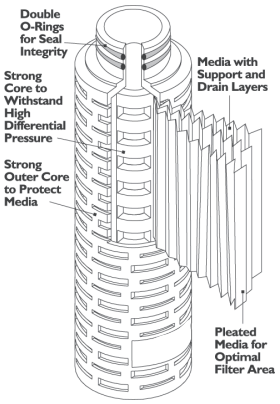
- Betafine™ PEG
- Betafine™ XL

3M Purification Depth Cartridge Filtration

- Betapure™ CMP Cartridge & Capsule Filters
- Betapure™ NT-T
- Betapure™ AU Rigid Filters
- 3M™ DF series
- Micro-Klean™ D Series
- CUNO™ Metal Screen Filter Elements
- Micro-Klean™ RT Series

3M Purification Purifier Cartridge Filtration

- Zeta Plus™ Trace Metals Purifiers
- 3M™ Activated Carbon Series
- Zeta Plus™ Activated Carbon Purifier



3M Purification Membrane Cartridge Filtration

3M Purification offers a variety of membrane products for the critical purification of process fluids requiring hydrophilic media (aqueous based fluids, pre-RO water), hydrophobic media (gas, high temperature etch baths, aggressive solvents) and charged modified media (final and POU water). 3M Purification's range of membrane filtration products includes LifeASSURE™ EF series cartridges and capsules, and LifeASSURE™ PFS series cartridges and SCF capsules. All membrane products are manufactured in clean environments using advanced thermo-plastic welding techniques and without the use of adhesives, binders, and surfactants. They are 100% integrity tested during manufacturing to assure that the filter is defect-free and will perform to specifications. Each product is labeled to ensure full traceability.

LifeASSURE™ EF Series Filter Cartridges

LifeASSURE™ EF series filter cartridges deliver superior flow performance and advanced particle retention for ultra high purity water applications. Utilizing 3M Purification's charge modification technology the filter combines both mechanical sieving (pore size) and electro-kinetic adsorption (positive charge) to enhance particle removal capability of submicron contaminants like colloidal silica and bacteria fragments. LifeASSURE EF series filters are absolute rated, naturally hydrophilic, charge modified nylon 6,6 membranes incorporated into an all polypropylene cartridge. Combined with over 11 ft2 of filter surface area per 10" cartridge, long life, high flow rates, and low pressure drop are realized with LifeASSURE EF series. A quantum leap in process economies is now within the reach of every LifeASSURE EF series user.

For more information, please ask for 3M Purification literature number LITZREL02.

LifeASSURE™ ER Series Filter Cartridges

LifeASSURE™ ER series filter cartridges are ideally suited for a wide range of applications such as acids, bases, and solvents. Designed with pleated PTFE membrane in an all polypropylene construction, LifeASSURE ER series filter cartridges provide excellent particle retention and downstream cleanliness out of the package. Each filter cartridge is pre-flushed with high purity water to reduce extractables and downtime.

For more information, please ask for 3M Purification literature number LITMRFA3.

LifeASSURE™ MFE Series Filter Cartridges

LifeASSURE™ MFE series filter cartridges provide high retention and high flow for a wide range of aggressive fluids. Utilizing 3M Purification's Advanced Pleat Technology (APT) construction, LifeASSURE MFE series provides superior filter life and flow with a low pressure drop when compared against competitive membrane cartridges. Designed with pleated PTFE membrane in an all polypropylene construction, LifeASSURE MFE series filter cartridges provide excellent particle retention and downstream cleanliness for gas and liquid applications.

For more information, please ask for 3M Purification literature number LITCMR2.

LifeASSURE™ PSN Series Filter Cartridges and Capsules

LifeASSURE™ PSN series nylon 6,6 filter cartridges and capsules are highly retentive membrane filter elements designed to meet the exacting requirements of photoresist and ancillary chemical applications. Utilizing 3M Purification Advanced Pleat Technology manufacturing, LifeASSURE PSN series filters provide superior flow characteristics with minimal pressure drop. Increasing flow while maintaining filter efficiency results in particle specifications being achieved in less time. This decrease in processing time results in lower total filtration costs–reduced energy consumption, pump wear, and labor.

For more information, please ask for 3M Purification literature number LITCPSLDCAP1.

LifeASSURE™ PSN 50mm Filter Capsules

LifeASSURE™ PSN 50mm filter capsules are highly retentive membrane filters designed to meet the exacting requirements of photoresist and ancillary chemical applications. These low hold-up volume filter capsules allow material suppliers to assess parameters such as material compatibility, photo-speed, and particle retention testing in a rapid and cost effective manner. LifeASSURE PSN 50mm filter capsules contain the same filter media as full size LifeASSURE PSN series filter cartridges and capsules, ensuring a consistent level of membrane quality throughout laboratory, pilot, and full-scale production testing.

For more information, please ask for 3M Purification literature number LITCPSLDCAPADM.

LifeASSURE™ EMC Filter Cartridges

LifeASSURE™ EMC Filter Cartridges are highly retentive naturally hydrophilic nylon 6,6 filter elements designed to meet the exacting requirements of ultra-high purity applications like DI water, critical parts cleaning, and chemicals. Utilizing 3M Purification's Advanced Pleat Technology (APT) manufacturing and FlexN Multi-Zone Membrane, LifeASSURE EMC Filter Cartridges provide superior flow characteristics with minimal pressure drop. Designed with pleated nylon 6,6 membrane in an all high purity virgin polypropylene construction, LifeASSURE EMC Filter Cartridges are also pre-rinsed with ultra high purity water to reduce extractables and downtime.

For more information, please ask for 3M Purification literature number LITZRLAEMC1.

LifeASSURE™ IMC Filter Cartridges

LifeASSURE™ IMC series filter cartridges are high efficiency naturally hydrophilic nylon 6,6 filter elements designed to meet the exacting requirements of macro-electronic applications. Utilizing 3M Purification's Advanced Pleat Technology manufacturing and FlexN Multi-Zone Membrane, LifeASSURE IMC Filter Cartridges provide much longer filter life with lower pressure drops when compared to other membrane cartridges. Designed with pleated nylon 6,6 membrane in an all polypropylene construction, LifeASSURE IMC series filter cartridges are ideally suited for DI Water and Parts Cleaning applications.

For more information, please ask for 3M Purification literature number LITZROPT1.

Betafine™ PEG Series Filter Cartridges

Betafine™ PEG series filter cartridges are graded porosity, absolute rated, all polypropylene filters that feature 3M Purification's Advanced Pleat Technology manufacturing. The graded porosity structure removes particles sequentially by size–the larger particles by the more open, upstream layer and the smaller particles by the tighter, downstream layer. The outer upstream layer acts as a pre-filter, while the inner downstream layer provides the absolute removal specified by the pore size rating of the cartridge. This construction efficiently spreads the contaminant throughout the depth of the filter media resulting in extremely high contaminant holding capacity and low pressure drop for longer service life.

For more information, please ask for 3M Purification literature number LITPXLEL.

Betafine™ XL Series Filter Cartridges

Betafine™ XL series filter cartridges are compact, absolute rated, all polypropylene filters that feature 3M Purification's Advanced Pleat Technology (APT) manufacturing. The 100% polypropylene construction provides excellent thermal and chemical compatibility for process and rinse water applications in CD/DVD, Data Storage, Printed Circuit Boards, and Video Display manufacturing. Betafine XL series filter cartridges employ a more compact design than standard 3M Purification cartridges making them ideal for applications where a low hold-up volume is necessary. A low hold-up volume filter cartridge, allows for smaller filter housings to be employed, thereby reducing the waste of expensive photoresists and ancillary chemicals.

For more information, please ask for 3M Purification literature number LITCBFXL.

SCF Capsule Filters

Small Capsule Filter (SCF) Capsules are compact filter assemblies with 3M Purification media housed in a polypropylene capsule. These low hold-up volume filter capsules allow material suppliers to assess parameters such as material compatibility, photo-speed, and particle testing in a rapid and cost effective manner for both laboratory and pilot scale production. A low hold-up volume also reduces chemical handling and hazardous waste disposal in Video Display, CD/DVD, CMP, Photoresist, and Ancillary Chemical applications.

For more information, please contact your local 3M Purification representative.

Betapure™ CMP Filter Cartridges and Capsules

Betapure™ CMP filter cartridges and capsules are high capacity filters optimized for oxide and metal slurries used at point-of-use for chemical mechanical planarization applications. Betapure CMP filters are composed of all-polypropylene components and features a multi-zone “graded porosity” design for the peak level of particle classification. This novel construction provides enhanced flow characteristics, including low pressure drop, to minimize shearing of the slurry while providing superior filter life. Betapure CMP capsules are offered with Flaretek® and NPT fitting connections in lengths of 4", 10", 15", and 20".

For more information, please ask for 3M Purification literature LITCCMPCTG1 and LITCCMPCAP1.

Betapure™ NT-T Filter Cartridges

Betapure™ NT-T filter cartridges are absolute rated, all polypropylene depth filters designed to maximize flow and service life. Betapure NT-T achieves superior flow characteristics through an innovative design that allows uniform distribution of the fluid throughout the entire depth of the filter cartridge. Filter construction combines a polypropylene media with fluid distribution netting to form multiple layers. Selectively positioned media flow channels allow enhanced movement of the fluid from one layer to the next. Three distinct media sections, made from multiple media and netting layers, are combined to form the filter cartridge. Within each media layer a portion of the fluid travels through the media while the balance of the fluid is delivered directly to the next distribution layer through the flow channels. The fluid distribution netting provides horizontal and vertical flow paths to evenly distribute the fluid across the surface of each sequential media layer. Betapure NT-T filters are ideally suited for Video Display, CD, DVD, Pre-RO, and Plating Bath applications where superior service life and a consistent level of filtration are required.

For more information, please ask for 3M Purification literature number LITCPN1

.

Betapure™ AU Series Filter Cartridges and Capsules

Betapure™ AU series filter cartridges and capsules utilize state-of-the-art technology to produce a clean, rigid, filter structure with consistent and reproducible filtration characteristics for Pre-RO, CMP Slurry Raw Materials, and Ceramic Slurry applications. The filter matrix is constructed using long bi-component fibers, each fiber having an inner core and an outer sheath. Betapure AU series filters are available in two bi-component fiber structures, polypropylene/polyethylene or polyester/co-polyester, to provide the greatest range of chemical compatibility.

The bi-component fibers of the filter matrix are thermally bonded by utilizing the difference in melt temperatures of the two fiber components. Heating the matrix to the melt temperature of the outer sheath, but below that of the inner core causes the fiber-to-fiber bond at every contact point (see SEM at left). The high degree of fiber-to-fiber bonding provides a rigid structure that eliminates the need for a core support and any possibility of media migration. Dynamic applications where the filtration system is pulsed, cycled, or exposed to high differential pressures can cause non-rigid filters to unload contaminants back into the process fluid. The rigid structure of Betapure resists deformation, particle unloading, and by-pass to deliver consistent particle removal efficiency even under adverse operating conditions.

For more information, please ask for 3M Purification literature number LITCBP001.

3M™ DF Series Filter Elements

The 3M™ DF series filter system is an advanced alternative to standard bag filters. 3M DF series filter elements are offered in a graded-porosity filter media where two media layers of different porosities are combined. The result is superior contaminant holding capacity for electronics applications such as Pre-RO, Cooling Towers, CMP Slurries, and Printed Circuit Boards. The more open layer on the upstream section provides effective pre-filtration of larger particles and the tighter layer on the downstream section provides effective final filtration of smaller contaminants. This feature, combined with a 62% increase in filter surface area, ensures that 3M DF series provide:

- Lower initial pressure drop
- Up to 4 times the service life of conventional filter bags
- Superior contaminant removal efficiency
- Enhanced flow per filter element
- Reduced total filtration costs by minimizing downtime, disposal, and labor

For more information, please ask for 3M Purification literature number LITCDUOF1.

Micro-Klean™ D Series Filter Cartridges

Micro-Klean™ D series filter cartridges are nominally rated, graded porosity, high capacity, high flow rate filters designed for macro-electronic applications. The graded porosity design provides more open filtration on the outside (upstream) of the filter and finer, more efficient filtration, on the inner (downstream) layer of the cartridge. This reduces the potential for premature plugging caused by large particles as they are trapped on the outside (upstream) layer thus allowing smaller contaminants to flow through extending the service life of the filter. By combining an internal media blanket with an open wind process, Micro-Klean D series produces a filter with exceptional flow capacity, superior filtration efficiency and greater consistency. The media blanket and wind matrix are offered in cotton and polypropylene materials of construction.

For more information, please ask for 3M Purification literature number LITZROPT1.

CUNO™ Metal Screen Filter Elements

CUNO™ Metal (316L stainless steel) Screen filter elements are ideally suited for demanding gas and liquid applications. The all metal rigid filter element is capable of withstanding high operating and differential pressures making it a perfect choice when a specific flow rate is needed for high viscosity fluids. All metal provides excellent maximum forward and reverse differential pressure which means the filtration system can withstand dynamic pulsing without releasing contaminants unlike polymeric filters. CUNO Metal Screen filter is the metal filter of choice around the world for corrosive, high temperature, and high pressure applications.

For more information, please ask for 3M Purification literature number LITMS001.

Micro-Klean™ RT Series Filter Cartridges

Micro-Klean™ RT series all polypropylene depth filters employ 3M Purification's Rigid Extrusion Bonded Technology (REBel). This design provides a high degree of fiber-to-fiber thermal bonding, without the use of adhesives, binders, or surfactants to produce a rigid, core-less, filter structure. Benefits of the rigid thermal bonded filter include:

- No unloading of contaminants with increasing differential pressure like typical melt-blown polypropylene filters
- A consistent level of filtration throughout the life of the filter resulting in superior quality effluent
- Allows grooves to be machined into the upstream surface, providing more than double the effective surface area, resulting in maximum flow with minimal pressure drop
- A low operating pressure drop achieves the required flow using fewer filter elements than competitive products
- Micro-Klean RT series filter applications include Pre-RO, Printed Circuit Boards, Video Display, CD/DVD, and CMP Slurry Manufacturing.

For more information, please ask for 3M Purification literature number LITCPOLYKLN.

Zeta Plus™ 40Q Trace Metals Purifiers

Zeta Plus™ trace metals purifiers are capable of removing metallic or ionic contaminants from photoresists, solvents, and ancillary chemicals while not sacrificing flow and improving throughput. Zeta Plus purifiers contain multiple high capacity ion exchange technologies that reduce trace metals such as Na, Fe, K, and Ca to single digit parts per billion levels in single pass or recirculation mode applications. Unlike competitive purifiers that only contain ion exchange technologies on the surface of the media, Zeta Plus purifiers are able to purify ionic contaminants throughout the entire depth of the media. This novel design provides a more efficient means of purification per surface area while delivering superior flow characteristics and a lower cost-of-ownership.

For more information, please ask for 3M Purification literature number LITZP40Q1.

3M Activated Carbon Series Filter Purifier Cartridges

3M Activated Carbon Series cartridges have been specifically designed to remove dissolved organic contaminants from electroplating applications like those used in CD/DVD mastering. The novel cartridge construction combines an integral 5 micron pre-filter to reduce premature plugging of the carbon bed by particulates and a 5 micron post filter to remove carbon fines that can potentially extract from the bed. The activated carbon bed, pre-filter, and post filter are contained in a polyethylene cage which has low extractables.

For more information, please ask for 3M Purification literature number LITAC001.

Zeta Plus™ Activated Carbon Purifier Cartridges

Zeta Carbon Activated Carbon purifier cartridges have been specially formulated to remove organic contaminants from high purity chemicals in a single pass. Zeta Carbon cartridges combine activated carbon, purified cellulose fibers, and a positively charged resin within a porous depth media structure. This construction enhances surface area for the reactive sites of the purifier thereby increasing contact time with the chemical while removing organic contaminants to single digit ppb levels. Zeta Carbon also improves flow and throughput as compared to bulk activated carbon systems which in turn reduces processing times and the potential for health (dust) and safety (fire risk) related issues.

For more information, please ask for 3M Purification literature number LITCZC1.

3M™ Filter and Purifier Housings

3M Purification offers an extensive range of filter and purifier housings to meet most fluid applications in the semiconductor and all electronics industry. From bulk photoresist and ancillary chemicals manufacturing to ultra-high purity water, 3M Purification has engineered a cost effective solution. 3M Purification housings can meet virtually any process flow (up to 2000 gpm) requirements from lab scale through full production. All housings are designed for increased functionality permitting rapid installation and removal of filter and purifier cartridges. Fast action swing bolts and quick release clamps minimize downtime and improve overall equipment effectiveness. 3M Purification housings are designed and tested to assure safe operation in demanding process applications. Housings can be provided that meet safety code requirements of all countries around the world, including ASME Code and CE marked vessels. Our diverse product line can accommodate the varying needs of both micro and macro electronic applications such as Semiconductor, CD, DVD, Video Display, Hard Drives, and M.E.M.S.

In-house design and fabrication services deliver standard or customized versions of 3M Purification housing products. Options available include:

- Mechanical polishing to 10 micro inch Ra
- Certified electro-polishing to customer certified Cr:Fe ratios
- Materials of Construction – Carbon Steel, 304L SS, 316L SS, Haste
- A wide variety of inlet, outlet, vent, and drain fitting configurations
- Various pressure ratings
- Compliance to regulatory codes and standards – ASME, CE
- Documentation–material test reports, inspection reports
- Special linings for corrosive applications – PFA, PVDF
- Special cleaning, handling, and packaging
- On-site service and support SCF Capsule Filters

For more information on alternate materials of construction or a customized housing solution, please contact your local 3M Purification representative.

3M™ CT Series Filter Housings

3M™ CT series filter housings are three piece, all metal housings that accept double open ended (DOE) or single open ended (SOE) filter cartridges. The 3M CT Series is offered with either 304 or 316 stainless steel wetted parts and features a ring nut for closure sealing. All housings have a maximum recommended operating pressure of 300 psig @ 200ºF (20.68 bar @ 93ºC) for liquid service and are available in 10", 20", and 30" lengths.

For more information, please ask for 3M Purification literature number LITHSCT3.

3M™ ZMCMP Series Filter Housings

3M™ ZMCMP Filter Housings have been specifically designed to meet the exacting requirements of high purity DI Water applications and can be found in many leading edge fabs around the world. All housings are manufactured from 316L stainless steel, comply with ASME code, and are mechanically polished to 10 Ra and electro-polished.

3M ZMCMP housings incorporate fast action swing bolts and an “auto-lift” spring loaded piston (outside of fluid path) feature which reduces downtime and enables a single operator to maintain the system. Standard housings sizes can accommodate 21, 30, or 41 filter cartridges, in lengths of 30" or 40".

For more information, please contact your local 3M Purification representative.

3M™ ZVS and ZMS Series Sanitary Filter Housings

3M™ ZVS and ZMS series sanitary filter housings are high quality, electro-polished, 316L stainless steel filter housings for critical gas and liquid applications. These housings are offered in both in-line (ZVS) and T-line (ZMS) configurations and will accommodate 10", 20", 30", and 40" filter cartridges. Both 3M ZVS and ZMS filter housings are hydrostatically tested and mechanically polished to a 20 micro inch surface roughness average and offered with 1.5" and 1" sanitary flange connections respectively. Both housings offer a maximum operating pressure of 150 psig (10.34 bar) and maximum operating temperature of 250ºF (121ºC).

For more information, please ask for 3M Purification literature number LITZRH.104.

3M™ ZWC and ZWB Series Filter Housings

3M™ ZWB and ZWC series filter housings are manufactured from high quality 316L stainless steel and electro-polished for increased corrosion resistance in fluid applications for the semiconductor and electronics industries. Both housings are designed for high flow rate applications and can accommodate four, eight, eleven, or twenty-one filter cartridges up to 40 inches long. Two housing closure systems are available. The 3M ZWC series filter housing is offered with a quick release clamp to secure the housing dome to the base for operations up to 75 psig (5.17 bars). The 3M ZWC series filter housing uses fast action swing bolt closures to secure the housing dome to the base for operation to 150 psig (10.34 bars). 3M ZWB and 3M ZWC series sanitary filter housings have a maximum operating temperature of 200ºF (93ºC) and are offered with 2" and 4" sanitary flange connections. Both housings can be PFA coated for maximum corrosion resistance and increased chemical compatibility.

For more information, please ask for 3M Purification literature number LITZRH106.

3M™ ZPC and ZPB Series Filter Housings

3M™ ZPC and ZPB series filter housing are manufactured from high quality 316L stainless steel and electro-polished for increased corrosion resistance in pilot and full scale production applications including photoresists and ancillary chemicals. Two housing closure systems are available with either 1.5" or 2" sanitary flange connections. The 3M ZPC series filter housing is offered with a quick release clamp and has a maximum recommended operating pressure of 75 psi (5.17 bars) and maximum operating temperature of 200ºF (93ºC). The 3M ZPB series filter housing uses fast action swing bolt closures and has a maximum operating pressure of 150 psig (10.34 bars) and a maximum operating temperature of 200ºF (93ºC). 3M Zeta Plus series filter housings can accommodate one to four 8", 12", or 16" diameter Zeta Plus filter cartridges to meet your flow rate needs. The housings can also be PFA coated for maximum corrosion resistance and increased chemical compatibility.

For more information, please ask for 3M Purification literature number LITHSZPBC.

3M™ ES Series ASME Code Filter Housings

The 3M™ ES series ASME code filter housing is manufactured from 304L, or 316L stainless steel and can accommodate DOE, SOE, and Zeta Plus filter cartridges. The 304L and 316L stainless steel housings are offered with maximum operating pressures of either 150 psig (10.34 bar) or 300 psig (20.68 bar) at a maximum operating temperature of 250ºF (121ºC). All housings include ASME Code stamp and National Board certification assuring that all materials and fabrication procedures meet industry requirements. Other options such as radiography, surface finish, sealing bolt configuration, fluoropolymer coatings, and fitting connections/locations are available making the 3M ES series filter housing the most functional and versatile filter housing available.

For more information, please ask for 3M Purification literature number LITCHSES1.

3M™ DF Series ASME Code Filter Housings

3M™ DF series ASME code filter housings are designed and manufactured to economically meet demanding electronics applications like Pre-RO, Cooling Towers, CMP Slurries, and Printed Circuit Boards. The housings are available for #1 and #2 size 3M DF series filters and are constructed from either 304 or 316L stainless steel. The novel flow configuration of the 3M DF series housing eliminates the “dirty chamber” that is common in bag filter housings, thus eliminating the potential for cross contamination of dirty fluid into the clean effluent during filter element change-out. 3M DF series filter housings incorporate an environmentally friendly design that reduces the potential handling of hazardous chemicals by allowing removal of the 3M DF series filter element without the spillage of, or contact by the operator with, the process fluid.

For more information, please ask for 3M Purification literature number LITCDUOF1.

ChemSECURE™ 47mm PTFE Filter Housings

These low hold-up volume filter housings allow end users to assess parameters such as material compatibility, photo-speed, trace metals removal, and particle retention testing in a rapid and cost effective manner. 47mm PTFE Housings accept most all 3M Purification filter and purification media, ensuring a consistent level of filtration and purification quality throughout laboratory and pilot-scale testing. All wetted surfaces are composed of high purity PTFE for excellent chemical compatibility with most aggressive fluids. The compact size also allows for easy replacement and installation of filtration and purification media while reducing chemical waste.

For more information, please ask for 3M Purification literature number LITHSCHMS1.

Plastic Filter Housings

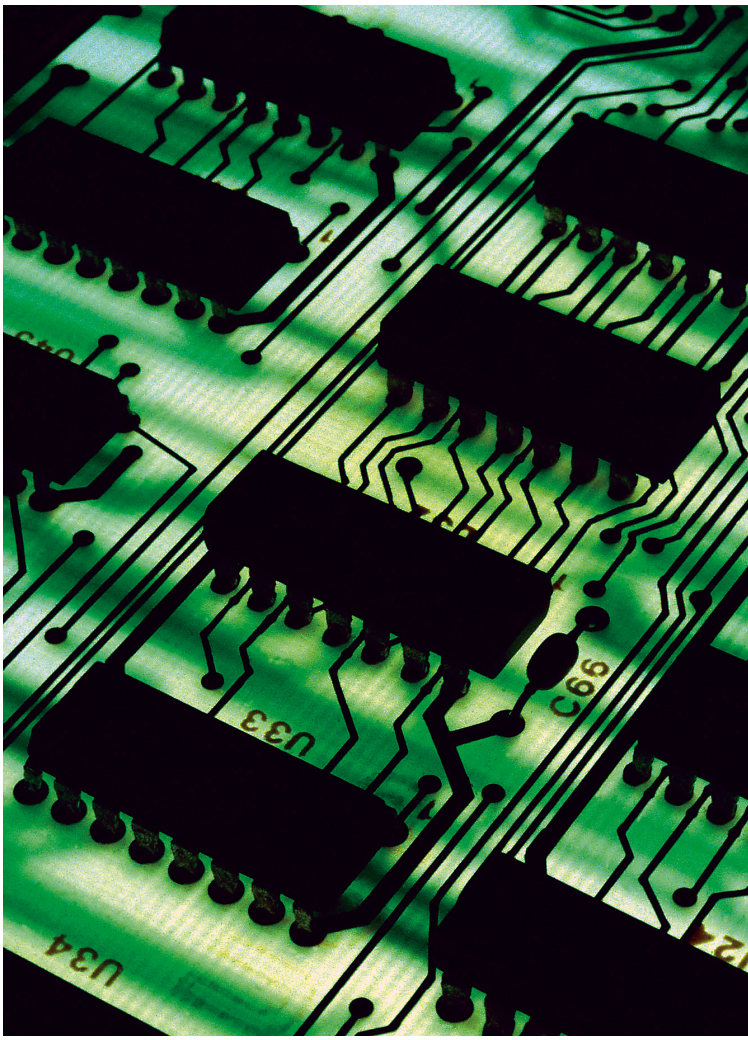
3M Purification offers a variety of plastic housings to accommodate a broad range of chemical and thermal applications in a cost effective manner. Most all housings will accept either DOE or SOE filter cartridges in 10" and 20" lengths. These housings are ideally suited for a wide range of applications such as DI water, printed circuit boards, plating solutions, and CMP.

For more information, please contact your 3M Purification representative.

Customer Needs. Realized.

By combining our large inventory and experienced staff with the latest manufacturing equipment, we are able to produce cost-effective and higher quality products. When you select 3M Purification, you get more than just a filter or a purifier. You get a partner who delivers enabling technology with superior service and support around the globe. Semiconductor and electronics manufacturers require the highest purity DI Water, Chemicals, and Gases for improved yields and reduced component level defectivity. 3M Purification Electronics provides that peak level of contamination control for demanding applications in the electronics industry. 3M Purification delivers fast and on time through our extensive network of direct and distributor sales which allows our customers to cut their inventory costs, by maintaining only necessary inventory. Our more than 2000 employees, along with trained stocking distributors and manufacturing facilities in the United States, Japan, China, Singapore, France, Australia, and Brazil, allow us to provide superior customer service.

To learn more about the latest filtration and purification advancements, visit our website at www.3Mpurification.com.



Important Notice

The information described in this literature is accurate to the best of our knowledge. A variety of factors, however, can affect the performance of the Product(s) in a particular application, some of which are uniquely within your knowledge and control. **INFORMATION IS SUPPLIED UPON THE CONDITION THAT THE PERSONS RECEIVING THE SAME WILL MAKE THEIR OWN DETERMINATION AS TO ITS SUITABILITY FOR THEIR USE. IN NO EVENT WILL 3M PURIFICATION INC. BE RESPONSIBLE FOR DAMAGES OF ANY NATURE WHATSOEVER RESULTING FROM THE USE OF OR RELIANCE UPON INFORMATION.**

It is your responsibility to determine if additional testing or information is required and if this product is fit for a particular purpose and suitable in your specific application.

3M PURIFICATION INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Limitation of Liability

3M Purification Inc. will not be liable for any loss or damage arising from the use of the Product(s), whether direct, indirect, special, incidental, or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.

Your Local Distributor:

3M Purification Inc.
400 Research Parkway
Meriden, CT 06450, U.S.A.
Tel (800) 243-6894
(203) 237-5541
Fax (203) 630-4530
www.3Mpurification.com

LITCATEL 1111b

Quality. Consistency. Performance.