Sample Preparation Product Guide

Your data depend on your preparation tools.

Merck Millipore is a division of MERCK

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Overview of Membrane Technology

Choosing the proper membrane device for your laboratory process is an important first step in any successful analysis. To help you select the filtration device best suited to your specific application, we have included this overview of microfiltration (MF) and ultrafiltration (UF) membrane technologies. You will find descriptions of the principal theory behind each technology, definitions of associated terms and explanations of the key criteria you should consider when choosing filtration devices.

For more information, ask our technical service team.

Visit **www.merckmillipore.com/techservice** for contact information or browse our extensive online technical library at **www.merckmillipore.com**.

Membrane Processes

The advantages of using membranes for sample preparation are numerous. Separation occurs via selective diffusion of a component through membrane pores, with either pressure, vacuum or concentration gradient being the driving force for this diffusion. As a result, membrane-based separation is relatively energy-efficient. Also, precision both in membrane manufacturing, as well as in application of pressure or vacuum, allow great control over separation parameters, such as particle size, volume-to-surface area ratio, and flux. Finally, the relatively gentle conditions required for membrane separations allow for separation of chemically reactive or unstable species—for example, biomolecules.

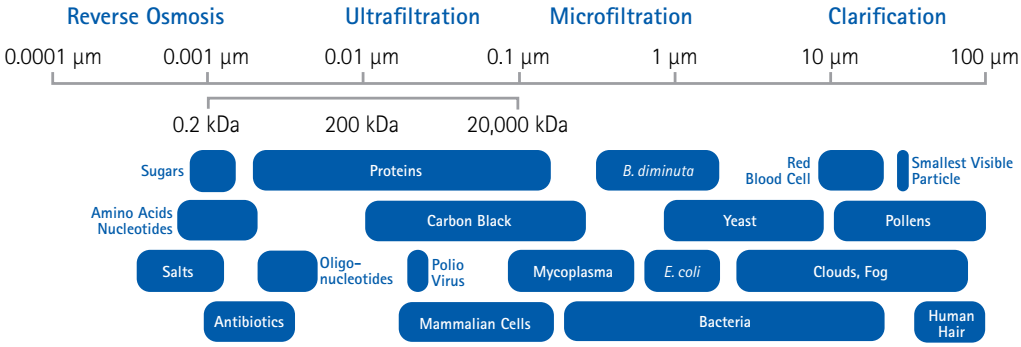


Figure 1. Membrane pore size affects type of particles retained.

Microfiltration

Microfiltration (MF) is the process of removing particles or biological entities in the 0.025 µm to 10.0 µm range from fluids by passage through a microporous medium such as a membrane filter. Although micron-sized particles can be removed by use of non-membrane or depth materials such as those found in fibrous media, only a membrane filter having a precisely defined pore size can ensure quantitative retention (Figure 2). Membrane filters can be used for final filtration or prefiltration, whereas a depth filter is generally used in clarifying applications where quantitative retention is not required or as a prefilter to prolong the life of a downstream membrane.

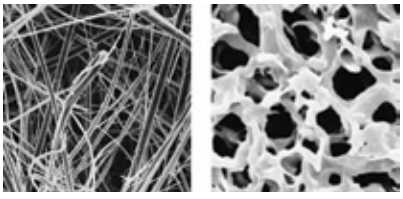


Figure 2. Depth filters (Left) have a random network of flow channels that trap particles throughout the depth of the matrix. Membrane filters (Right) have a geometrically regular matrix of pores. Particles are retained by size exclusion.

Ultrafiltration

Ultrafiltration (UF) is the process of separating extremely small particles and dissolved molecules from fluids. The primary basis for separation is molecular size, although in all filtration applications, the permeability of a filter medium can be affected by the chemical, molecular or electrostatic properties of the sample. UF can only separate molecules which differ by at least an order of magnitude in size. Molecules of similar size cannot be separated by UF (see Figure 1). Materials ranging from 1 to 1,000 kDa molecular weight (MW) are retained by certain UF membranes, while salts and water will pass through. Colloidal and particulate matter can also be retained. UF membranes can be used both to purify material passing through the filter and also to collect material retained by the filter. Materials significantly smaller than the pore size rating pass through the filter and can be depyrogenated, clarified and separated from high molecular weight contaminants. Materials larger than the pore size rating are retained by the filter and can be concentrated or separated from low molecular weight contaminants.

UF is far gentler to solutes than processes such as precipitation, and it is more efficient because it can simultaneously concentrate and desalt solutes. It does not require a phase change, which often denatures labile species, such as proteins, DNA and RNA, and UF can be performed either at room temperature or in a cold room. UF is thus an ideal method, not only for preparing protein samples, but also for manipulating nucleic acids, including molecular cloning and purifying plasmids. DNA and RNA samples with starting concentrations as low as 5 ng/mL can be routinely concentrated in minutes with 99% recovery of starting material. Solvents can be exchanged by diafiltration. In this process, the sample is concentrated, then diluted to the original volume with the desired buffer and concentrated again, thus "washing out" the original solvent.

Membrane Attributes

Microfiltration (MF)

Pore Size

When choosing the optimal microfiltration membrane for your application, pore size is one important variable. A MF membrane's pore size rating, typically given in units of microns, indicates that particles larger than the rating will be retained. MF membrane pores range from 0.025 µm (used for microdialysis of nucleic acids and proteins), to 0.1–0.22 µm (used for sterile filtration), to 0.3–0.45 µm (used for clarification or microbiological retention), to 0.45–8.0 µm (used for air and fluid particle monitoring). See page 171 for a complete pore size selection chart.

Membrane Diameter

The filter diameter required for a particular application depends on the volume of the solution being filtered and the flow rate (flux). Flux values are listed for each product in this application guide to allow you to choose the appropriate membrane diameter.

Membrane Throughput or Filtration Capacity

How rapidly and efficiently you can filter your solution also depends on the filtration capacity (or throughput). When filtering large volumes or heavily contaminated solutions, such as crude cell lysates, membrane pores can fill up to maximum capacity, slowing the rate of filtration. Of the several membranes available, Millipore Express® (PES) membrane filters have the highest filtration capacity (Figure 3). These filters have an asymmetric pore structure – at the top, where filtration starts, the pores are larger. The pore size then decreases from the top face of the filter to the bottom, where the pore size is small enough to retain bacteria (0.1 µm or 0.22 µm). This asymmetric pore design traps large particles at the top so that they do not clog the tight pores on the retentive side of the membrane, enhancing the filtration capacity and useful life of the filter.

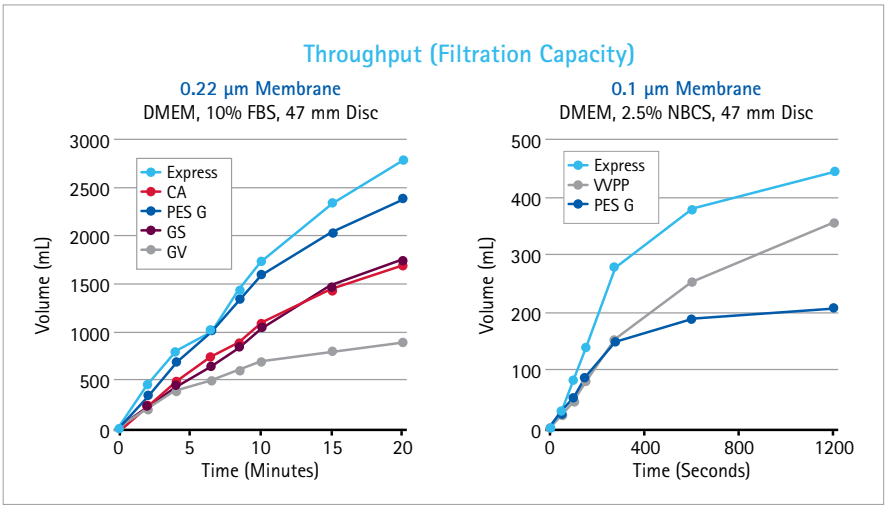


Figure 3. Several membrane types were compared for throughput or filtration capacity. 47 mm discs were challenged with either DMEM, 10% FBS (0.22 µm filters, left), or with DMEM, 2.5% NBCS (0.1 µm filters, right). In both cases, the Millipore Express® (PES) filters exhibited the highest filtration capacity.

Prefilters

Another way to extend the lifespan and throughput of your filter is to add an upstream prefilter. Organic solvents are most often prefiltered through polypropylene prefilters, available in 0.6 – 30 µm pore sizes. These polypropylene filters can also be used for aqueous solutions if they are first wetted with alcohol. Aqueous solutions are most widely clarified with glass fiber prefilters with binder resin, which have superior wet strength and can collect dirt from heavily contaminated liquids. If you are concerned about glass fibers shedding into the filtrate, use Type-RW prefilters, which are made from non-shedding materials (polymers of cellulose esters formed around a polyester web). Type-RW prefilters have equivalent dirt-holding capacity to their glass fiber counterparts.

Chemical Compatibility and Extractables

Researchers use MF membranes to remove dissolved gases and particulates from a variety of aqueous solutions and organic solvents.

Most lab filtration applications also demand that filtered solutions do not retain impurities from the filter unit itself. Extractability is the degree to which impurities can be leached from the membrane into the solution; membranes and filter units made from low-extractable polymers with broad chemical compatibility ensure that filtrates perform well in downstream applications.

For your particular application, see the Filter Selection Guide on page 170 or the comprehensive chemical compatibility chart starting on page 220.

Adsorption

Nonspecific adsorption of molecules to filter membranes hinders reproducibility in many analytical processes. For example, adsorption of a dissolved compound to a membrane during sample filtration will result in underestimation of the dissolution rate of this compound.

MF membranes are also often used to filter cell culture media containing protein additives, such as those in serum supplements. Researchers must be confident that when cell culture solutions are filtered, either to ensure sterility or to remove particulates, the proteins are not adsorbed to the membrane and lost. For example, concentrations of growth factors needed to maintain special cell types must remain constant before and after filtration. Protein binding is also undesirable in filters used to clarify cell lysates before protein purification.

For dilute protein solutions, keep membrane diameter to a minimum to further avoid adsorption.

Ultrafiltration (UF)

Nominal Molecular Weight Limit

UF membranes are rated according to the nominal molecular weight limit (NMWL), also sometimes referred to as molecular weight cut-off (MWCO). The NMWL indicates that most dissolved macromolecules with molecular weights higher than the NMWL will be retained. An ultrafiltration membrane with a stated NMWL should retain (reject) at least 90% of a globular solute of that molecular weight in daltons. A lower NMWL increases rejection but decreases the filtration rate for the same membrane material.

Retention and product recovery are a function of a variety of other factors, including the molecular shape and size of the molecule, electrostatics, sample concentration and composition, operating conditions and device or system configuration. Two membranes may have the same NMWL but will exhibit different retention of molecules within a relatively narrow range of sizes. In addition, slender, linear molecules (e.g., nucleic acids) may find their way through pores that will retain a globular species of the same weight. Retention can also be affected by hydration, counterions, steric effects, macromolecular conformation changes, solute-solvent interactions and solute-solute interactions. Nevertheless, NMWL has proven to be an effective general indicator of membrane performance for globular proteins.

It is best to choose a device with cut-off at about one half of the molecular weight of the protein to be concentrated. This maximizes protein recovery and minimizes filtration time.

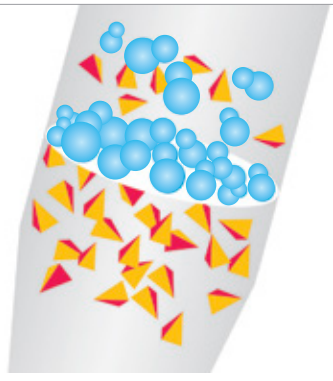
Nucleotide Cut-Off (NCO)

By virtue of the rod-like three-dimensional structures of nucleic acids or polysaccharides, these types of molecules require a tighter membrane (with a smaller cut-off) than globular proteins of the same molecular weight. It is therefore convenient to consider the membrane retention characteristics of nucleic acids as being related to their length (in nucleotides) rather than their molecular weight. Several additional factors affect the recovery of nucleic acid fragments from a membrane of a given NMWL. These factors include the strandedness of the DNA or RNA molecule, whether the DNA is linear, relaxed or supercoiled (for plasmid), the ionic strength of the solvent, the velocity of the process stream over the membrane and the nature of the driving force. The overall effect is that optimal nucleic acid recovery is achieved in low-salt buffers run under conditions of relatively low velocity (e.g., low vacuum pressure or low g-force).

If the DNA sample is in the presence of high salt (or the device is run at a higher-than-recommended g-force), a significantly reduced DNA recovery may be observed. Under these conditions, higher DNA or RNA recovery can be achieved by using a tighter membrane. However, it will take significantly longer to complete the purification. For applications such as PCR where removal of unincorporated single-stranded primers from double-stranded DNA fragments is required, the molecular weights of the primer and DNA fragment should differ by at least an order of magnitude for efficient separation.

Concentration Polarization

Another factor affecting retention characteristics is the potential for membrane fouling, or concentration polarization. This occurs when there is an accumulation of the retained solute on the surface of the membrane. At high concentrations, a gel layer forms that can act as a secondary membrane (Figure 4). This may interfere with passage of the molecules through the membrane and can adversely affect the flow rate. During concentration polarization, the gel layer on the membrane surface superimposes its own rejection characteristics on those of the membrane. Usually, concentration polarization increases retention of lower molecular weight species. A membrane with a 100 kDa NMWL may reject 10–20% of albumin in a 0.1% solution of pure albumin. However, in the presence of larger solutes such as IgG, it may reject 90% of the albumin. Concentration polarization makes it very difficult to use UF for solute fractionation unless the solutes to be separated differ in size by at least an order of magnitude.



Ultrafiltration separates proteins from soluble salts. "Concentration Polarization" slows down filtration. The proteins form a gel layer on the membrane surface.

Figure 4. Concentration polarization at high concentrations.

Flux (UF Flow Rate)

A membrane's flux is defined as the flow rate divided by the membrane area. Using membranes with higher NMWL ratings will increase the flow, but at the same time lower the retention. A membrane should be selected for required rejection, consistent with desired flow rate. This is determined by surface area, macrosolute type, solubility, concentration and diffusivity, membrane type, temperature effects on viscosity and, to some extent, pressure. When concentration polarization is rate-controlling, flux is affected by solute concentration, fluid velocity, flow channel dimensions, and temperature.

Effects of Operating Parameters on Flux

Pressure

When ultrafiltering dilute protein solutions or colloid suspensions, flux will increase with increasing transmembrane pressure (TMP). These effects are most apparent when operating under controlled positive pressure, such as when using a stirred cell. When the process is membrane-controlled (i.e., when the resistance of the gel layer is much smaller than that of the membrane), the flux-pressure relationship is linear. When the process is controlled by polarization (e.g., when the resistance of the gel layer is much larger than that of the membrane), flux will reach a plateau and may actually decrease with increases in pressure.

Concentration

When concentration of the retained species is very low, flux is independent of concentration. As solute concentration rises during operation, increased viscosity and the polarization effect cause flux to decrease.

Temperature

Increasing the operating temperature normally increases UF rates. A higher temperature increases solute diffusivity (typically 3–3.5% per degree Celsius for proteins) and decreases solution viscosity. Common practice is to operate at the highest temperature tolerated by the solutes and the equipment.

pH

Changing solution and/or pH often changes molecular structure. This is especially true for proteins. At its isoelectric point, a protein begins to precipitate, causing a flux decrease.

Fouling

Flux decrease due to concentration polarization should not be confused with the effect of membrane fouling. Fouling is usually the deposition and accumulation of submicron particles and solute on the membrane surface and/or crystallization and precipitation of smaller solutes on or within the pores of the membrane. There may be a chemical interaction with the membrane.

Importance of recovery

While rejection is used to characterize membrane performance, it does not always directly correlate with solute recovery from a sample or volume. Actual solute recovery—the amount of material recovered after UF—is generally based on mass balance calculations.

Since adsorption is a direct function of membrane and device surface area, device size must be considered when recovery is samples should be concentrated with membranes of minimal surface area, as long as reasonable flow rates can be achieved.

Mode of Operation

Normal vs. Tangential Flow Filtration

In normal flow filtration (NFF), fluid is convected directly toward the membrane under an applied pressure or vacuum. Particulates that are too large to pass through the pores of the membrane accumulate at the membrane surface or in the depth of the filtration medium, while smaller molecules pass through to the downstream side. NFF can be used for sterile filtration of clean streams, clarifying prefiltration, and virus/protein separations.

In tangential flow filtration (TFF), the fluid is moved tangentially along the surface of the membrane. An applied pressure serves to force a portion of the fluid through the membrane to the filtrate side. As in NFF, particulates and macromolecules that are too large to pass through the membrane pores are retained on the upstream side.

However, in this case, the retained components do not build up at the surface of the membrane. Instead, they are swept along by the tangential flow. This feature of TFF makes it an ideal process for finer sized-based separations. Although TFF is more commonly associated with large-scale processing, centrifugal UF devices with vertical membrane panels, such as Amicon® Ultra devices, also benefit from a TFF-like mode of separation, particularly in a swinging bucket rotor.

Cellular Sample Preparation

Prepare, grow and analyze with advanced systems for every cell culture challenge. To complement our trusted sterile filtration tools, Merck Millipore supports both conventional and emerging formats for mammalian cell culture with innovative solutions ranging from inserts and filter plates to optimized platforms for dynamic microenvironment control.

Prepare

With industry-leading, innovative designs for filtration devices and over 50 years of membrane technology expertise, Merck Millipore offers a wide range of solutions to make the repetitive yet critical steps of preparing cells and media accurate, quick and easy.

Grow

page 23

Analyze

page 33

Water for Cell Culture

Certified water quality from an ISO® 9001 / cGMP environment

Water for Cell Culture has been developed for laboratories requiring less than 50 L of water/year. Intended for research use only, it has been tested and is suitable for use in experiments requiring sterile, mycoplasma-free and pyrogen-free water.

Features & Benefits

- Certified water quality: Strict quality control tests and production in an ISO® 9001 / cGMP environment provide high-quality water for critical cell culture experiments. Delivered with a Certificate of Quality.
- Mycoplasma-free: Sterile and free of pyrogens, mycoplasma, calcium and magnesium.
- Easy traceability: One label can be peeled off and affixed to a laboratory notebook for traceability in experiments.
- Volume range adapted to user needs: Available in 1 L, 0.5 L, 125 mL bottles in different package sizes.

Applications

Cell Culture, Cell-based Assays, Sterile Applications

Ordering Information

Description	Volume (mL)	Volume (L)	Qty/Pk	Catalogue No.
Ultrapure Water for Cell Culture, cell culture tested, delivered sterile, mycoplasma-free and pyrogen-free		1	1	H20CC1001
		1	6	H20CC1006
	500		1	H20CC0501
	500		6	H20CC0506
	125		6	H20CC0106
	125		24	H20CC0124

For more information visit: **www.merckmillipore.com/labwater**

Stericup® and Steritop® Filter Units

Efficient media sterilization and storage up to 1 L

The Stericup® vacuum filtration system is the most efficient single-use, disposable process for sterile media preparation. It combines a Steritop® filter unit with a receiver flask for processing and storing volumes from 150 mL to 1,000 mL in a single, ready-to-use format. Its no-tip, easy-grip flask design and balanced profile improve stability during filtration in tight laminar flow hoods, and the convenient labeling and packaging make it easy to open and track each device. The bottom of the receiver flask is slightly recessed, so you can conveniently stack capped flasks after filtration, maximizing precious refrigeration space. You can also use Steritop® bottle-top devices with your own sterile capture flask or bottle.

Features & Benefits

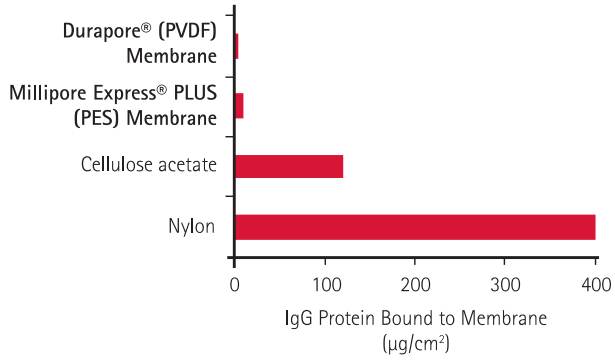
- Millipore Express® PLUS membrane for fastest flow rates and low protein binding to minimize absorption and protein loss, which affect downstream performance and costs
- Durapore® membrane for ultra-low protein binding for minimum absorption and protein loss
- Snug tight packaging, easy tear-open pouch, and convenient label designs make storing, opening and tracking your devices easy and efficient
- Stable base and easy grip design of the Stericup® device enable any user to comfortably perform all stages of the workflow in a laminar flow hood
- Recessed bottom of Stericup receiver flasks allows flasks to be stacked easily in refrigerated spaces

Applications

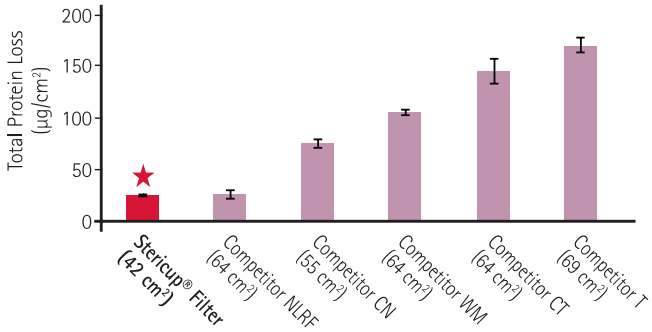
Sterilization of Aqueous Solutions (150 mL to 1 L); Sterile Filtration of Culture Media and Buffers with High-Value Protein or Small Molecule Component

Product Performance

Protein Binding by Membrane Type



Low Protein Binding: Minimizes Protein Loss



13 mm disks from were cut out from different filtration devices (n=3). Protein binding was quantified by incubating discs in 1 mL tracer (1 mg/mL goat IgG in PBS containing ^{125}I-goat IgG at 0.1 µCi/mL). After 2 h of shaking at RT, the tracer solution was aspirated. Disks were washed 3X in PBS then assayed for bound radioactivity.

Ordering Information

Description	Membrane/Application	Pore Size (µm)	Funnel Capacity (mL)	Receiver Bottle (mL)	Qty/Pk	Catalogue No.
Stericup® Filter Units — combine a filter unit with a receiver flask and cap for processing and storage.						
Stericup®-VP Filter Units	Millipore Express® PLUS (PES) / removal of mycoplasma*	0.1	250	250	12	SCVPU02RE
			1000	1000	12	SCVPU11RE
Stericup®-GP Filter Units	Millipore Express® PLUS (PES) / fast filtration of tissue culture media and buffers	0.22	150	150	12	SCGPU01RE
			250	250	12	SCGPU02RE
			500	500	12	SCGPU05RE
			500	1000	12	SCGPU10RE
			1000	1000	12	SCGPU11RE
Stericup®-GV Filter Units	Durapore® (PVDF) /filtration of high value biomolecules, lowest protein binding	0.22	150	150	12	SCGVU01RE
			250	250	12	SCGVU02RE
			500	500	12	SCGVU05RE
			500	1000	12	SCGVU10RE
			1000	1000	12	SCGVU11RE
Stericup®-HV Filter Units	Durapore® (PVDF) /filtration of high value biomolecules, lowest protein binding	0.45	150	150	12	SCHVU01RE
			250	250	12	SCHVU02RE
			500	500	12	SCHVU05RE
			1000	1000	12	SCHVU11RE
Steritop® Bottle-Top Filter Units can be used on bottles with 33 mm or 45 mm openings.						
Steritop®-GP Filter Units	Millipore Express® PLUS (PES) / fast filtration of tissue culture media and buffers	0.22	150	33	12	SCGPS01RE
				45	12	SCGPT01RE
			250	33	12	SCGPS02RE
				45	12	SCGPT02RE
			500	33	12	SCGPS05RE
				45	12	SCGPT05RE
			1000	45	12	SCGPT10RE
Steritop®-GV Filter Units	Durapore® (PVDF) /filtration of high value biomolecules, lowest protein binding	0.22	500	45	12	SCGVT05RE
Receiver Bottles and Caps			250	45	12	SC00B02RE
			500	45	12	SC00B05RE
			1000	45	12	SC00B10RE

*0.10 µm pore size is designed to enhance maximum filtration of tissue culture media but it is not a guarantee of complete mycoplasma removal.

For more information visit: **www.merckmillipore.com/cellculture**

Simply better membrane technology, simply better Stericup® filters.

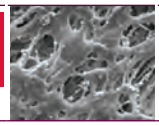
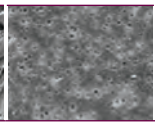
Don't take risks with your media. If your sterile filtration membranes are clogging and/or binding serum proteins in your media, your cells risk:

- Cellular damage
- Exposure to toxins
- Suboptimal cell growth

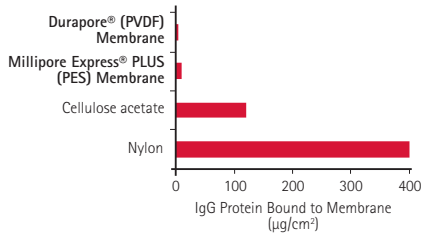
Trust Stericup® filters with NEW improved Millipore Express® PLUS membrane. Our most popular Stericup® membrane, Millipore Express® PLUS polyethersulfone (PES), now delivers even faster filtration rates while reducing overall protein and reagent loss.

Learn more at: **www.merckmillipore.com/sterilefiltration**

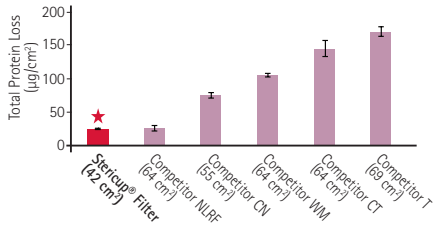
Membrane design makes a difference.

Membrane	Pore Structure	Membrane Top	Membrane Bottom	Main Features
Millipore Express® PLUS PES (polyethersulfone)	 Asymmetric			• High flow rate • Low protein binding • Low volume retention

Protein Binding by Membrane Type



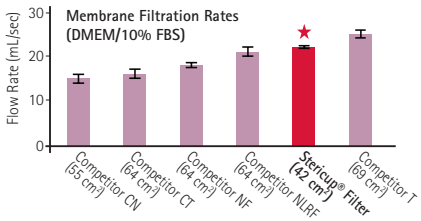
Low Protein Binding: Minimizes Protein Loss



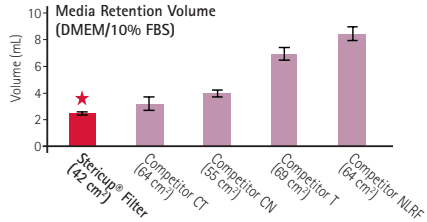
13 mm disks from were cut out from different filtration devices (n=3). Protein binding was quantified by incubating discs in 1 mL tracer (1 mg/mL goat IgG in PBS containing ^{125}I-goat IgG at 0.1 µCi/mL). After 2 h of shaking at RT, the tracer solution was aspirated. Disks were washed 3X in PBS then assayed for bound radioactivity.

Simply better Stericup® filters.

Faster filtration.



Lower retention volume.



500 mL of DMEM+10%FBS was filtered to completion through various 0.22 µm hydrophilic PES membrane filtration devices. Filtration rates and retention volumes were calculated (n=3).

For Stericup® filter order information, see page 10.

Steriflip® Filter Units

No sample transfer, just connect your tube and filter

The Steriflip® filter unit eliminates messy pouring during sample transfer. Directly attach the unit to a 50 mL centrifuge tube containing your sample, flip it over, and apply vacuum. The filtrate collects in the attached 50 mL centrifuge tube. Steriflip® filters come in different pore sizes that are ideal for cell isolation. These include nylon net filters in 40, 60 and 100 µm pore sizes, which are ideal for stem cell, cardiomyocyte, neurological and skeletal tissue applications. The vacuum-assisted, closed system ensures sample sterility while enabling fast separation of large volumes of cellular material for efficient recoveries.

Features & Benefits

- Eliminates messy sample transfer via a simple vacuum-assisted, closed system
- Isolate cells from cellular debris using any of the various pore-sized nylon net filters
- Ideal for sterilizing small batches of culture media
- Attaches to any standard 50 mL centrifuge tube, eliminating unnecesary materials, time and risk of spillage

Applications

Sterilization of Aqueous Solutions (up to 50 mL), Sterile Filtration of Small Batches of Culture Media, Sterile Filtration of Buffers with High Value Protein or Small Molecule Components, Cell Isolation

Specifications

Materials	
Device	MBS/Polypropylene
Membrane	As indicated in table
Inlet Fittings	Double lead thread with vacuum port
Outlet Fittings	Double lead thread for 50 mL centrifuge tube
Filtration Area, cm²	7
Process Volume, mL	50
Hold-up Volume, µL	600
Maximum Operating Temperature, °C	45
Sterilization Method	Gamma irradiation

Ordering Information

Description	Pore Size (µm)	Qty/Pk*	Catalogue No.
Units with fast flow and low protein binding Millipore Express® (PES) membrane			
Steriflip®-GP Filter Unit	0.22	25	SCGP00525
Units with very low protein binding Durapore® (PVDF) membrane			
Steriflip®-GV Filter Unit	0.22	25	SE1M179M6
Steriflip®-HV Filter Unit	0.45	25	SE1M003M00
Unit with nylon net filter			
Steriflip®-NY Filter Unit	20.0	25	SCNY00020
	40.0	25	SCNY00040
	60.0	25	SCNY00060
	100.0	25	SCNY00100
Accessories			
Steriflip® Funnel Attachment, non-sterile		25	SC50FL025

*Each box of 25 filter units includes one centrifuge tube stand.

For more information visit: **www.merckmillipore.com/cellculture**

Stericap™ PLUS Universal Bottle-Top Filter Device

Fast large-volume filtration into any sized bottle

The Stericap™ PLUS Universal Bottle-Top Filter Device with Millipore Express® PLUS membrane provides fast vacuum filtration and low protein binding without the need for a prefilter in most cases. It filters quickly, without clogging, even viscous solutions typical of serum-containing media. This non-cytotoxic, non-pyrogenic device can be used to fill any vacuum-rated bottle or other container with an inner neck diameter of 20 to 67 mm. This allows maximum versatility, capacity, speed, and flowthrough efficiency when you need to filter larger volumes into containers with openings of various sizes.

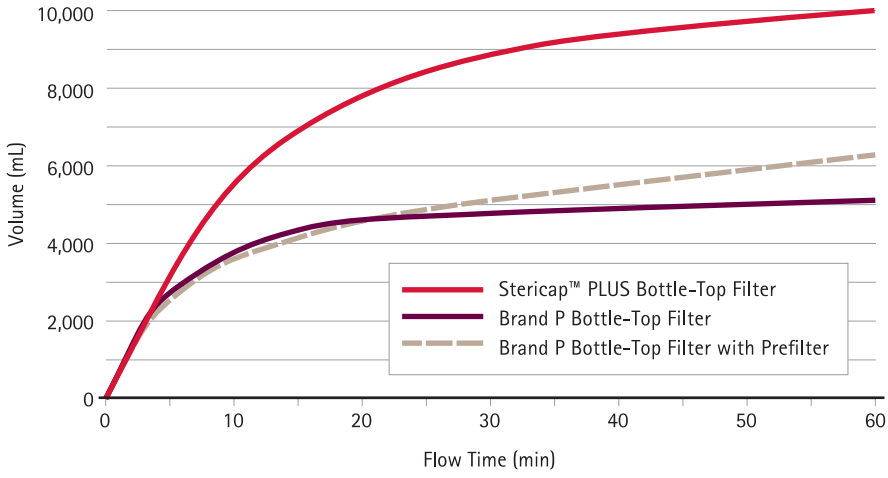
Features & Benefits

- Millipore Express® PLUS membrane for fastest flow rates and low protein binding
- Fits any vacuum-rated bottle from 20 to 67 mm in diameter for maximum flexibility
- High volume capacity for larger and less frequent preparation steps
- Easy flow control button so the filter can be easily transferred from bottle to bottle without turning off the vacuum each time
- Free of cytotoxic and pyrogenic contaminants for robust cell culture and sensitive downstream applications

Applications

Sterilization of Aqueous Solutions, Media Preparation, Buffer Preparation

Product Performance



High Flow and High Throughput
In an in-house study, reconstituted Dulbecco's Modified Eagles Medium (DMEM) with 10% fetal bovine serum was filtered through Stericap™ PLUS devices (n = 3) and competitive bottle-top devices (n = 2 each). The data show the average flow times.

Specifications

Materials	
Housing	Styrene/Polypropylene/Polyethylene
Membrane (Millipore Express® PLUS)	Polyethersulfone
Pore Size (µm)	0.22
Connections	
Inlet Connection	Hose barb
Outlet Connection	Universal bottle top
Vent	Needle valve with female Luer-Lok®
Vacuum Port	Hose barb
Filtration Area, cm²	40
Maximum Operating Vacuum	635 mm Hg (25" Hg)
Sterilization	Gamma irradiation

Ordering Information

Description	Qty/Pk	Catalogue No.
Stericap™ PLUS Filter Unit	10	SCGPCAPRE

For more information visit: **www.merckmillipore.com/cellculture**

Steripak™ Filter Units

Largest laboratory-scale, bottle-top filtration

Steripak™-GP filter units are designed for larger scale, pressure-driven filtration of tissue culture media with or without serum. Each filter is for a single use and is not autoclavable. The filter units come in two sizes with the smaller unit able to filter up to 10 L and the larger up to 20 L.

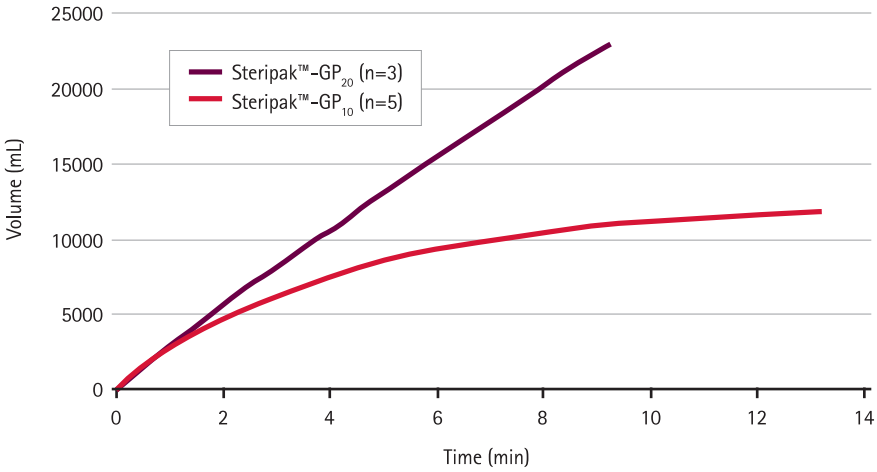
Features & Benefits

- Millipore Express® PLUS membrane for fastest flow rates and low protein binding
- Larger scale, pressure-driven filtration device for faster flow rates speeds time-consuming, large-volume filtrations
- 10 L and 20 L capacity sizes for maximum laboratory-scale filtration options
- Manually operated top air vent to prevent air lock stop of flow
- Filling bell for cleaner filling environment around the opening of the receptacle bottle

Applications

Sterilization of Aqueous Solutions, Media Preparation, Buffer Preparation

Product Performance



Steripak™ filters deliver fast flow and high throughput. Data show typical flow rates and throughput for 100 cm² (Steripak™-GP_{10}) and 200 cm² (Steripak™-GP_{20}) filters using tissue culture medium with 10% serum at 25 psi (1.7 bar).

Specifications

Materials of Construction	
Housing	SAN
Membrane	Polyethersulfone
Inlet Connection	6 mm (1/4 in.) stepped Hose Barb
Outlet Fittings	6 mm (1/4 in.) stepped Hose Barb and filling bell
Pressure, bar (psi)	Forward: 5.2 (75); Reverse: 0.35 (5)

Ordering Information

Description	Filter Area (cm²)	Qty/Pk	Catalogue No.
Steripak™-GP_{10} Filter Unit	100	3	SPGPM10RJ
Steripak™-GP_{20} Filter Unit	200	3	SPGPM20RJ

For more information visit: **www.merckmillipore.com/cellculture**

Sterivex™ Filter Units

Compact design ideal for large-volume filtration using positive pressure

Filter-sterilize volumes up to 1,000 mL or 2,000 mL, using Sterivex™ pressure-driven filter units (capacity depends on the type of membrane used in the device). With three different membrane options and a variety of outlet connection options, Sterivex™ filters can fit virtually any workflow and dispense into nearly any storage container. Sterivex™ filters work with syringes, peristaltic pumps or pressure vessels and eliminate the risk of contamination associated with decanting or pipetting.

Features & Benefits

- Works with a variety of pressure devices including syringes, perstaltic pumps and pressure vessels
- Comes in multiple membrane types to suit your application needs with capacities up to 2 L

Applications

Sterilization of Aqueous Solutions

Specifications

Materials	
Device	Eastar®
Membrane	As indicated in table
Inlet Fittings	Female Luer-Lok® with upstream vent
Filtration Area, cm²	10
Process Volume, mL	2000
Hold-up Volume, µL	200
Maximum Operating Temperature, °C	45
Maximum Inlet Pressure, bar (psi)	3.1 (45)
Sterilization Method	Gamma irradiation

Ordering Information

Description	Process Volume (mL)	Outlet Type	Qty/Pk	Catalogue No.
Units with fast flow and low protein binding 0.22 µm Millipore Express® (PES) membrane for sterilization of aqueous solutions; supplied sterile				
Sterivex™-GP Filter Unit	2000	Filling bell	10	SVGPB1010
		Male Luer-Lok®	15	SVGPL10RC
		Male nipple	15	SVGP01015
		Male nipple	50	SVGP01050
Units with very low protein binding 0.22 µm Durapore® (PVDF) membrane for sterilization of aqueous solutions; supplied sterile				
Sterivex™-GV Filter Unit	1000	Filling bell	10	SVGVB1010
		Male Luer-Lok®	15	SVGVL10RC
		Male nipple	15	SVGV01015
		Male nipple	50	SVGV010RS
Units with very low protein binding 0.45 µm Durapore® (PVDF) membrane for clarification of aqueous solutions; supplied sterile				
Sterivex™-HV Filter Unit	1000	Filling bell	10	SVHVB1010
		Male Luer-Lok®	15	SVHVL10RC
		Male nipple	15	SVHV01015
		Male nipple	50	SVHV010RS

For more information visit: **www.merckmillipore.com/cellculture**

Sterile 33 mm Millex® Filters

20% more filter surface than 25 mm filters for significantly higher flow rate and throughput

Millex® syringe filters provide convenient sterilization of small volumes and are ideal for solutions such as antibiotics and tissue culture additives. Their unsurpassed quality and consistency of results have led to the development of many sample preparation methods that specify Millex® filters. Now sterile Millex® filter units are available in larger 33 mm housing with either MCE, PVDF or PES membranes for increased filtration performance and ease of use.

33 mm Millex® Filter Advantages

Faster flow rate for greater throughput

The larger filter surface area increases flow rate and throughput. It also makes it easier to filter solutions because it reduces the pressure required to empty the syringe.

Exceptionally high fluid recovery

In addition to improving filtration throughput, Millex® 33 mm filters also have an exceptionally low hold-up volume (less than 100 µL) despite the large size of the membrane surface area and housing, so there is minimal sample loss within the device during filtration.

Ultra-low protein binding maximizes recovery and accuracy

Whether you choose to use the fastest flow, low-protein-binding Millipore Express® PLUS (PES) membrane-containing Millex® 33 mm filters or the ultra-low protein binding version containing our Durapore® PVDF membrane, you will be assured maximum recovery of soluble proteins, such as serum components typically added to cell culture media. Preserving these additives translates into consistently intact, sterile cell culture media, ensuring reproducible cell growth, behavior and downstream results.

Higher pressure rating for speed and reduced risk of bursts

Millex® filters have a very high maximum housing pressure of 10.5 bar (150 psig), which means you can filter solutions faster than before and practically eliminate the risk of bursts due to overpressurizing the fluid flow, which can often happen with syringe filtration.

Color-coded for instant visual identification

The color-coded band on the Millex® housing clearly indicates which membrane is inside, so you don't have to read labels or risk confusing similar-sized devices on the bench.

Automated ISO certified cleanroom manufacture

Millex® filters are manufactured in a closed, controlled environment using an automated process. Human hands, which can introduce variability, never touch the filter during assembly. A Certificate of Quality included in each box describes our quality standards in detail.

Choice of membranes

Millex® 33 mm filters are available with three membranes:

- Millipore Express® PLUS (PES) membrane
- Durapore® (PVDF) membrane
- Mixed cellulose esters (MCE) membrane

For sterile Millex® filter ordering information, see page 20.

Sterile Millex® Syringe Filter Selection Guide

Research Applications

Tissue culture media and additives / Buffers / DMSO / Biological solutions

Medical Applications

Drugs / Vitamins / Clinical solutions

Membrane	Pore Size (µm)	Diameter (mm)	Process Volume (hold-up)	Housing and Sterilization Method	CE	(M)	50 units/pk	100 units/pk	250 units/pk	1,000 units/pk
Durapore® (PVDF) Membrane Lowest binding membrane for protein-rich solutions	0.1 µm Sterile Filtration & Mycoplasma removal	33 mm	100 mL (<100 µL)	Modified Acrylic, RS	●		SLVV033RS			
						●	SLVM33RS			
	0.22 µm Sterile Filtration	33 mm	100 mL (<100 µL)	Modified Acrylic, RS	●		SLGV033RS		SLGV033RB	SLGV033RK
						●	SLGVM33RS			
		13 mm	100 mL (<100 µL)	HDPE, EO	●			SLGV013SL		
		4 mm	100 mL (<100 µL)	HDPE, EO				SLGV004SL		
	0.45 µm Clarification of sterile solutions	33 mm	100 mL (<100 µL)	Modified Acrylic, RS	●		SLHV033RS		SLHV033RB	SLHV033RK
						●	SLHVM33RS			
		13 mm	100 mL (<100 µL)	HDPE, EO	●			SLHV013SL		
		4 mm	100 mL (<100 µL)	HDPE, EO				SLHV004SL		
	5.0 µm Clarification of Sterile Solutions	25 mm	100 mL (<100 µL)	PVC, EO			SLSV025LS			
Millipore Express® PLUS (PES) Membrane Fast flow and low binding for cell culture media preparation	0.22 µm Sterile Filtration	33 mm	200 mL (<100 µL)	Modified Acrylic, RS	●		SLGP033RS		SLGP033RB	SLGP033RK
						●	SLGPM33RS			
		25 mm	100 mL (<100 µL)	PVC, EO	●		SLMPL25SS*			
						●	SLMP025SS			
	0.45 µm Clarification of sterile solutions	33 mm	200 mL (<100 µL)	Modified Acrylic, RS	●		SLHP033RS		SLHP033RB	
						●	SLHPM33RS			
MF-Millipore™ (MCE) Membrane Most referenced general purpose membrane	0.22 µm Sterile Filtration	33 mm	100 mL (<100 µL)	Modified Acrylic, RS	●		SLGS033SS		SLGS033SB*	
						●	SLGSM33SS			
		25 mm	100 mL (<100 µL)	PVC, EO			SLGSV255F SLGL0250S*			
	0.45 µm Clarification of sterile solutions	33 mm	100 mL (<100 µL)	Modified Acrylic, RS	●		SLHA033SS		SLHA033SB	
						●	SLHAM33SS			
	0.80 µm Clarification of sterile solutions	33 mm	100 mL (<100 µL)	Modified Acrylic, RS	●		SLAA033SS		SLAA033SB	
						●	SLAAM33SS			
PTFE, Hydrophilic Broad chemical compatibility	0.2 µm Sterile Filtration of DMSO	13 mm	10 mL (<25 µL)	HDPE, EO				SLLG013SL		
		25 mm	100 mL (<100 µL)	HDPE, EO			SLLG025SS			

CE = CE Marked, (M) = Medical device, * Male Luer-Lok®
HDPE = High-density polyethylene, PVC = Polyvinyl chloride, RS = Radiosterilized, EO = Ethylene Oxide-treated

Sterile Millex® Syringe Filter Selection Guide

Venting and Gas Filtration

Sterile filtering gases / Venting sterile containers / In-line vacuum pump protection / Transducer protection

Membrane	Pore Size (µm)	Diameter (mm)	Housing and Sterilization Method	Inlet Connection	Outlet Connection	10 units/pk	25 units/pk	50 units/pk	100 units/pk
Durapore® (PVDF) Membrane Super hydrophobic membrane for transducer protection	0.22 µm	25 mm	PVC, EO	FLL	MLS			SLGVS25PS SE2M407H0**	
								SE2M407H0**	
					MLL			SLGVS25US SLGVS25XS	
								SLGVS25XS	
					SPIKE			SLGVS25LS	
Fluoropore™ (PTFE) Membrane Hydrophobic chemistry for gas filtration	0.20 µm	25 mm	PVC, EO	FLL	MLS			SLFG025LS	
					MLL			SLFG25BS	
					Needle		SLFGN25VS		
			PP, Autoclavable		MLS			SLFG02550	
	0.20 µm	50 mm	PP, Autoclavable	SHB	SHB	SLFG05010			
					1/8 in. NPTM	SLFG55010			
				SHB (latex)	1/8 in. NPTM	SLFG65010			SLFG65000
				1/8 in. NPTM	1/8 in. NPTM	SLFG75010			SLFG75000
				SHB (silicone)	SHB (silicone)	SLFG85010			SLFG85000
	0.45 µm	50 mm	PP, Autoclavable	SHB	SHB	SLFH05010			SLFH05000
	1.0 µm	50 mm	PP, Autoclavable	SHB	SHB	SLFA05010			SLFA05000

**Solvent resistant housing
PVC = Polyvinyl Chloride, PP = Polypropylene, EO = Ethylene Oxide
FLL = Female Luer-Lok® outlet, FLS = Female Luer-slip™, MLL = Male Luer-Lok® outlet, MLS = Male Luer-slip™, SHB = Stepped Hose Barb

Sterile Millex® Syringe Filters for Liquid and Air Sterilization

Faster flow rates and higher recoveries

Available in 4, 13, 25, 33, and 50 mm diameters with a variety of membranes, Millex® sterile syringe filters are ideal for sterilizing organic solvents, aqueous solutions or air/gas. Many sample preparation methods specify Millex® filters because of their unsurpassed quality and consistency. Millex® filters not only feature minimal hold-up volume and faster flow rates, but they also withstand higher operating pressures and are chemically compatible with a range of samples and solvents to minimize leaching of extractable impurities. Millex® filters are produced in a controlled, automated environment with the highest quality standards. Sterile devices come with a certificate of quality, with select devices marked for medical applications.

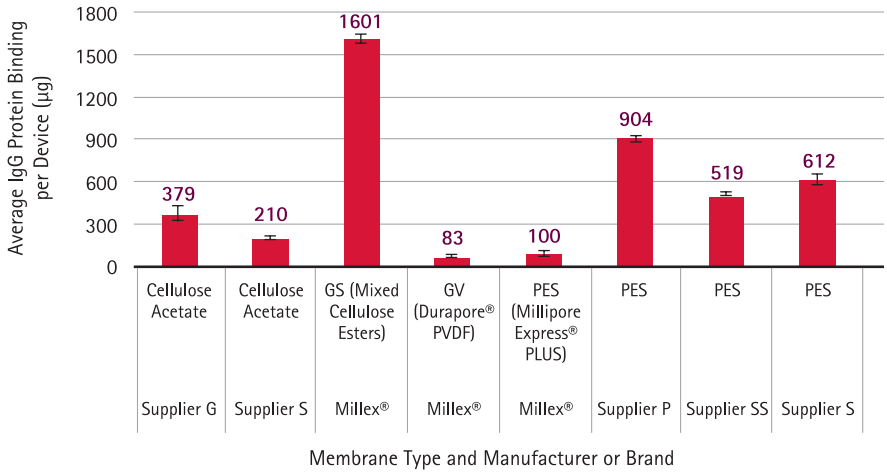
Features & Benefits

- Tailored to a variety of applications based on membrane type, housing and validation rating
- Medical Device-rated devices in some countries including vented devices for direct patient care
- Specialized filter units to protect hemodialysis transducers from blood and moisture and for vacuum line protection
- Low extractables and low absorption membranes for minimum sample losses
- Faster flow rates and higher operating pressures for high performance needs

Applications

Sterilization of Aqueous Solutions, Organic Solvents and Gases, Filtration of High Value Protein or Small Molecule Components, Select Medical Device Applications (Some Including Direct Patient Care Depending on Country/Region)

Product Performance

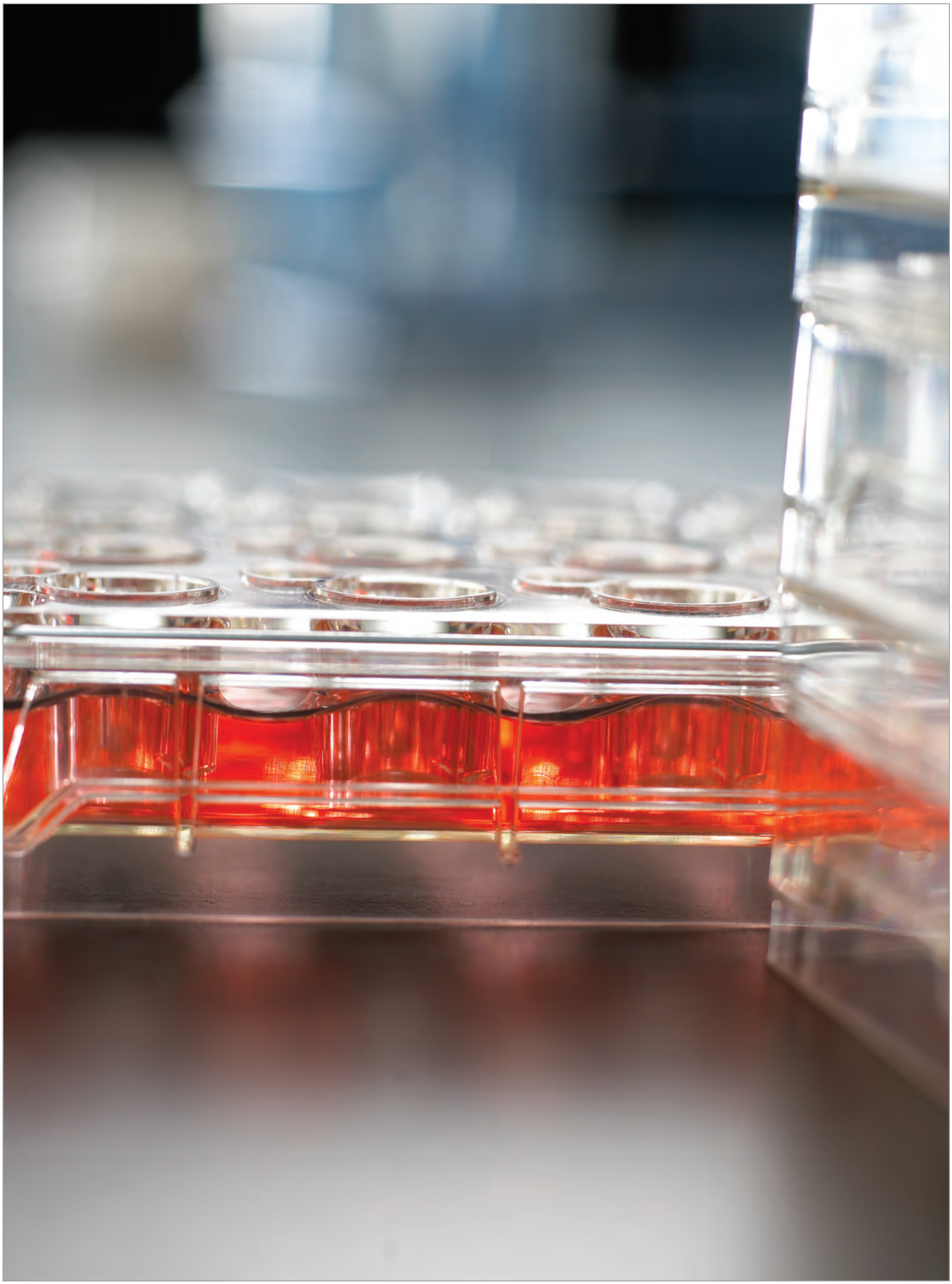


Millex® filters with PVDF and PES membranes exhibit significantly less protein binding than other syringe filters. Membrane disks cut from various syringe filters were offered a 1 mg/mL tracer solution (1 mg/mL goat IgG in PBS with 0.1 µCi/mL of ^{125}I-goat IgG). The chart shows the amount of protein bound after two hours of shaking and three washes with PBS.

Ordering Information

Description	Pore Size (µm)	Type	Process Volume	Hold-up Volume	Sterilization Method	Qty/Pk	Catalogue No.
4 mm Diameter							
Durapore® (PVDF) Membrane	0.22	GV	1 mL		EO	100	SLGV004SL
	0.45	HV	1 mL		EO	100	SLHV004SL
13 mm Diameter							
Hydrophilic PTFE Membrane	0.22	LG	10 mL		EO	100	SLLG013SL
Durapore® (PVDF) Membrane	0.22	GV	10 mL		EO	100	SLGV013SL
	0.45	HV	10 mL		EO	100	SLHV013SL
25 mm Diameter							
Durapore® (PVDF) Membrane	5	SV	100 mL		EO	50	SLSV025LS
Millipore Express® (PES) Membrane	0.22	GP	100 mL		EO	50	SLMP025SS
Millipore Express® (PES) Membrane with male Luer-Lok® outlet	0.22	GP	100 mL		EO	50	SLMPL25SS
Mixed Cellulose Esters (MCE) Membrane with male Luer-Lok® outlet	0.22	OR	100 mL		EO	50	SLGL0250S
Mixed Cellulose Esters (MCE) Membrane with vented inlet	0.22	GS	100 mL		EO	50	SLGSV255F
Mixed Cellulose Esters (MCE) Membrane	0.8	AA	100 mL		EO	50	SLAAV255F
Hydrophilic PTFE Membrane	0.22	LG	100 mL		EO	50	SLLG025SS
Glass Filter for Prefiltration	NA	AP	100 mL		Autoclavable	50	SLAP02550
33 mm Diameter							
Millipore Express® PLUS (PES) Membrane Fast flow and low binding for cell culture media preparation	0.22	GP	200 mL		RS	50	SLGP033RS
						250	SLGP033RB
						1000	SLGP033RK
	0.45	GP	200 mL		RS	50	SLHP033RS
						250	SLHP033RB
Durapore® (PVDF) Membrane Lowest binding membrane for protein rich solutions	0.1	W	100 mL		RS	50	SLVV033RS
	0.22	GV	100 mL		RS	50	SLGV033RS
						250	SLGV033RB
						1000	SLGV033RK
	0.45	GV	100 mL		RS	50	SLHV033RS
						250	SLHV033RB
						1000	SLHV033RK
Mixed Cellulose Esters (MCE) Membrane Most referenced general purpose membrane	0.22	GS	100 mL		EO	50	SLGS033SS
						250	SLGS033SB
	0.45	HA	100 mL		EO	50	SLHA033SS
						250	SLHA033SB
	0.8	AA	100 mL		EO	50	SLAA033SS
						250	SLAA033SB

For more information visit: **www.merckmillipore.com/cellculture**



Cellular Sample Preparation

Prepare

page 9

Grow

Not only do our cell culture devices and surfaces provide the most convenient, reliable, analysis-ready cell cultures, but they also yield cell growth, structure, and function that more closely mimic what occurs *in vivo*. Spend less time growing cells and fumbling with clumsy devices and more time on your research.

Analyze

page 33

Millicell® 24 & 96-Well Cell Culture Insert Plates

Membrane-based culture for optimum growth and differentiation

Millicell® plates are optimized to grow and sustain high integrity cell monolayers. Cells grown on Millicell® plate membranes grow better than on plastic because the cells are nourished from both the apical and basolateral sides. Cell growth and function more closely mimic what occurs in vivo. Millicell® plates are designed for analysis as well as cell growth and can be used manually or with automated cell seeding, feeding and washing systems.

Features & Benefits

- Compatible with seed-and-feed systems
- Works with automated liquid handling systems and span pipettes
- Basolateral and apical access to cells
- Transepithelial electrical resistance (TEER) measurement systems available

Applications

Cell Growth, Feeding, Cell Analysis

Specifications

Sterility	Sterile
Dimensions (l x w x h) (mm)	128 x 84.8 x 26.2
Filtration Area (cm^2), 24 well	0.7
Filtration Area (cm^2), 96 well	0.12

Ordering Information

Description	Media	Chemistry	Device Material	Configuration	Pore Size (µm)	Qty/Pk	Catalogue No.
Millicell®-24-Well Plates and Accessories							
Millicell®-24 Cell Culture Insert Plate, polycarbonate	Isopore	Polycarbonate	Polystyrene	24 well	0.4	1	PSHT01R1
					0.4	5	PSHT01R5
					3.0	1	PSST010R1
					3.0	5	PSST010R5
					5.0	1	PSMT010R1
					5.0	5	PSMT010R5
					8.0	1	PSET010R1
					8.0	5	PSET010R5
Millicell®-24 Cell Culture Insert Plate, polyethylene terephthalate	NA	Polyethylene Terepthalate	Polystyrene	24 well	1.0	1	PSRP010R1
					1.0	5	PSRP010R5
24-Well Receiver Tray with Lid	NA	NA	Polystyrene	24 well	NA	5	PSMW010R5
Single-Well Receiver Tray with Lid	NA	NA	Polystyrene	1 well	NA	5	PSSW010R5
Millicell®-96-Well Plates and Accessories							
Millicell®-96 Cell Culture Insert Plate, polycarbonate	Isopore	Polycarbonate	Polystyrene	96 well/ Single well feeder	0.4	1	PSHT004R1
						5	PSHT004R5
				96 well/ 96 well feeder	0.4	5	PSHT004S5
Millicell®-96 Cell Culture Insert Plate, polyethylene terephthalate	NA	Polyethylene terepthalate	Polystyrene	96 well/ Single well feeder	1.0	1	PSRP004R1
						5	PSRP004R5
96-Well Feeder/Transport Tray with Lid	NA	NA	Polystyrene	96 well	NA	5	MACAC0RS5

For more information visit: **www.merckmillipore.com/cellculture**

Millicell® Cell Culture Inserts

Optimized cell growth, attachment and differentiation

With Millicell® inserts, adherent or suspension cells can access media from both their apical and basolateral sides. Cell growth, structure, and function more closely mimic what occurs *in vivo*. In addition, Millicell® inserts make it possible to study both sides of the cell monolayer.

- Unique design allows easier basolateral access than other hanging inserts with less risk of contamination
- Available in 5 pore sizes and 3 diameters
- 1 µm pore size is optically transparent for better visualization by microscopy

Features & Benefits

- For co-culturing and permeability assays

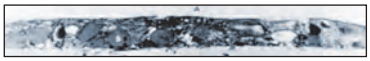
Applications

Cell Attachment, Cell Growth, Cell Differentiation , Immunocytochemistry

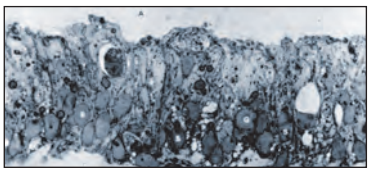
Product Performance

Plastic

Filter



Filter & RBM



Cells grow better on a membrane than on plastic because they are nourished from both the apical and basolateral sides. A comparison between Sertoli cells grown on plastic and on a Millicell® membrane impregnated with reconstituted basement membrane (RBM) demonstrates that cells grown on Millicell® membrane (bottom) form tall columnar monolayers with ovoid or pyramidal nuclei.

Ordering Information

Description	Media	Chemistry	Pore Size (µm)	Configuration	Filtration Area, (cm^2)	Qty/Pk	Catalogue No.
Millicell® Standing Inserts							
Organotypic Insert	Biopore™	Hydrophilic PTFE	0.4	6 well	4.2	50	PICM0RG50
HA Insert	MF-Millipore®	Mixed Cellulose Esters	0.45	24 well	0.6	50	PIHA01250
				6 well	4.2	50	PIHA03050
CM Insert	Biopore™	Hydrophilic PTFE	0.4	6 well	4.2	50	PICM01250
				24 well	0.6	50	PICM03050
PCF Insert	Isopore™	Polycarbonate	0.4	24 well	0.6	50	PIHP01250
			0.4	6 well	4.2	50	PIHP03050
			3	24 well	0.6	50	PITP01250
			12	24 well	0.6	50	PIXP01250
			8	24 well	0.6	50	PI8P01250
Millicell® Hanging Inserts							
PET Insert (Polyethylene terphthalate)		PET	0.4	6 well	4.5	48	PIHT30R48
			1	6 well	4.5	48	PIRP30R48
			3	6 well	4.5	48	PISP30R48
			5	6 well	4.5	48	PIMP30R48
			8	6 well	4.5	48	PIEP30R48
			0.4	12 well	1.1	48	PIHT15R48
			1	12 well	1.1	48	PIRP15R48
			3	12 well	1.1	48	PISP15R48
			5	12 well	1.1	48	PIMP15R48
			8	12 well	1.1	48	PIEP15R48
			0.4	24 well	0.33	48	PIHT12R48
			1	24 well	0.33	48	PIRP12R48
			3	24 well	0.33	48	PISP12R48
			5	24 well	0.33	48	PIMP12R48
			8	24 well	0.33	48	PIEP12R48

For more information visit: **www.merckmillipore.com/cellculture**

Millicell® EZ SLIDES

From culture to analysis all in one EZ SLIDE

Simplify your cell analysis by using the multi-chamber Millicell® EZ SLIDE to culture, fix, stain and view your samples all in one device. There's no need to remove the medium chamber from the slide prior to fixing or staining. Easily remove wells without worrying about breaking slides or harming cells. Acquire data simply and quickly with Millicell® EZ SLIDES.

Features & Benefits

- Breakable tabs for easy well removal
- No adhesive used to attach wells to slide
- No leaky wells
- Polypropylene wells allow for fixing and staining with wells still attached
- Slide holder protects slide from damage

Applications

Cell Growth, Immunocytochemistry of Fixed or Live Cells, Microscopy

Specifications

Chamber Capacity	4-Well Unit	8-Well Unit
Growing Area per Well, cm^2	1.7	0.7
Media Volume Range, mL	0.5-1.7	0.2-0.7
Materials	**Component**	**Material**
	Lid	Polystyrene
	Wells	Polypropylene
	Slide	Glass
	Slide holder	Polystyrene
Sterilization Compatibility	Ethylene oxide	

Ordering Information

Description	Qty/Pk	Catalogue No.
Millicell® EZ SLIDE, 4-well glass	16	PEZGS0416
	96	PEZGS0496
Millicell® EZ SLIDE, 8-well glass	16	PEZGS0816
	96	PEZGS0896
Millicell® EZ SLIDE Microscope Slide Holder	1	PEZXMSH01
Millicell® EZ SLIDE, unprinted 4-well glass (without prink ink), non-sterile	16	PEZGUP0416
Millicell® EZ SLIDE, with confocal cover slip, non-sterile (4-well, 16/pk)	16	PEZCON0416

For more information visit: **www.merckmillipore.com/cellculture**

Millicell® HY Multilayer Culture Flasks

High throughput culture flasks

We can't make your cells grow any faster, but with our flasks, you'll spend less time in the hood. When growing large numbers of cells, you need a high throughput flask to save space and time. Each Millicell® HY (high yield) flask provides a consistent, quality growth environment across all layers, with the same volume of media in each layer. Recovering cells is as easy as growing them. With easy access to pipetting or pouring, Millicell® HY flasks deliver reproducible, high yields of healthy cells. Plus, they've been tested for use with stem cells.

Features & Benefits

- Consistent, high cell yields and viability
- Same media requirements (volume per unit area) as traditional T-flasks
- Uniform culture conditions without media leaking or spillover between layers

Applications

Cell Growth

Specifications

Materials	Material	
Flask	Polystyrene	
Cap	High density polyethylene	
Cap Vent	0.2 µm polypropylene	
Dimensions	**T-600**	**T-1000**
Length, cm	22.2	22.2
Width, cm	12	12
Height (excluding cap), cm	3.2	5.1
Height (including cap), cm	5.5	7.4
Surface area, cm^2	596.4	984.4
Media Volume, mL	120-180	200-300
Sterilization Compatibility	Ethylene oxide	

Ordering Information

Description	Qty/Pk	Catalogue No.
Millicell® HY Flask T-600, sterile	16	PFHYS0616
Millicell® HY Flask T-1000, sterile	8	PFHYS1008

For more information visit: **www.merckmillipore.com/cellculture**

ECM Proteins and Coated Plates

Meet cell type-specific needs for growth and adhesion

Studies show that anchorage-dependent cells growing on extracellular matrix (ECM) proteins undergo more efficient plating, have a higher proliferation rate, reach a higher density, and require lower serum and growth factor concentrations—demonstrating enhanced differentiation potential. We offer a wide variety of ECM proteins and coated cultureware to meet the individual needs of your cell line. Our ECM Cell Culture Optimization Array can help you determine the best coating and concentration for your particular cell type. You can choose from the convenience of precoated cultureware or the flexibility of making your own coatings with our ECM proteins and plates.

Features & Benefits

- ECM proteins available as stand-alone options for your own experimental designs
- Pre-coated cultureware and strips for maximum convenience and reproducibility
- Optimization array for easy ECM identification and optimal concentration determination

Applications

Enhancing Cell Adhesion for Difficult Cultures and Proliferation Studies, Cell Migration and Invasion Assays, Cell Survival and Differentiation Assays

Ordering Information

Description	Configuration	Surface Area (cm^2)	Media Volume (mL)	Sterility	Qty/Pk	Catalogue No.
Millicoat™ ECM Coated Tissue Culture Plate						
Cell Culture Plate with Collagen I Coating	6 well	9.6	2.0-5.0	Non-sterile	5	PICL06P05
	24 well	1.9	0.5-1.0	Non-sterile	5	PICL24P05
Cell Culture Plate with Poly-D-Lysine Coating	6 well	9.6	2.0-5.0	Non-sterile	5	PIDL06P05
	24 well	1.9	0.5-1.0	Non-sterile	5	PIDL24P05
Cell Culture Plate with Fibronectin Coating	6 well	9.6	2.0-5.0	Non-sterile	5	PIFB06P05
	24 well	1.9	0.5-1.0	Non-sterile	5	PIFB24P05
Cell Culture Receiver Plate	6 well	9.5	1.9-4.3	Sterile	50	PIMWS0650
	12 well	3.8	0.9-1.8	Sterile	50	PIMWS1250
	24 well	1.9	0.6-1.6	Sterile	50	PIMWS2450

Ordering Information

Description	Configuration	Qty/Pk	Catalogue No.
Millicoat™ ECM Coated Strips			
Millicoat™ Human Fibronectin Coated Strips	96 well	1 plate	ECM101
Millicoat™ Human Vitronectin Coated Strips	96 well	1 plate	ECM102
Millicoat™ Human Laminin Coated Strips	96 well	1 plate	ECM103
Millicoat™ Human Collagen Type I Coated Strips	96 well	1 plate	ECM104
Millicoat™ Human Collagen Type IV Coated Strips	96 well	1 plate	ECM105
Millicoat™ ECM Screening Kit, 1 ea. ECM101-ECM105	96 well	1 set	ECM205
ECM Cell Culture Optimization Arrays			
ECM Cell Culture Optimization Array (Colorimetric)	96 well	1 kit	ECM541
ECM Cell Culture Optimization Array (Colorimetric)	48 well	1 kit	ECM542
ECM Cell Culture Optimization Array (Fluorometric)	96 well	1 kit	ECM546
ECM Proteins: Collagen			
Human Collagen Type I		100 µg	CC050
Human Collagen Type II		100 µg	CC052

Ordering Information – Continued

Description	Qty/Pk	Catalogue No.
Human Collagen Type III	100 µg	CC054
Human Collagen Type IV	100 µg	CC076
Human Collagen Type V	100 µg	CC077
Collagen Type III, bovine purified protein	10 mg	CC078
Bovine Collagen Type IV	500 µg	CC083
Bovine Collagen Type VI	250 µg	CC086
Collagen Type I, rat tail	100 mg	08-115
ECM Proteins: Fibronectin		
Human Plasma Fibronectin Purified Protein	1 mg	FC010
Human Plasma Fibronectin Purified Protein	5 mg	FC010-5MG
Human Plasma Fibronectin Purified Protein	10 mg	FC010-10MG
Human Plasma Fibronectin Purified Protein	100 mg	FC010-100MG
Fibronectin 40 kDa α Chymotryptic Fragment (Heparin-binding region), Human purified	500 µg	F1903
Fibronectin 120 kDa α Chymotryptic Fragment (Cell Attachment region), Human purified	500 µg	F1904
Fibronectin, Bovine	500 µg	FC014
ECM Proteins: Laminin		
Laminin, mouse purified	1 mg	CC095
Human Merosin	500 µg	CC085
Human Laminin (pepsinized) Purified Protein	100 µg	AG56P
Rat Laminin-5	10 µg	CC145
ECM Proteins: Vitronectin		
Vitronectin, Human Purified Protein	100 µg	CC080
Vitronectin, human recombinant	500 µg	08-126
ECM Proteins: Tenascin		
Human Tenascin-C Purified Protein	100 µg	CC065
Chicken Tenascin	100 µg	CC115
Chicken Tenascin	50 µg	CC118
ECM Proteins: Additional Matrices		
ECL Cell Attachment Matrix	5 mg	08-110
Poly-D-Lysine solution, 1.0 mg/mL	20 mL	A-003-E
Chicken Extracellular Chondroitin Sulfate Proteoglycans	100 µg	CC117
Synthetic Laminin Peptide for Rat Neural Stem Cells	5 x 3 mg	SCR127

For more information visit: **www.merckmillipore.com/cellculture**

Millicell ERS-2 Volt-Ohm Meter and Accessories

Reliably measure integrity of epithelial monolayers

The Millicell® ERS-2 (Electrical Resistance System) reliably measures membrane potential and resistance of epithelial cells in culture. This device qualitatively measures cell monolayer health and quantitatively measures cell confluence. A silver/silver chloride (Ag/AgCl) pellet on each electrode tip measures voltage. Due to the small size of the electrodes, you can easily measure transepithelial voltage and the resistance of cells grown on microporous membranes. Accessories include a replacement (fixed) electrode set, adjustable electrode set and a specialized electrode set for use with Millicell®-96 cell culture insert plates.

Features & Benefits

- Portable instrument that fits into laminar flow hoods
- Measurements do not compromise sterility or damage cells on the membrane
- Widely cited and recommended in epithelial cell culture protocols

Applications

Measurement of Transepithelial Electrical Resistance (TEER), Cell Monolayer Health Assessment, Quantitative Measurement of Confluence

Ordering Information

Description	Qty/Pk	Catalogue No.
Millicell® ERS-2 Voltohmeter	1	MERS00002
Replacement Electrodes, 1 pair	1	MERSSTX01
Adjustable Electrodes, 1 pair	1	MERSSTX03
Specialized Electrodes (for Millicell® 96-well plate only), 1 pair	1	MERSSTX00
Replacement Test Electrodes, 1 pair	1	MERSSTX04
Replacement Battery, 6V NiMH 2200 mAH, 1 each	1	MERSBAT01

For more information visit: **www.merckmillipore.com/cellculture**

Scepter™ 2.0 Handheld Automated Cell Counter

Accurate cell counts in 30 seconds

While other automated counters consume bench space and rely on object recognition software, manual focusing, and clumsy loading chambers, the Scepter™ cell counter provides true automation without the error that accompanies vision-based systems. Using Coulter principle-based technology for the ultimate in accuracy, the Scepter™ cell counter does all the work and delivers reliable cell counts and cell size information in less than 30 seconds. The histogram output reflects heterogeneous cell populations, and you can adjust gating parameters to focus on the cells that interest you most. This system is intended for research use only and has been tested with cell types representative of those in use today.

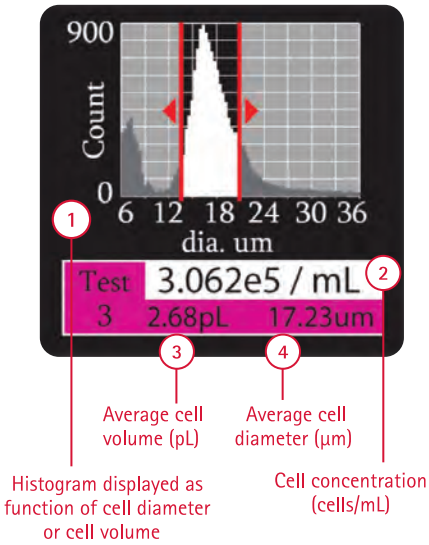
Features & Benefits

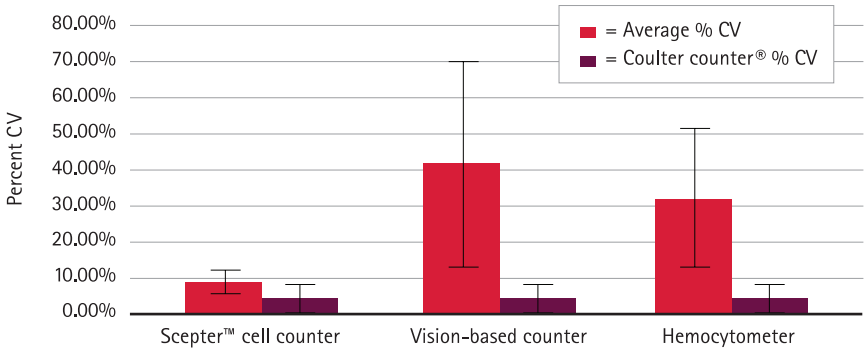
- The Scepter™ cell counter's screen displays multiple pieces of data
- Cell concentration for estimating culture density and readiness for testing or passaging
- Average cell size for cell health and behavior related to cell dimensions
- Average cell volume for cell health and behavior related to cell dimensions
- Histogram of size or volume distribution for mixed populations of cells and overall cell population health

Applications

Cell Health Monitoring, Checking Quality of Cultures, Ensuring Sample-to-Sample Consistency

Product Performance





The average percent coefficient of variation (CV) for each counting method shown was calculated using cell concentration measurements at 50,000 cells/mL samples of 19 different cell lines. The Scepter™ cell counter is more precise than vision-based counting and hemocytometry, and approaches the precision of the Coulter Counter® standard (maroon bars). Error bars represent standard deviation.

Ordering Information

Description	Qty/Pk	Catalogue No.
Scepter™ 2.0 Handheld Automated Cell Counter with 40 µm Scepter™ Sensors (50 Pack)	1	PHCC20040
Scepter™ 2.0 Handheld Automated Cell Counter with 60 µm Scepter™ Sensors (50 Pack)	1	PHCC20060
Includes:		
Scepter™ Cell Counter	1	
Downloadable Scepter™ Software	1	
O-Rings	2	
Scepter™ Test Beads	1	PHCCBEADS
Scepter™ USB Cable	1	PHCCCABLE
Scepter™ Sensors, 60 µm	50	PHCC60050
	500	PHCC60500
Scepter™ Sensors, 40 µm	50	PHCC40050
	500	PHCC40500
Universal Power Adapter	1	PHCCPOWER
Scepter™ O-Ring Kit, includes 2 O-rings and 1 filter cover	1	PHCCOCLIP

For more information visit: **www.merckmillipore.com/scepter**

Cellular Sample Preparation

Prepare

page 9

Grow

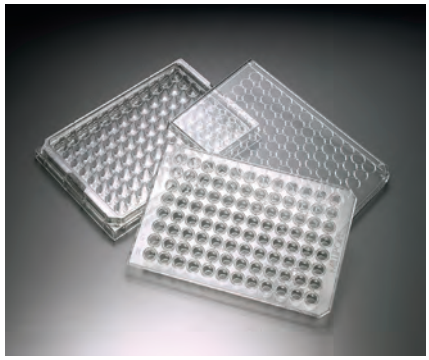
page 23

Analyze

For multidimensional analysis of cellular phenotypes with respect to time, space and changing conditions, we provide reagents, platforms and devices that successfully meld sophisticated technology with ease of use and optimization.

MultiScreen® Plates for Cell-Based Assays

High throughput assays for migration, invasion and more



Using filter plates for cell-based assays in life science and drug discovery research can decrease sample-to-sample variability, reduce background through more thorough washing, increase throughput and enable automation. MultiScreen® filter plates and kits are available in a range of pore sizes to support assays with suspension and adherent cell lines and support cell growth for co-culture and transmigration assays. MultiScreen® -MIC filter plates are designed for broad assay compatibility and are available in three membrane pore sizes. The 96-well plates increase throughput 4x over 24-well systems, without sacrificing membrane surface area.

Features & Benefits

- Incubate, filter, wash, and assay 96 samples simultaneously, saving time and money
- Range of membrane pore sizes and plate formats available for invasion, migration, and chemotaxis assays
- Proven protocols available
- Compatible with automated liquid handling systems

Applications

Cell Viability and Proliferation Assays, Migration Assays, Invasion Assays, Chemotaxis Assays, Whole Cell Incubation Assays, Whole Organism Assays, Conventional and Time-Resolved Fluorescent Detection

Specifications

Sterility	Sterile
Filtration area, cm²	0.28

Ordering Information

Description	Chemistry	Device Material	Configuration	Pore Size (µm)	Qty/Pk	Catalogue No.
MultiScreen®-MIC Plate	Polycarbonate	Styrene	96 well	3.0	10	MAMIC3S10
				5.0	10	MAMIC5S10
				8.0	10	MAMIC8S10
Accessories						
MultiScreen® 96-well Receiver Plate		Styrene	96 well		10	MAMCS9610
MultiScreen® Single-well Culture Tray		Styrene	1 well		10	MAMCS0110

For more information visit: **www.merckmillipore.com/cellculture**

Elispot MultiScreen®$_{HTS}$ Filter Plates and Antibody Pairs

Improved spot recovery and spot definition

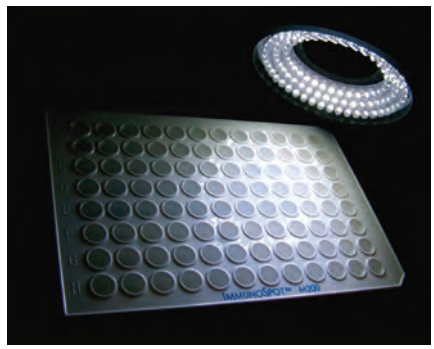
The Elispot (enzyme-linked immunospot) assay provides powerful detection of specific immune responses on a single cell level. Over the years, this assay has been optimized through the introduction of specifically designed antibodies, automated reader systems, and 96-well Elispot membrane plates. MultiScreen®$_{HTS}$ filter plates provide high protein-binding capacity with low background staining, reliable sensitivity and high lot-to-lot reproducibility. The plates are designed for enhanced imaging on a range of systems including Zeiss and AID imaging devices. They also have a removable underdrain to allow for easy membrane access.

Features & Benefits

- Validated membranes
- Uniform spot morphology and distribution
- Easy membrane access
- Compatible with automation

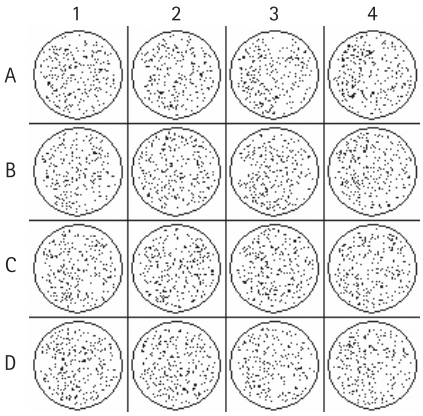
Applications

Elispot Assays

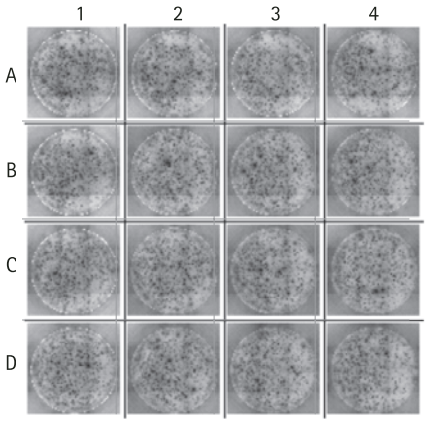


Product Performance

Photomicrograph



Digital Image



Spot Number by Well Location

	1	2	3	4
A	599	601	649	605
B	509	649	631	598
C	584	607	609	618
D	619	550	605	625

Optimized membrane gives consistent results even in corner and edge wells. These images represent the number of cells secreting IFN-γ in response to PHA-L stimulation of Human Peripheral Blood Mononuclear cells (HPBMC). The wells were seeded with 50,000 cells and developed using BCIP/NBTplus substrate. The wells were imaged with the Zeiss KS Elispot imaging system. Typical MultiScreen®$_{HTS}$-IP filter plate variability expressed by coefficient of variation (% CV)* is less than 10%. * %CV = (SD/mean)*100

Ordering Information

Description	Chemistry	Sterility	Material	Color	Qty/Pk	Catalogue No.
MultiScreen®$_{HTS}$ Filter Plates						
MultiScreen®$_{HTS}$-HA Filter Plate	Mixed Cellulose Esters	Sterile	Styrene	Clear	10	MSHAS4510
MultiScreen®$_{HTS}$-IP Filter Plate	Hydrophobic PVDF	Sterile	Acrylic	White	10	MSIPS4W10
		Non-Sterile	Acrylic	Clear	10	MSIPN4510
		Non-Sterile	Acrylic	White	50	MSIPN4W50
		Non-Sterile	Acrylic	Clear	50	MSIPN4550
		Sterile	Acrylic	Clear	10	MSIPS4510
MultiScreen® Filter Plates						
MultiScreen®-IP Filter Plate	Hydrophobic PVDF	Sterile	Acrylic	Clear	10	MAIPS4510
		Sterile	Acrylic	White	10	S2EM004M99

Ordering Information – Continued

Description	Chemistry	Sterility	Material	Color	Qty/Pk	Catalogue No.
MultiScreen®-IP Filter Plate w/o Underdrain	Hydrophobic PVDF	Sterile	Acrylic	White	10	MAIPSWU10
MultiScreen®-HA Filter Plate	Mixed Cellulose Esters	Sterile	Styrene	Clear	10	MAHAS4510
MultiScreen®$_{HTS}$ 8-Well Strips						
MultiScreen®$_{HTS}$-IP Filter Plate 8-Well Strips	Hydrophobic PVDF	Non-Sterile	Acrylic	Clear	10	M8IPS4510
Accessories						
MultiScreen® Tool					1	MSPLRS096
Elipunch Kit					1	MELIPUNCH
MultiScreen® Sealing Tape, clear					100	MATAHCL00
MultiScreen®$_{HTS}$-Support Frame					10	M8IPFRAME
Elispot Matched Antibody Pairs						
IL-2 Elispot Antibody Pair, Mouse					1 kit	ELI-002-M
IL-4 Elispot Antibody Pair, Human					1 kit	ELI-004-H
IL-4 Elispot Antibody Pair, Mouse					1 kit	ELI-004-M
IL-5 Elispot Antibody Pair, Human					1 kit	ELI-006-H
IL-5 Elispot Antibody Pair, Mouse					1 kit	ELI-006-M
IL-6 Elispot Antibody Pair, Human					1 kit	ELI-008-H
IL-6 Elispot Antibody Pair, Mouse					1 kit	ELI-008-M
IL-10 Elispot Antibody Pair, Human					1 kit	ELI-010-H
GM-CSF Elispot Antibody Pair, Human					1 kit	ELI-012-H
IL-12p40 Elispot Antibody Pair, Mouse					1 kit	ELI-014-M
IFNγ Elispot Antibody Pair, Human					1 kit	ELI-016-H
IFNγ Elispot Antibody Pair, Mouse					1 kit	ELI-016-M
TNFα Elispot Antibody Pair, Human					1 kit	ELI-018-H
TNFα Elispot Antibody Pair, Mouse					1 kit	ELI-018-M

For more information visit: **www.merckmillipore.com/cellculture**

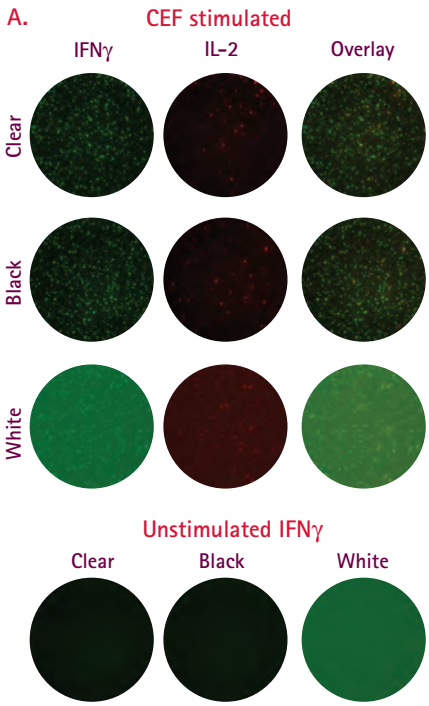
MultiScreen® plates for Elispot assays: State-of-the-art tools for functional immunology

The enzyme-linked immunospot (Elispot) assay detects soluble proteins secreted from single cells, on a membrane, using antibodies. Elispot assay sensitivity, ease of use, and cost make these ideal multifunctional T cell assays for the research, therapeutic, and diagnostic communities. While Elispot assays permit frequency determination for very rare events, data interpretation can become ambiguous when spot numbers in antigen-containing wells are low or spot counts in negative control wells are elevated. Thus, it is important to optimize basic assay parameters and reagents to maximize the signal-to-noise ratio.

These parameters include (but are not limited to):

Choice of Plate (Membrane):
PVDF membrane plates are recommended over a mixed cellulose ester format, due to slightly improved binding of capture antibody and superior performance in spot detection, particularly for fluorescent applications. MultiScreen® plates for Elispot feature multiple advantages, including low background, lot-to-lot reproducibility, uniform spot distribution, automation compatibility and a removable underdrain for membrane access.

Negative/Positive Controls:
Negative controls routinely consist of cells cultured without stimuli, whereas polyclonal T-cell activators are commonly used as positive controls to confirm both cell and assay functionality.



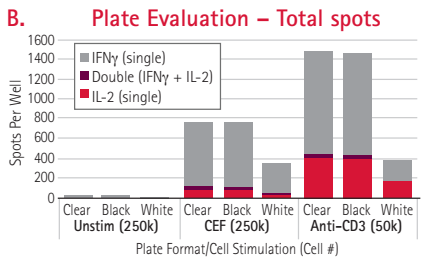


Figure 1. Dual color IFNγ/IL-2 fluorescent Elispot (FluoroSpot) assays were performed on total PBMC in three different Multiscreen®$_{HTS}$ plate formats (Clear, Black, and White). Spot clarity was roughly equivalent on the clear and black formats. By contrast, white plates showed high background signal, making spot detection difficult, particularly in the Green channel (IFNγ-FITC). A comparison of spot counts demonstrated a significant reduction in "spots counted" on white plates when compared to either black or clear formats.

Plate Organization/Edge Effects:
Medium evaporation from peripheral wells in prolonged cultures may impact overall assay performance. Where possible, the use of "media only" wells around the periphery of the true sample wells can minimize this effect.

Prewetting:
Prewetting the membrane is not universally applicable to all Elispots; its requirement is dependent on the inherent hydrophobicity of the capture antibody; therefore, the pre-wetting protocol should be optimized prior to application.

Coating Plates with Capture Antibody: To ensure performance while maximizing cost efficiency, it is critical to standardize the amount of capture antibody used per well. For optimal performance, we recommend initial titration of both the coating and detection antibodies in tandem.

For more information, including ordering information for MultiScreen® Elispot plates, visit: **www.merckmillipore.com/elispot**

MultiScreen®-Mesh Filter Plates with 96-Well Receiver Plate

For whole organism screening

This filter plate provides a complete system for culturing, testing and reading assay results in a one-step protocol. The system is ideal for target screening and other applications that evaluate the effect of new compounds on whole, multicellular organisms. The MultiScreen®-Mesh filter plate is optimized for compound and target identification in a 96-well format. The filter plate and 96-well tray fit together to provide a ready-to-use system for assays measuring paralysis, cytotoxicity, and death of multicellular organisms. Simply transfer parasites, nematodes or other multicellular organisms into the wells, treat with target compound, and measure the migration of the organisms.

Features & Benefits

- Multiple configurations and applications
- Chemical compatibility
- Automation-compatible
- Superior vacuum filtration and filtrate collection
- Plates are optically clear for use with an imaging microscope or other microscopic analysis

Applications

Whole Organism Screening

Specifications

Materials	
Plate	Polystyrene
Filter	Nylon mesh

Ordering Information

Description	Pore Size (µm)	Sterility	Qty/Pk	Catalogue No.
MultiScreen®-MESH Plate	100	Non-sterile	10	MANM10010
	20	Non-sterile	10	MANMN2010
	40	Non-sterile	10	MANMN4010
	60	Non-sterile	10	MANMN6010
MultiScreen® 96-well Transport Receiver Plate	NA	Non-sterile	50	MATRNPS50
MultiScreen® Single-well Culture Tray	NA	Sterile	10	MAMCS0110
MultiScreen® 96-well Culture Tray	NA	Sterile	10	MAMCS9610

For more information visit: **www.merckmillipore.com/cellculture**

MultiScreen®$_{HTS}$ Vacuum Manifold

Crosstalk-free for superior reproducibility

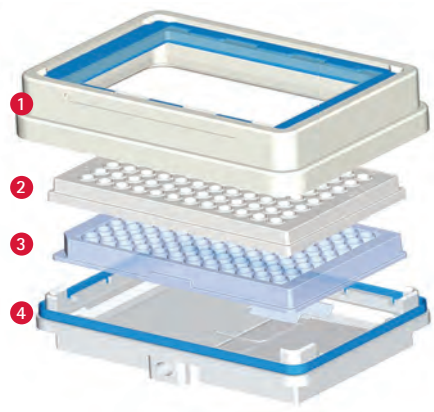
The MultiScreen®$_{HTS}$ Vacuum Manifold is designed to improve filter-based assay performance and reliability. The manifold supports a wide variety of MultiScreen® platforms, including 96-well and 384-well filter plates for bioassays and deep-well Solvinert™ filter plates for sample preparation.

The manifold configuration is easily adapted to accommodate filter-to-waste or collection assays. For those assays where filtrate collection is required, the MultiScreen®$_{HTS}$ Vacuum Manifold incorporates DirectStack™ technology. This feature eliminates gaps between flow directors and receiver wells to increase assay reliability and eliminate cross talk. The direct stacking of plates also makes vacuum initiation effortless.

The MultiScreen®$_{HTS}$ Vacuum Manifold is also ideally suited for automation. The compact size of the manifold base is modeled on ANSI/SBS standards for microplates to fit most robot deck locations. The manifold collar is lightweight and features a groove for easy handling by robotic gripper systems. If additional precision is needed for placement of the collar during assembly/disassembly routines, a collar holder accessory is available.

- DirectStack™ technology enables crosstalk-free filtrate collection
- Unique design removes hanging droplets, eliminating cross-contamination risk
- Configurations for deep-well or standard receiver plates
- ANSI/SBS-compliant footprint allows for easy robotic deck integration
- Solvent-resistant

DirectStack™ Technology Improves Assay Reliability



1. Manifold Collar
2. MultiScreen®$_{HTS}$ Filter Plate
3. Collection Plate
4. Manifold Base

Figure 1. Plate-on-plate stacking eliminates gaps between flow directors and receiver wells in applications that require filtrate collection.

Featured Application Notes and Technical Notes

Download from: **www.merckmillipore.com**

MultiScreen®$_{HTS}$ Filter Plates: New Plate Design for Full Automation Compatibility Data Sheet; Lit No. PF1544EN00

High throughput MultiScreen®$_{HTS}$ filter plates are specifically developed for use with automation. The 96-well plates are designed to standardized dimensions and meet ANSI/SBS 2004 plate specifications. They are fully compatible with automated gripper arms, stackers, bar code labels, and plate readers.

MultiScreen®$_{HTS}$ Vacuum Manifold Data Sheet; Lit No. PF2014EN00

For MultiScreen®$_{HTS}$ Vacuum Manifold ordering information, see page 40.

MultiScreen®$_{HTS}$ Vacuum Manifold

For vacuum filtration of 96 and 384 samples

The MultiScreen®$_{HTS}$ vacuum manifold with DirectStack™ technology provides enhanced performance for use with MultiScreen®$_{HTS}$ 96- and 384-well filter plates as well as the High Volume and Solvinert™ filter plate families. Manifold components are resistant to solvents and suitable for use with automated or manual protocols. The manifold configuration is easily adapted to accommodate filter-to-waste or filtrate collection assays. For those assays where filtrate collection is required, the MultiScreen®$_{HTS}$ Vacuum Manifold incorporates DirectStack™ technology. This feature eliminates gaps between flow directors and receiver wells to increase assay reliability, eliminate crosstalk and facilitate vacuum initiation.

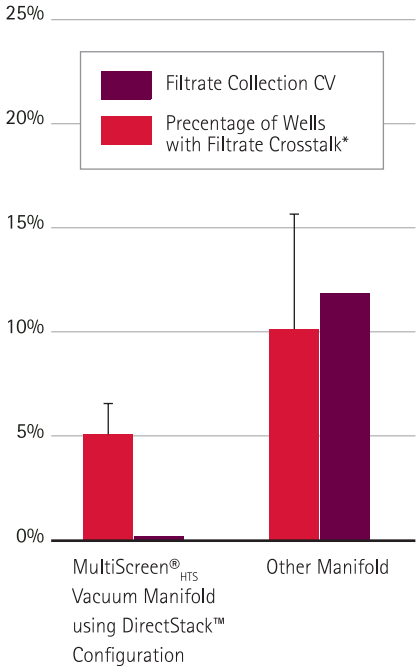
Features & Benefits

- DirectStack™ technology for crosstalk-free filtrate collection
- Configurations for deep-well or standard receiver plates
- ANSI/SBS compliant footprint allows for easy robotic deck integration

Applications

Vacuum Filtration of Multiwell Filter Plates, Automated Liquid Handling

Product Performance



MultiScreen®$_{HTS}$ vacuum manifold with DirectStack™ feature enhances 384-well filter plate performance. Data shown are for MultiScreen®$_{HTS}$ 384 well filter plates (n=4). %CV was determined by microplate spectrophotometer absorbance measurement of dye in aqueous buffer. Filtrate crosstalk was determined by filtering a checkerboard pattern of wells containing fluorescent dye or buffer only into a 384-well collection plate and measuring fluorescence using a Tecan Spectrafluor™ Plus plate reader.

*A filtrate crosstalk event is defined as any buffer-only well location with >2% fluorescent signal.

Ordering Information

Description	Qty/Pk	Catalogue No.
MultiScreen®$_{HTS}$ Vacuum Manifold for Use with 96- and 384-well MultiScreen®$_{HTS}$ Filter Plates as well as MultiScreen® Solvinert, Solvinert Deep Well and MultiScreen® High Volume Filter Plates		
MultiScreen®$_{HTS}$ Vacuum Manifold Includes manifold base, standard collar, gaskets, gasket inserts, all tubing, valves, and pressure gauge	1	MSVMHTS00
Adapters for MultiScreen®$_{HTS}$ Vacuum Manifold		
Deep Well Collar	1	MSVMHTS0D
High Volume Collar	1	MSVMHTSHV
Collar Holder, for automation	1	MSVMHTS0H

Ordering Information – Continued

Description	Qty/Pk	Catalogue No.
Replacement Parts		
Replacement Gasket Set	1	MSVMHTS04
On/Off Valve Kit	1	MSVMHTS06
Control Valve Kit	1	MSVMHTS10
Vacuum Gauge Kit	1	MSVMHTS07
Standard Collar with Gasket	1	MSVMHTS08
Replacement Tubing, 10 ft (3 m)	1	MSVMHTS09
MultiScreen®$_{HTS}$ Vacuum Manifold for Use with Standard MultiScreen® (classic) Filter Plates		
MultiScreen® Vacuum Manifold 96-well	1	MAVM0960R
Includes manifold base, standard ring with gaskets, support grid, all tubing, valves and pressure gauge		
Vacuum Pump – Accessories		
Millex®-FG Filter Unit, 0.20 µm, hydrophobic PTFE, 50 mm	10	SLFG05010
Chemical Duty Pump, 100 V/50–60 Hz	1	WP6110060
Chemical Duty Pump, 115 V/60 Hz	1	WP6111560
Chemical Duty Pump, 220 V/50 Hz	1	WP6122050
Vacuum Filtering Flask, 1 L	1	XX1004705
No. 8 Stopper, 9.5 mm (3/8 in.) hole, silicone	5	XX2004718

For more information visit: **www.merckmillipore.com/cellculture**

Millicell® µ-Angiogenesis Activation and Inhibition Assay Kits

Easy-to-use slide-based assays

Studying how compounds affect angiogenesis, either to promote or inhibit new capillary tube formation, can lead to therapies affecting wound healing, tissue regeneration, cardiovascular disease, stroke, tumor progression, and more. The Millicell® µ-Angiogenesis activation and inhibition assay kits provide a powerful, quantitative platform for real-time monitoring of changes in tubule formation with unprecedented optical resolution.

Features & Benefits

- Continuous, live monitoring of cells as tubules form
- Even, flat slide surface prevents any liquid meniscus from forming, eliminating out-of-focus areas
- Full well visualization at low magnification
- Less reagent and cells needed, reducing costs and waste by up to 80%
- All-in-one slide used to grow, assay, and stain cells

Applications
Angiogenesis Assays

Specifications

Components	Contents	Part No.
Millicell® µ-Angiogenesis Slides	5	CS203030
Fibronogen Solution	1 x 1.5 mL vial	CS203035
Thrombin Solution	1 x 0.75 mL vial	CS203036
ITS Media Supplement	1 x 0.5 mL vial (100x)	CS203037
PMA (Phorbol 12-Myristate 13-Acetate)	1x 1.0 mg vial	CS203037
Calcein-AM	1 x 50 µg vial	CS202541

Ordering Information

Description	Qty/Pk	Catalogue No.
Millicell® µ-Angiogenesis Activation Assay Kit	1 kit	MMA130
Millicell® µ-Angiogenesis Inhibition Assay Kit	1 kit	MMA125

For more information visit: **www.merckmillipore.com/cellculture**

Millicell® µ-Migration Assay Kit

Stable gradient for quantitative, real-time, slide-based assays

Traditional multiwell (Boyden chamber) migration assays can have limitations, such as nonlinear, poorly established gradients, dependence on endpoint measurements and the inability to acquire images of the cells while they are migrating. The Millicell® µ- Migration Assay Kit overcomes these limitations. Its microfluidic, low-volume format promotes a stable concentration gradient. Designed for video microscopy assays, the slide is made from a plastic with high optical qualities similar to those of glass. At specific time intervals, images of the observation area can be acquired, allowing real-time monitoring and quantitative measurements of cell migration.

Features & Benefits

- Live cell tracking of single cell or cell population migration
- Establishes a stable and linear concentration gradient that lasts ≥ 48 hours
- Helps distinguish chemotaxis from random movement through multiparametric analysis, including cell directionality and velocity
- Enhanced optical imaging of slow- and fast-migrating cells
- Analyze 3 chemoattractants in parallel for increased throughput and flexibility

Applications

Migration and Chemotaxis Assays

Specifications

Components	Contents	Part No.
Millicell® µ-Migration Slides	4	CS204500
Millicell® µ-Migration Caps and Plugs	48 each	CS204501
Human Collagen IV	1 x 100 µg vial (1 mg/mL)	CS204498
Acetic Acid Buffer	1 x 1.5 mL vial (0.5 M)	CS204485
BSA Solution	1 x 100 µL vial (30%)	CS204507
Beveled Pipette Tips: Fisherbrand® SureOne™	2 x 96-tip boxes	02-707-419

Ordering Information

Description	Qty/Pk	Catalogue No.
Millicell® µ-Migration Assay Kit	1 kit	MMA205

For more information visit: **www.merckmillipore.com/cellculture**

CellASIC® ONIX Microfluidic Platform

For dynamic environmental control over live cells

The easy-to-use CellASIC® ONIX Microfluidic Platform delivers precise control for live cell imaging experiments by facilitating long-term perfusion cell culture. The system integrates with your existing microscope system to enable dynamic time-lapse experiments never before possible. Cutting-edge microfluidics technology provides an improved cell culture microenvironment, exceptional quality for high magnification microscopy, and superior media switching capabilities.

Features & Benefits

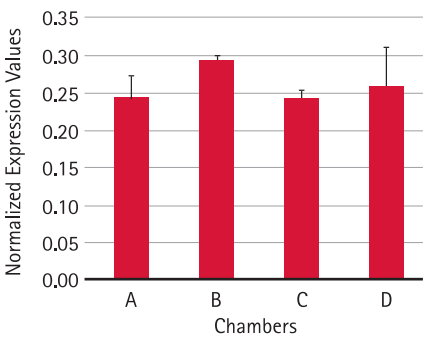
- Preprogram dynamic inputs to the environment, including media, activators, inhibitors, detection reagents, gas mixture, and temperature for completely hands-free operation
- Software-driven flow switching with completely customizable flow rates that can change at preset time points
- Compatible with most inverted microscopes, enabling dynamic, live-cell microscopy experiments that cannot be done in static culture dishes
- Multiple application-specific plates enable a range of experimental designs
- Easy software setup using application-specific wizards to get you started immediately

Applications

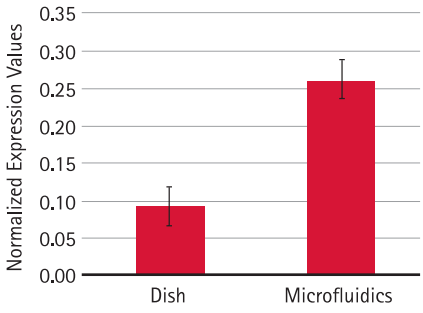
3D Cell Culture, Chemotaxis/Migration in Reponse to Chemogradient, Cell Response to Changing Media Conditions, Neural Stem Cell Imaging, Host-pathogen Interations, Bacteria Single Cell Response, Yeast Single Cell Response, Hypoxic Conditions to Mimic Tumor Environments

Product Performance

A. Per Cell EGFR Expression (Microfluidics)



B. Per Cell EGFR Expression (Microfluidics vs. Petri Dish)



(A) Per-cell EGFR expression normalized to GAPDH expression and total number of cells per chamber. (B) Comparison of per-cell EGFR expression of MCF-10A cells cultured in the CellASIC® ONIX System (M04S plate) vs. in standard Petri dish.

Specifications

Microscope Compatibility	Inverted microscope
Microscopy Techniques	Fluorescence, Brightfield, Phase Contrast, Confocal, TIRF, and DIC Microscopy
Imaging Substrate	#1.5 glass coverslip
Microfluidic Plate Footprint	96-well plate footprint
Number of Chambers	4 microfluidic cell culture chambers in parallel
Culture Time with CellASIC® ONIX Microfluidic Platform	1-3 days continuous
Cell Suspension Volume	5-10 µL (M04 CellASIC® ONIX Microfluidic Plates), 50 µL (B04/Y04/C04 CellASIC® ONIX Microfluidic Plates)
Number of Pressure Inputs	8 inputs
Output Pressure Range	0-10 ± 0.25 psi (0-70 ± 1.7 kPa)
Optical Transparency	Optically clear manifold and microfluidic plates
Optical Premixed Gas Input	Works with clean, dry, premixed gas containing air, CO_2, nitrogen and oxygen up to 25% regulated to between 45-55 psi (310-379 kPa)
Temperature Control Range	Room temp. to 40 °C
Rise Time (25 °C to 37 °C)	
Cooling Time (37 °C to 25 °C)	
Gas Consumption	3 mL/min ± 0.5 mL/min
Dimensions	310 mm Wide x 257 mm Deep x 163 mm High
Compatible Cell Types	
Adherent Cells	HeLa, CHO Cell, NIH-3T3, MCF-7, MCF-10A, PC-3, HUVEC, PC-12, HL-60, HT-29, Neuron Cells (Hippocampal/Cortical), Cardiomyocytes
Non-Adherent Cells	Macrophages, Lymphocytes, T Cell, Bacteria (*E. coli, B. subtillus*, Cyanobacteria, *M. smegmatis*), Yeast (*S. cerevisiae, S. pombe*), *Chlamydomonas*
ECM Coating Substrates Used	Fibronectin, Collagen, Matrigel® substrate, Poly-D-lysine, laminin, Poly-L-ornithine, Hydrogels

Ordering Information

Description	Qty/Pk	Catalogue No.
CellASIC® ONIX Microfluidic System Package: Includes CellASIC® ONIX Microfluidic Perfusion Controller, Manifold, Accessory Box, and CellASIC® ONIX FG Software	1	EV262
CellASIC® ONIX Microincubator Package for Temperature and Gas Control: Includes CellASIC® ONIX Microincubator Controller, Microincubator Manifold, and Accessory Box	1	MIC230
CellASIC® ONIX Tri-Gas Mixer: Compressed Air, CO_2, and Nitrogen Gas Mixer	1	GM230
B04A Microfluidic Plate for Bacteria Cells (4 Chambers)	5	B04A-03-5PK
C04A Microfluidic Plate for Chlamydomonas Cells (4 Chambers)	5	C04A-01-5PK
M04G Microfluidic Gradient Plate for Mammalian Cells (4 Chambers)	5	M04G-02-5PK
M04L Microfluidic Open-Top Plate for Mammalian CellS (4 Chambers)	5	M04L-03-5PK
M04S Microfluidic Switching Plate for Mammalian Cells (4 Chambers)	5	M04S-03-5PK
Y04C Microfluidic Plate for Haploid Yeast (4 Chambers)	5	Y04C-02-5PK
Y04D Microfluidic Plate for Diploid Yeast (4 Chambers)	5	Y04D-02-5PK
Accessory Box for CellASIC® ONIX Microfluidic Perfusion System	1	ABN2
Accessory Box for CellASIC® ONIX Microincubator Controller	1	ABI1
Replacement Gasket for F84-GL3 CellASIC® ONIX Manifold	1	F84-GL3-GK
Replacement Gasket for F84-HG3 CellASIC® ONIX Microincubator Manifold	1	F84-HG3-GK

For more information visit: **www.merckmillipore.com/cellasic**

Studying drug-induced cell death of 3D cell cultures using the CellASIC® ONIX Platform

Summary

The main objective in cell culture is eliciting cellular responses that match physiological responses as closely as possible. Current strategies for 3D cell culture include growing cells in a natural or synthetic 3D matrix, on biodegradable polymers, in a cross-linked hydrogel or in porous synthetic scaffolds consisting of interconnected voids in a woven mesh. However, even these advanced cell culture platforms, if subjected to static conditions of gas, nutrient medium and waste buildup, may dry out and are limited by the inefficient mass transport between the inside and outside of 3D cell structures.

To overcome the challenges of mass transport in 3D culture, we used a microfluidic platform to achieve perfusion-based microenvironment control and study drug-induced cell death of 3D cultures of MCF7 cells. We compared these results against a traditional chambered slide.

Compared to traditional slides, the microfluidic platform provided better imaging results and consistency of cell culture, while maintaining similar cell morphology and viability. In addition, microfluidics enables continuous media flow in and out of a 3D culture, increasing the efficiency with which cells can access nutrients and eliminate waste. This setup increases the longevity of 3D culture and allows one to design experiments to study dynamic cell responses to drug over time.

Materials and Methods

The CellASIC® ONIX Microfluidic platform is composed of a microfluidic system, which delivers a controlled perfusion of the cells, a microincubator controller, which provides the temperature and gas microenvironmental conditions required for healthy cell culture, an application-specific microfluidic plate and manifold with recirculating heater. The plate and manifold were kept on the microscope, enabling live imaging of the cell culture.

Static culture. MCF7 cells in Matrigel® matrix were added to the wells of a Millicell® EZ SLIDE chambered slide. Once the matrix solidified, complete medium was added to each well. Cells were then incubated at 37 °C.

Automated microfluidic perfusion culture and drug treatment. MCF7 cells were suspended in ice-cold Matrigel® matrix within the CellASIC® ONIX Microfluidic Chambers. The CellASIC® ONIX system was then programmed to follow a schedule of continuous medium flow throughout the experiment. After 96 h, two inlet wells were replaced with medium containing different concentrations of doxorubicin, and the protocol was resumed for another 48 h.

Automated, in-plate viability staining. The LIVE/DEAD® Viability Kit (Life Technologies) was prepared according to the manufacturer's protocol. In this assay, live cells, stained with Calcein-AM, fluoresce green, and dead cells, stained with EthD-1, fluoresce red. The

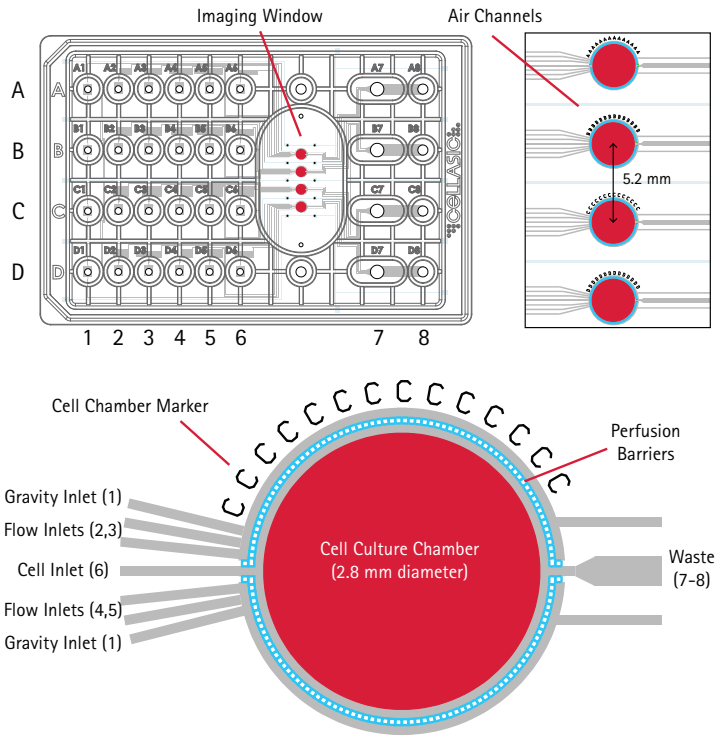


Figure 1. The microfluidic plate contains four independent flow units (A–D), each with four upstream solution inlets, a gravity flow inlet, a cell inlet, and two waste wells. Continuous flow of solutions from inlets 2–5 can create a dynamic exposure profile for imaging responses of live, 3D cultures.

plate was sealed to the manifold and placed on the lab bench, and a two-step protocol was created in order to flow live/dead stain, followed by PBS, into the cell chambers.

Results

Long-term 3D culture. MCF7 cells formed cell clusters after 24 h that maintained their morphology after 96 h of culture in both perfusion culture (Figure 2A, 2C) and in static culture in the chambered slide (Figure 2B, 2D). Because cell cluster growth was limited by the height of the microfluidic plate chambers, more cells were in sharp focus in the same focal plane than were in focus in the chambered slide.

Drug-induced cell death. Cell viability was assessed using in-plate live/dead staining. We observed the expected increase in red staining with respect to increasing doxorubicin dose, indicating that the 3D cell clusters were being permeated by the drug as well as by the staining reagents (Figure 3).

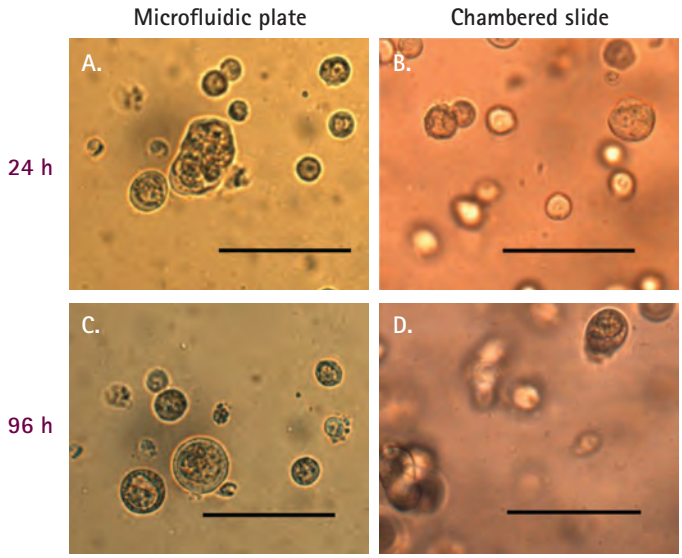


Figure 2. 3D cell cultures in sharp focus using the microfluidic platform (A,C). Static cultures in chambered slides (B,D) showed similar morphology but fewer cell clusters per focal plane. Scale bars = 100 µm.

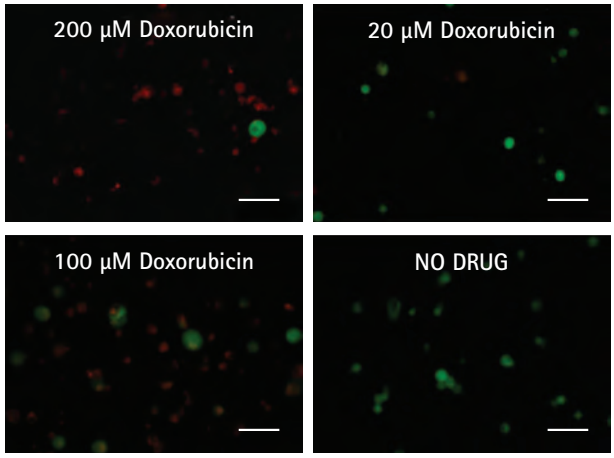


Figure 3. Dose-dependent MCF7 cell death upon doxorubicin treatment as measured by in-plate live/dead staining of 3D cultures. Scale bars = 100 µm.

Discussion

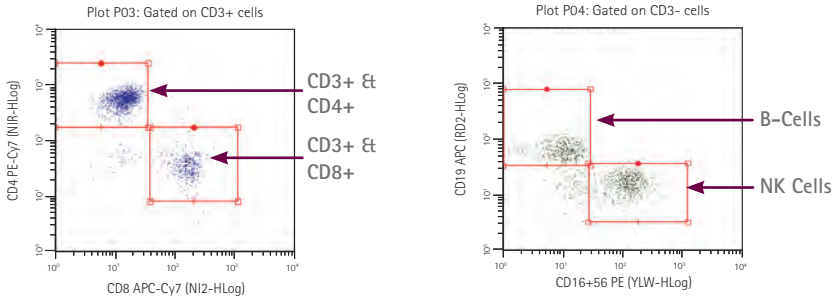
We have shown that it is possible to simultaneously maintain four, virtually hands-free, healthy, 3D cell cultures for several days using perfusion feeding. Further, we analyzed drug-induced cell death using hands-free, in-plate viability staining. This demonstrates that this platform enables the analysis of the response of individual cells within 3D culture over time. In addition, the microfluidic platform enables the culture of a larger number of cell clusters per focal plane, providing better imaging results. The ability to analyze more cell clusters at once, in parallel experiments, may provide increased statistical power to studies of cellular response and enable the routine use of 3D cultures for higher-throughput studies and screening.

For product ordering information, see page 43.

Simple, scalable cellular analysis solutions: Muse® Cell Analyzer and guava easyCyte™ Flow Cytometers.

You'll quickly find that guava easyCyte™ microcapillary flow cytometers are simpler to operate and maintain than traditional sheath fluid-based instruments. They all use small sample volumes, generate minimal waste and have lower operating costs, enabling on-demand use in any lab environment. Equipped with insightful data acquisition and analysis software, guava easyCyte™ instruments are available with single-load and high throughput options.

Immunological Phenotyping 6-Color Assay

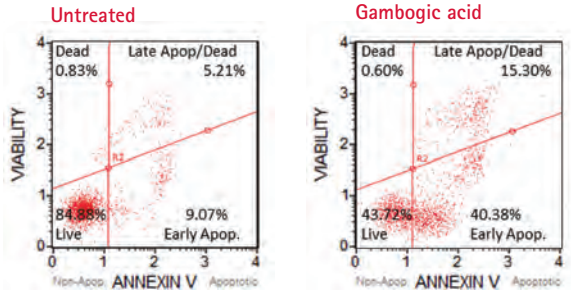


50 µL adult human blood was stained for 15 minutes at room temperature with a cocktail containing CD3-FITC, CD16-PE, CD56-PE, CD45-PerCP-Cy5.5, CD4-PE-Cy7, CD19-APC, and CD8-APC-Cy7, lysed, fixed and analyzed on a guava easyCyte™ 8HT system.

Learn more about guava easyCyte™ flow cytometers at: **www.merckmillipore.com/guava**

With the Muse® Cell Analyzer, we've miniaturized flow cytometry and packed 3-parameter analysis into a compact, affordable instrument, bringing accurate cell analysis to every benchtop. Effortlessly acquire data with our optimized Muse® assays designed for immunology, cell health, apoptosis, and cell signaling studies.

Muse® Annexin V & Dead Cell Assay



Apoptotic impact of gambogic acid on Jurkat cells.

Learn more about the Muse® Cell Analyzer at: **www.merckmillipore.com/muse**

Cytometry without limits:
Extend the range of your research

The Amnis® FlowSight® and ImageStream®^{X} Mark II cyometers combine the speed, sensitivity, and phenotyping abilities of flow cytometry with the detailed imagery and functional insights of microscopy. This unique combination enables a broad range of applications that would be impossible using either technique alone.

Autophagy

During autophagy, cytoplasmic LC3 is processed and recruited to the outer membrane of autophagosomes. Cells undergoing autophagy can be identified by visualizing LC3 puncta and enumerating the spots within each cell using the Spot Count feature of the IDEAS software package:

Figure 1. The IDEAS image processing software included with the ImageStream®^{X} Mark II cytometer determines the Spot Count of every cell. In this example, cells with varying number of LC3-FITC spots are shown with their corresponding Spot Count.

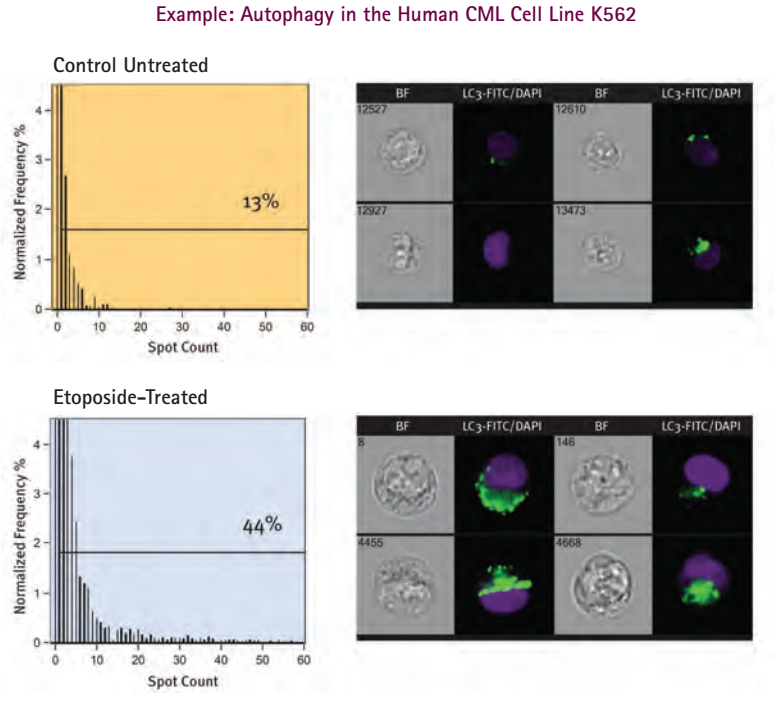
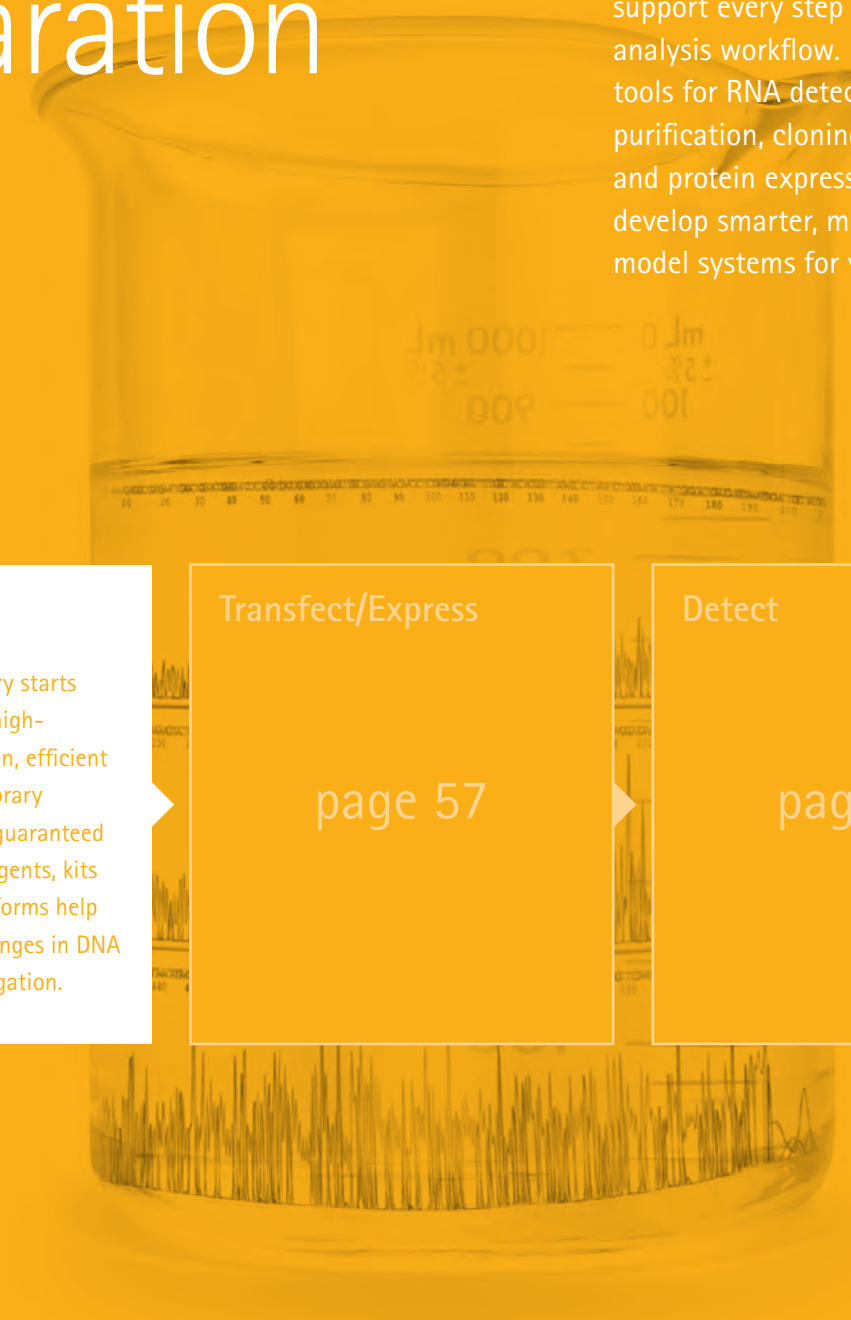


Figure 2. K562 cells were treated with etoposide to induce autophagy. Representative brightfield and merged LC3-FITC (green) and DAPI (purple) images are shown for control and treated cells. The number of LC3 puncta was quantified for each cell using the Spot Count feature of the IDEAS software and each sample of over 10,000 cells was characterized by a Spot Count histogram. The percentage of cells exhibiting one or more puncta increased from 13% (control) to 44% (etoposide-treated).

For complete product information, visit: www.merckmillipore.com/amnis

Genomic Sample Preparation

Whether you need to clone a gene, modify a DNA sequence, quantify intracellular DNA and RNA or express a recombinant protein, you need a complete set of genomic analysis tools that work together. Building on the molecular biology expertise of Novagen, Merck Millipore's products support every step of your genomic analysis workflow. Learn how our tools for RNA detection, PCR, DNA purification, cloning, transfection and protein expression can help you develop smarter, more predictive model systems for your research.



Prepare/Clone

Successful gene discovery starts with high-fidelity PCR, high-recovery DNA purification, efficient DNA propagation and library preparation. Our 100% guaranteed polymerases, quality reagents, kits and competent cell platforms help overcome specific challenges in DNA amplification and propagation.

Transfect/Express

page 57

Detect

page 61

Novagen® KOD Polymerase PCR Systems

Optimized for the most challenging samples or DNA templates

KOD DNA polymerase is an ultra high-fidelity, thermostable DNA polymerase that provides low mutation frequency, fast extension rate, and high processivity for higher yields of full-length product in fewer reaction cycles. The KOD polymerase systems provide best-in-class amplification for a wide array of crude samples and targets with up to 90% GC-rich sequences. Combined with their ability to amplify long PCR targets, KOD polymerase systems extend the limits of typical PCR reactions as compared to other PCR enzymes. Choose the appropriate KOD DNA polymerase system based on your application requirements.

Features & Benefits

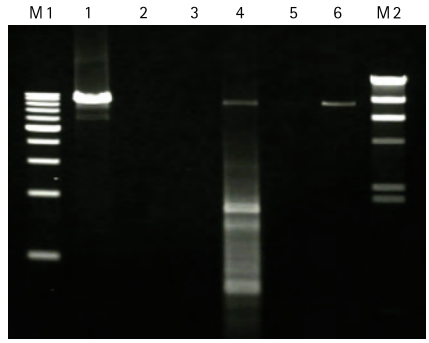
- High accuracy, yield, and processivity compared to most other proofreading DNA polymerases
- Optimized for complex crude samples with minimal sample processing
- Efficient amplification for up to 90% GC-rich templates
- Amplification of genomic targets up to 24 kb

Applications

PCR Amplification, Next-Gen Sequencing, Gene Expression Analysis

Product Performance

KOD Xtreme™ Hot Start DNA Polymerase amplifies GC-rich targets more efficiently than other polymerases. Six polymerases were used to amplify a 8.9 kb human IGF2R gene, containing ~90% GC content. Lane M1 and M2, markers; Lane 1, PCR using KOD Xtreme™ Hot Start DNA Polymerase; Lanes 2 to 6, competitor polymerase systems supplied with GC Buffers and tested using manufacturer protocols. Data contributed by Akio Sugiyama, Tsuruga Institute of Biotechnology.



Specifications

	KOD DNA Polymerase	KOD Hot Start DNA Polymerase	KOD XL DNA* Polymerase	KOD Xtreme™ Hot Start DNA Polymerase
PCR Product Size (kb)	<6	<21	<30	<40
Applications	Cloning, cDNA amplification	Cloning, cDNA amplification	Crude samples, multiplex, incorporation of derivatized dNTPs	Crude samples, long targets, difficult and GC-rich targets

*KOD-XL DNA polymerase amplification results in a mixture of blunt and 3'-dA products while other KOD DNA polymerases generate blunt end products.

Note: NovaTaq™ polymerase is also available for routine PCR.

Ordering Information

Description	Qty/Pk	Catalogue No.
KOD DNA Polymerase	250 U	71085-3
KOD Hot Start DNA Polymerase	20 U	71086-5
	200 U	71086-3
	1,000 U	71086-4
KOD Hot Start Master Mix	100 rxn	71842-3
	500 rxn	71842-4
KOD Xtreme™ Hot Start DNA Polymerase	200 U	71975-3
KOD XL DNA Polymerase	250 U	71087-3
	1,250 U	71087-4
NovaTaq™ DNA Polymerase	100 U	71003-3
	500 U	71003-4
	2,500 U	71003-5
NovaTaq™ Hot Start DNA Polymerase	250 U	71091-3
	1,250 U	71091-4

For more information visit: www.merckmillipore.com/kod

High recovery genomic DNA concentration using the new Microcon® PCR-grade centrifugal ultrafilter

Maximum recovery of pure intact genomic DNA from crude biological samples is the critical first step in any DNA analysis workflow. Typically, the process involves cell disruption, chemical or ion exchange-based extraction of the nucleic acid fraction and concentration of the purified DNA sample. While ethanol precipitation is commonly used for DNA concentration in research settings, an effective alternative is ultrafiltration via small spin columns such as the Microcon® DNA Fast Flow device. However, one concern in genetic testing is consumable product contamination with exogenous DNA during assembly and packaging. To minimize this potential, we have released the Microcon® DNA Fast Flow PCR Grade filter, which is ethylene oxide-treated to disrupt or fragment amplifiable DNA. Here, we show that it matches the original Microcon® filter in performance.

For Microcon® ordering information, please refer to page 100.

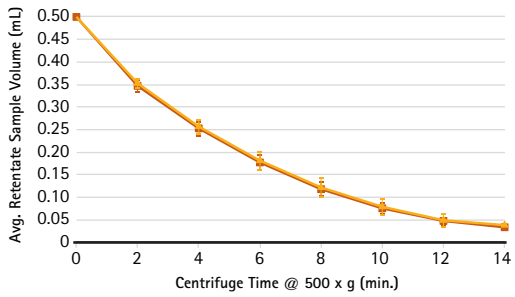


Figure 1. Equally fast ultrafiltration flow of Microcon® DNA Fast Flow (Orange) and Microcon® DNA Fast Flow PCR Grade (Yellow) devices as determined by measuring retentate volume at various time intervals and plotting retentate volume vs. centrifugation time. Each point represents the mean and standard deviation of four replicates.

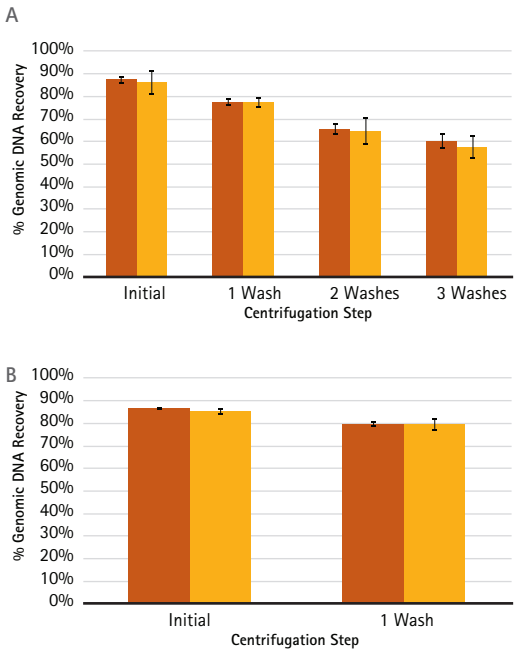


Figure 2. DNA recovery performance of Microcon® DNA Fast Flow (Orange) and Microcon® DNA Fast Flow PCR grade (Yellow) Microcon® devices as determined by comparison of retentate volume to starting material. Results show percent genomic DNA recovered with respect to centrifugation step. In each case, the starting material was either PCI-extracted DNA (A) or DNA in TE Buffer (B). For PCI samples, three successive wash steps were performed. Each bar represents the mean and standard deviation of four replicates.

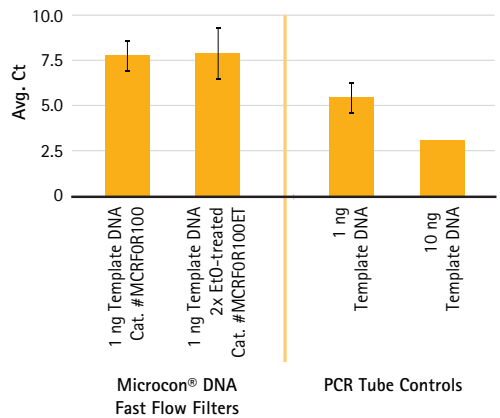


Figure 3. No inhibition of qPCR reactions. 1159 bp DNA qPCR average threshold cycle (Ct) results for Microcon® DNA Fast Flow and Microcon® DNA Fast Flow PCR Grade devices using pLH2 template DNA (1 ng). The qPCR results for the unprocessed PCR Tube Control 1159bp results (1 ng and 10 ng) are also shown. Each bar represents the mean and standard deviation of four replicates.

PCR Cleanup Filter Plates

Remove primers and unincorporated dNTPs in one step

Our PCR filter plates are fast, automatable solutions for high-throughput PCR purification. Available in 96- and 384-well formats and a µ96-well format for small volumes, MultiScreen® PCR plates use a size-exclusion membrane and vacuum filtration to provide a one-step protocol with excellent results. No centrifugation or precipitation is required. Full sample recovery from the top of the plate enhances compatibility with liquid handling systems. MultiScreen® $PCR_{µ96}$ and MultiScreen®PCR_{384} filter plates provide high recovery on even the smallest miniaturized reactions. Working volumes <150 µL conserve reagents and save money. For volumes >150 µL, use MultiScreen®PCR_{96} 96-well filter plate.

Features & Benefits

- High purity and high recovery
- No centrifugation or precipitation
- Fast processing times, automation compatible
- MultiScreen® $PCR_{µ96}$ filter plate recommended for small fragments (1-150 bp)

Applications

PCR Cleanup, Sequencing, Genotyping, Microarray, RNAi Purification, Microarray Purification, Genomic DNA Concentration

Specifications

Product name	Reaction volume	Number of samples	Mode of operation	Recommended applications	Features
MultiScreen® $PCR_{µ96}$ Filter Plate	20–150 µL	96	Vacuum	Sequencing Genotyping Microarray	• Highly concentrated final sample • Reaction miniaturization
MultiScreen® PCR_{96} Filter Plate	150–300 µL	96	Vacuum	Microarray	• Volumetric capacity
MultiScreen® PCR_{384} Filter Plate	20–100 µL	384	Vacuum	Sequencing Genotyping Microarray	• Highly concentrated final sample • Reaction miniaturization • Ultra-high throughput

Product name	Recovery of 137 bp PCR fragment*	Recovery of 301 bp PCR fragment*	Recovery of 657 bp PCR fragment*	Recovery of 1159 bp PCR fragment*	% Primer removal (20 bases), 100 µL volume
MultiScreen® $PCR_{µ96}$ Filter Plate	+	++	++	++	99.8%
MultiScreen® PCR_{96} Filter Plate	--	+	++	++	98.7%
MultiScreen® PCR_{384} Filter Plate	+	++	++	++	99.5%
-- Not Recommended					
+ Good Recovery					
++ Best Recovery					

*Results will vary based on starting concentration, load, and buffers used. Data obtained using the following concentrations:
137 bp: 10 ng/µL
301 bp: 30 ng/µL
657 bp: 55 ng/µL
1159 bp: 71 ng/µL

Ordering Information

Description	Reaction Volume (µL)	Qty/Pk	Catalogue No.
Filter Plates			
MultiScreen® $PCR_{\mu 96}$ Filter Plate	20–150	10	LSKMPCR10
	20–150	50	LSKMPCR50
MultiScreen® PCR_{96} Filter Plate	150–300	10	MSNU03010
	150–300	50	MSNU03050
MultiScreen® PCR_{384} Filter Plate	20–100	10	S384PCR10
	20–100	50	S384PCR50
Required Equiment			
MultiScreen®$_{HTS}$ Vacuum Manifold	1	1	MSVMHTS00
MultiScreen®$_{384}$ Vacuum Manifold	1	1	SAVM38401
Chemical Duty Pump, 115 V/60 Hz	1	1	WP6111560
Chemical Duty Pump, 220 V/50 Hz	1	1	WP6122050
Chemical Duty Pump, 100 V/50–60 Hz	1	1	WP6110060

For more information visit: www.merckmillipore.com/PCR

Novagen® Competent Cells for Bacterial Protein Expression

Optimized for high yields of full-length, soluble protein

When expressing recombinant proteins in *E. coli*, you need to obtain high yields of full-length, soluble protein. Our bacterial strains for protein expression include the best all-purpose strains and specialty strains for difficult-to-express proteins, all backed by unwavering technical support to ensure success. For ultimate convenience and reliability, Singles™ Competent Cells are provided in 50 µL volumes to eliminate the need to aliquot, freeze/thaw, or waste partially used vials. This saves time and money, minimizes contamination and ensures reliable cell performance.

Features & Benefits

- High yields of full-length, soluble protein
- Easy-to-use Singles™ format for greater convenience
- Selection of cell strains optimized for specific applications

Applications

Bacterial Protein Expression

Application Guide

Expression Strains	Feature	Target Application
DE3 Hosts	Lysogens of bacteriophage λDE3 that express T7 RNA polymerase	Protein induction from T7 expression vectors
(DE3) pLysS Hosts	Express T7 RNA polymerase and also encode T7 lysozyme that suppresses basal expression of toxic target proteins prior to induction	No protein/cell death due to toxic target protein
BL21 Strains	Deficient in *Lon* and *OmpT* proteases that minimize protein degradation	General protein expression
Origami™ 2 and Rosetta-gami™ Strains	*TrxB/gor*$^-$ hosts that minimize protein reduction in cytoplasm	Insoluble protein/no activity
Tuner™ and Rosetta-gami™ B Strains	*LacY*$^-$ hosts that attenuate expression/titrate IPTG and minimize protein misfolding	Insoluble protein/no activity
Rosetta and Rosetta-gami™ Strains	Supply rare tRNAs for improved full-length protein expression	Truncated protein
HMS174 and NovaBlue Strains	*RecA*$^-$ hosts BLR(DE3) that minimize plasmid recombination	Stabilizing target plasmids
B834 Strain	A methionine auxotroph ideal for protein labeling applications	Protein labeling

Ordering Information

Description	Transformation Efficiency	Reaction Size	Qty/Pk	Catalogue No.
Select Competent Cells for Bacterial Protein Expression				
BL21(DE3) Singles™ Competent Cells	>2 x 10^7 cfu/µg	50 µL	11 rxn	70235-3
			22 rxn	70235-4
BL21(DE3) pLysS Singles™ Competent Cells	>2 x 10^7 cfu/µg	50 µL	11 rxn	70236-3
			22 rxn	70236-4
Origami 2(DE3) Singles™ Competent Cells	>2 x 10^6 cfu/µg	50 µL	11 rxn	71408-3
			22 rxn	71408-4
Rosetta 2(DE3) Singles™ Competent Cells	>2 x 10^6 cfu/µg	50 µL	11 rxn	71400-3
			22 rxn	71400-4
Rosetta 2(DE3) pLysS Singles™ Competent Cells	>2 x 10^6 cfu/µg	50 µL	11 rxn	71401-3
			22 rxn	71401-4
HMS174(DE3) Competent Cells	>5 x 10^6 cfu/µg	20 µL	0.4 mL	69453-3
			1 mL	69453-4
Select Competent Cells for Cloning				
NovaBlue Singles™ Competent Cells	>1.5 x 10^8 cfu/µg	50 µL	11 rxn	70181-3
			22 rxn	70181-4
NovaBlue GigaSingles™ Competent Cells	>1.0 x 10^9 cfu/µg	50 µL	11 rxn	71227-3
			22 rxn	71227-4
HT96™ NovaBlue Competent Cells	>1.0 x 10^8 cfu/µg	96 x 20 µL	1 plate	71011-3
			4 plates	71011-4
NovaBlue(DE3) Competent Cells	>1.5 x 10^8 cfu/µg	20 µL	0.4 mL	69284-3
			1 mL	69284-4

For more information visit: www.merckmillipore.com/compcells

96-Well Plasmid and BAC Preparation Kit

Simply clear, concentrate, wash, and recover

The Montage® Plasmid Miniprep$_{96}$ Kit is a fast, easy-to-use kit for high-purity plasmid or bacterial artificial chromosome (BAC) minipreps. This simple protocol eliminates lengthy bind/elute methods and centrifugation steps to yield clean and reproducible DNA in 50% less time than traditional methods. Purified PCR samples are suitable for the most sensitive downstream applications including cloning, DNA sequencing, and transformation. BAC applications include sequencing, fingerprinting, arraying, and PCR amplification. The kit includes all the reagents and disposable materials you need to purify plasmid or BAC DNA in a 96-well format.

Features & Benefits

- Three short filtration steps: No centrifugation or precipitation steps required
- Minimum processing time
- Excellent purity, yields and reproducibility
- Automation compatible

Applications

Lysate Clearing, Plasmid Miniprep, BAC Miniprep, Cloning, Sequencing, Transformation

Ordering Information

Description	Components	Qty/Pk	Catalogue No.
Plasmid Miniprep Kits and Filter Plates			
Montage® Plasmid Miniprep$_{96}$ Kit	Includes 96-well filter plates and reagents	4	LSKP09604
		24	LSKP09624
MultiScreen®$_{HTS}$ Plasmid Plate	Does not include reagents	50	MSNUPSD50
MultiScreen®$_{HTS}$ Clearing Plate	Does not include reagents	10	MSNANLY10
		50	MSNANLY50
Accessories			
Stericup®-GV Filter, 0.22 µm, PVDF, 150 mL, radio-sterilized		12	SCGVU01RE
Adhesive Tape Covers		100	LSKAST100
Required Equiment			
MultiScreen®$_{HTS}$ vacuum manifold		1	MSVMHTS00
V-bottom plates		100	LSKVBP100
Chemical Duty Pump, 115 V/60 Hz		1	WP6111560
Chemical Duty Pump, 220 V/50 Hz		1	WP6122050
Chemical Duty Pump, 100 V/50–60 Hz		1	WP6110060
Reagents			
Cell Resuspension Solution, 0.5 L		1 bottle	LSKCRS500
Cell Lysis Solution, 0.5 L		1 bottle	LSKCLS500
Neutralization Solution, 0.5 L		1 bottle	LSKNS0500
Nuclease-free Water, 0.5 L		1 bottle	LSKNF0500
Tris Buffer, 0.5 L		1 bottle	LSKCTB500
RNase A, 0.9 mL		1 bottle	LSKPMRN30

Novagen® PureGenome™ High Efficiency NGS Library Preparation Reagents

Less bias. Less time. More matched reads.

Prepare Next Generation Sequencing (NGS) libraries with less hands-on time with the PureGenome™ High Efficiency NGS Library Preparation System. The easy, two-step library preparation procedure is followed by library amplification using our ultra-high fidelity KOD Hot Start DNA Polymerase Master Mix. This unique polymerase amplifies DNA with high processivity in highly TA- or GC-rich regions.

The combined efficiency of library construction and accuracy of amplification enables maximum library yields from lower input DNA, with minimal bias for better results.

- Requires less than 1 µg DNA input
- Offers high ligation efficiency
- Supports multiple platforms
- No GC bias in coverage depth

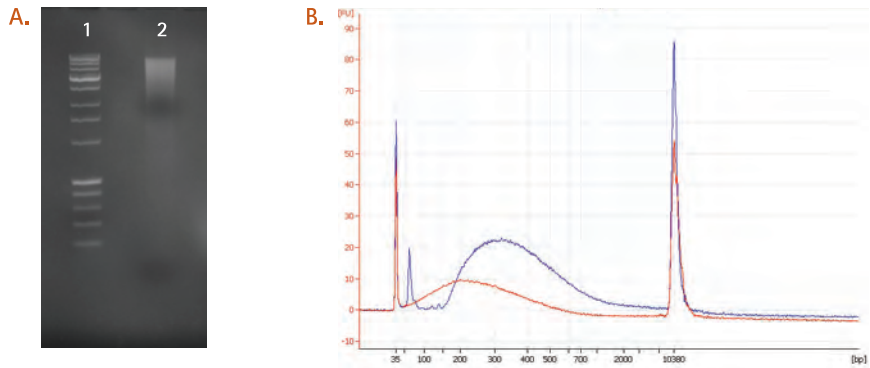
Features & Benefits

- Easy-to-use, less hands-on time with 2-step workflow

Applications

Next Generation Sequencing, Nucleic Acid Sample Prep

Product Performance



Generate pure genomic DNA, ready for shearing and library prep. A. Sixteen micrograms of genomic DNA was purified from 25 mg of mouse heart tissue using the PureGenome™ Tissue DNA Extraction Kit. Lane 1: 0.1-12 kbp DNA ladder; lane 2: genomic DNA. A260/A280 ratio was 1.8. B. DNA shown in (A) was used to generate an Illumina® sequencer-compatible NGS library; DNA was first sheared to an average size of 200 bp (red trace). Two µg of the sheared DNA was used to generate the NGS library using PureGenome™ NGS library preparation reagents (blue trace).

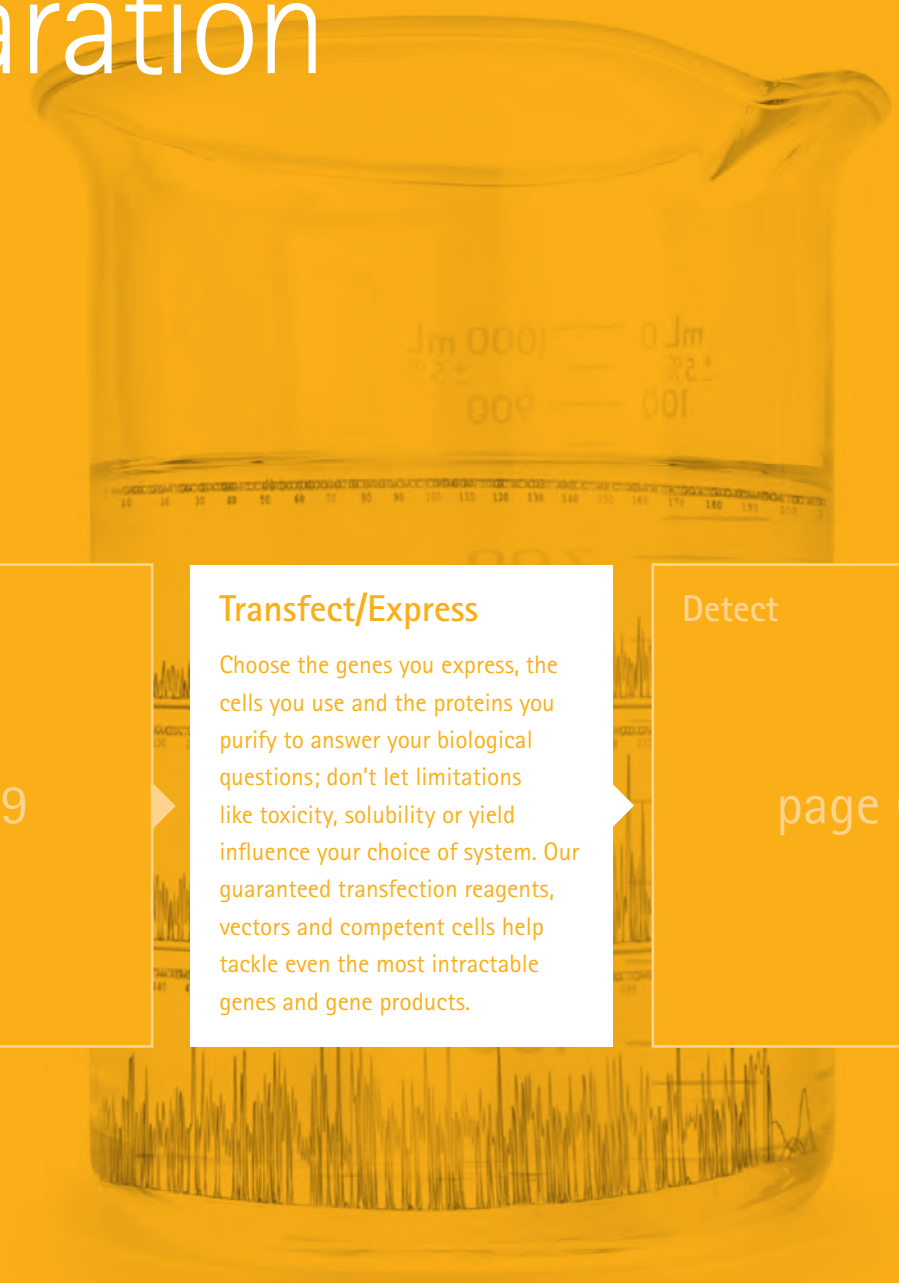
Ordering Information

Description	Components	Qty/Pk	Catalogue No.
Genomic DNA Extraction			
PureGenome™ Tissue DNA Extraction Kit	PureGenome™ Kits contain optimized Proteinase K for tissue lysis, buffers, SpinPrep™ Columns and Collection Tubes.	50 preps	72635-1KIT
PureGenome™ On-Spot Tissue DNA Kit	PureGenome™ Kits contain optimized Proteinase K for tissue lysis, buffers, SpinPrep™ Columns and Collection Tubes.	50 preps	72636-1KIT
PureGenome™ On-Spot Solution is provided for selecting targeted section areas prior to Proteinase K digestion and purification.			
Library Preparation			
PureGenome™ NGS Library DNA Modifier	Blunt-ending, A-tailing components & ligation	50 preps	PGN001-1EA
PureGenome™ NGS Library A-Tail Enhancer	PureGenome™ NovaTaq Polymerase for A-tailing	50 preps	PGN002-1EA
PureGenome™ NGS Library Amplifier	KOD Hot Start DNA Polymerase Mastermix for library enrichment/ amplification	50 preps	PGN003-1EA
The PureGenome™ reagents sets are validated together and uniquely lot-controlled to ensure high quality library preparation. Merck Millipore does not recommend purchasing individual reagent boxes.			
Library Validation			
PureGenome™ Next Generation Sequencing Library Validator Kit*	Kit components include (3) PureGenome™ NGS DNA Controls and PureGenome™ Validator Primer Mix.	1 kit (200 reactions)	PGN004-1EA

*Kit was optimized using SABiosciences SYBR® qPCR mastermix

For more information visit: www.merckmillipore.com/mobio

Genomic Sample Preparation



Prepare/Clone

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Transfect/Express

Choose the genes you express, the cells you use and the proteins you purify to answer your biological questions; don't let limitations like toxicity, solubility or yield influence your choice of system. Our guaranteed transfection reagents, vectors and competent cells help tackle even the most intractable genes and gene products.

Detect

page 61

Novagen® GeneJuice® Transfection Reagent

High-efficiency transfection for a wide variety of cells

GeneJuice® Transfection Reagent is optimized for maximal transfection efficiency, ease of use, and minimal cytotoxicity for successful gene expression. This transfection reagent is a superior alternative to a wide variety of other techniques including lipofection, calcium phosphate coprecipitation, electroporation, microinjection, biolistic particle delivery, and complex formation with DEAE-dextran.

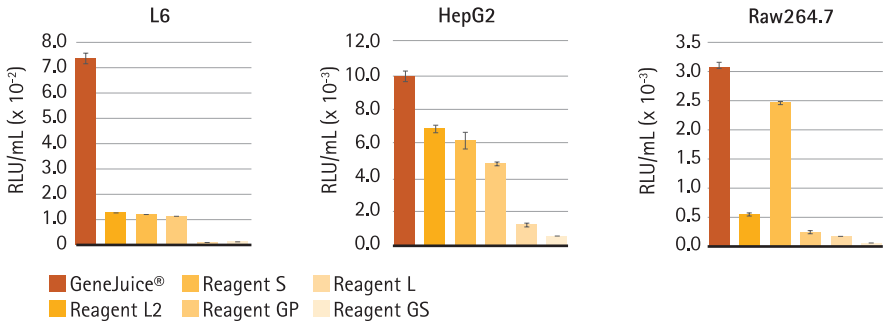
Features & Benefits

- Highly efficient DNA transfer for both stable and transient transfections
- Minimal cellular toxicity
- Compatible with both serum-containing and serum-free media
- Simplified protocol for a wide variety of cell types and applications

Applications

Stable and Transient Mammalian Transfection, Mammalian Protein Expression

Product Performance



GeneJuice® Transfection Reagent provides higher transfection efficiency than commonly used competitor reagents. Cell lines were plated at 3 × 10^4 cells per well in 24-well plates the day prior to gene delivery. Transfections and media changes were performed according to the manufacturers' optimized protocols. For transfection, 0.5 µg of low endotoxin purified pTriEx™-4 Fluc plasmid DNA was complexed with the relevant reagent and introduced into each well. After 48 h, cells were extracted with Reportasol™ Extraction Buffer and Fluc activity was assayed. Data are represented as relative light units per milliliter of extract (RLU/mL). All values reflect an average of four replicate cultures with standard errors.

Ordering Information

Description	Applications	Qty/Pk	Catalogue No.
GeneJuice® Transfection Reagent	The standard for transfection in most cell lines in serum-containing or serum-free media.	0.3 mL	70967-5
		1 mL*	70967-3
		5 x 1 mL	70967-6
		10 x 1 mL	70967-4
*The 1 mL size provides enough reagent to perform up to 500 transfections in standard 35 mm plates. GeneJuice®Transfection Reagent is supplied as a ready-to-use sterile solution.			
Other Transfection Reagents			
NovaCHOice® Transfection Kit	Efficient, scalable protein expression in suspension CHO lines.	1 mL	72622-3
		10 mL	72622-4
293-Free™ Transfection Reagent	Maximal output from HEK293 suspension cultures.	1 mL	72181-3
		5 x 1 mL	72181-4
		10 x 1 mL	72181-5
NanoJuice® Transfection Kit	Overcome the most difficult-to-transfect mammalian cells (e.g. primary cell lines).	240 rxn	71902-3
		2400 rxn	71902-4
Insect GeneJuice® Transfection Reagent	Optimized for insect cells.	0.3 mL	71259-3
		1 mL	71259-4
		10 x 1 mL	71259-5
RiboJuice™ siRNA Transfection Reagent	Effective delivery of siRNA for targeted gene silencing in most cell lines.	0.3 mL	71115-3
		1 mL	71115-4
ProteoJuice™ Transfection Reagent	Delivery of even the most complex proteins into most cells.	0.125 mL	71281-3
		4 x 0.125 mL	71281-4

For more information visit: www.merckmillipore.com/transfection

Novagen® Overnight Express™ Autoinduction Systems

Bacterial expression without monitoring or manual IPTG induction

Increase bacterial protein expression without having to monitor culture density. The Overnight Express™ Autoinduction Systems enable regulated protein expression in *E. coli*, without monitoring the culture or adding IPTG inducer during cell growth. The simplified protocol offers greater convenience, allowing you to focus on your research while it does its job.

Features & Benefits

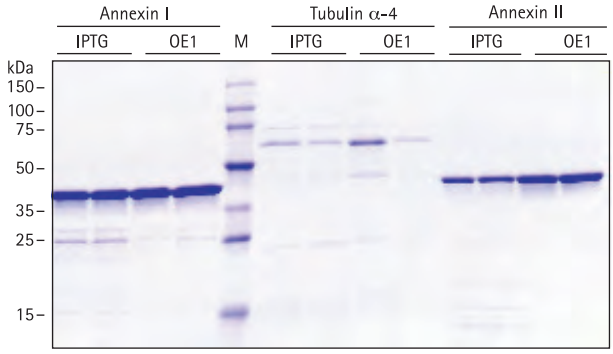
- Effortless protein expression in *E. coli* without the need for monitoring or induction
- Convenient for routine expression of proteins in multiple cultures or for high-throughput parallel analysis
- High cell densities and protein expression levels

Applications

Bacterial Protein Expression

Product Performance

Better yields, better nights' sleep with Overnight Express™ autoinduction. pET recombinants encoding the indicated His•Tag® fusion proteins were transformed into BL21(DE3) cells. For Overnight Express™ System 1 induction, 5 mL medium was inoculated with a single colony and incubated overnight (~16 h) at 30 °C with shaking. For IPTG induction, 5 mL medium was inoculated with a single colony and incubated at 16 °C with shaking to an average OD_{600} of 1.0. IPTG was added to 1 mM final concentration and incubated an additional 16 h. Proteins were purified and then analyzed by SDS-PAGE and Coomassie® blue staining.



Lanes	Sample volume
Annexin I	4 µL
Tubulin α-4	4 µL
Annexin II	IPTG, 8 µL; OE1, 4.5 µL

Lanes	Sample
IPTG	IPTG induction
OE1	Overnight Express™ Autoinduction System 1
M	Perfect Protein™ Markers, 15-150 kDa

Ordering information

Description	Application Information	Qty/Pk	Catalogue No.
Overnight Express™ Instant LB Medium	Complete autoinduction medium in granulated Luria-Bertani formulation.	1 EasyPak*	71757-3
		5 EasyPak*	71757-4
		1 kg	71757-5
Overnight Express™ Instant TB Medium	Complete autoinduction medium in granulated Terrific Broth formulation.	1 EasyPak*	71491-3
		5 EasyPak*	71491-4
		1 kg	71491-5
Overnight Express™ Autoinduction System 1	Autoinduction medium to be added to glucose-free medium (e.g., 2X YT, SOC, LB and TB).	1 L kit	71300-3
		5 L kit	71300-4
Overnight Express™ Autoinduction System 2	Compatible with selenomethionyl (Se-Met) labeling of proteins.	1 L kit	71366-3
		5 L kit	71366-4
Overnight Express™ NMR Medium - Optimization	Determine optimal culture conditions for high-level protein expression before isotopic protein labeling. It can also be used for ^{15}N protein labeling when user provides ^{15}N-ammonium chloride.	1 L kit	71760-3
Overnight Express™ NMR Medium - ^{15}N	High level incorporation of ^{15}N for initial NMR analysis to assess suitability for structure determination.	1 L kit	71759-3
		5 L kit	71759-4
Overnight Express™ NMR Medium - ^{15}N, ^{13}C	High level incorporation of ^{15}N and ^{13}C for backbone and side-chain assignments and for restraint measurements in structure determination.	1 L kit	71789-3

*EasyPak includes 45 g of media.

For more information visit: www.merckmillipore.com/OvernightExpress

UCOE® Mammalian Gene Expression Technology

Rapid, high-yield protein production in mammalian cells

Achieve dramatically improved gene expression in stably transfected mammalian cells by manipulating chromatin structure. Ubiquitous Chromatin Opening Element (UCOE®) technology prevents transgene silencing and gives consistent, stable and high gene expression, irrespective of the chromosomal integration site. UCOE® technology expression elements are small DNA elements (isolated from around house-keeping genes, which need to be active most of the time) that create a transcriptionally active open chromatin environment around an integrated transgene, maximizing its potential to be transcribed into protein, regardless of the position of the transgene in the chromosome.

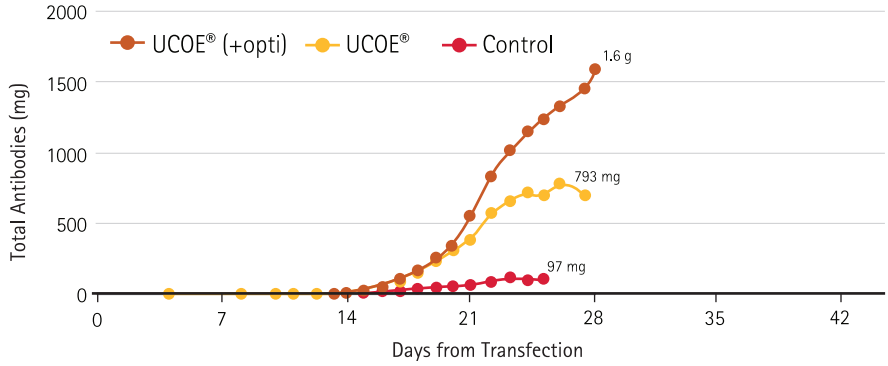
Features & Benefits

- 20-fold higher protein yields versus conventional vectors
- Greater stability of stably transfected cells
- Compatible with most industry standard platforms

Applications

Mammalian Protein Expression

Product Performance



Increased protein yield in mammalian cells transfected with UCOE® protein expression vector.
3 x 10^7 CHO-S cells were transfected with 90 µg of an antibody expression plasmid either with or without a UCOE®. Drug selection was applied, and once sufficient cell numbers were generated, cells were seeded at a cell density that would allow growth to 10 L. On day 16, a small non-feed addition was made to a proportion of the cultures (+opti).

Ordering Information

Description	Qty/Pk	Catalogue No.
UCOE® Expression Vector - Mouse 3.2 kb Puro Set	1 set	5.04865.0001
UCOE® Expression Vector - Mouse 3.2 kb Hygro Set	1 set	5.04866.0001
UCOE® Expression Vector - Human 4 kb Puro Set	1 set	5.04867.0001

For more information visit: www.merckmillipore.com/ucoe

Genomic Sample Preparation

Prepare/Clone

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Transfect/Express

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Detect

Accurately detect nucleic acids in your samples with our well-published, well-documented agarose and electrophoresis reagents. Our molecular biology-grade and Omnipur® grade reagents are DNAse-, RNAse- and protease-free to give you peace of mind and reproducible results.

Calbiochem® OmniPur® Grade Biochemicals and Reagents

DNAse-, RNAse- and protease-free reagents

OmniPur® products represent a grade of molecular biology reagents that are of the highest quality and deliver consistent performance from lot to lot. OmniPur® grade reagents are tested for the absence of DNase, RNase, and proteases for safe use in tissue and cell culture work as well as other sensitive applications.

Features & Benefits

- DNase-, RNase-, protease-tested for best results
- Stringent quality testing to ensure lot-to-lot consistency
- Suitable for research labs and production facilities

Applications

Molecular Biology, Nucleic Acid Sample Preparation, Protein Sample Preparation

Ordering information

Description	Qty/Pk	Catalogue No.
OmniPur® Sterile Water, DEPC Treated, Nuclease-Free	100 mL	9601-100ML
	500 mL	9602-500ML
	1 L	9610-1L
	5 L	9612-5L
	10 L	9613-10L
OmniPur® Sterile Water, WFI Quality, Cell Culture Tested	500 mL	4.86505.0500
	1 L	4.86505.1000
	5 L	4.86505.5000
	10 L	4.86505.9010
	20 L	4.86505.9020
	200 L	4.86505.9200
OmniPur® Sodium Dodecyl Sulfate (SDS)	500 g	7910-500GM
	5 kg	7960-5KG
OmniPur® 10X PBS Liquid Concentrate	4 L	6505-4L
	20 L	6504-20L
OmniPur® Formamide, Deionized	100 mL	4610-100ML
	500 mL	4650-500ML
	4 L	4670-4L

Note: Visit our website for a complete listing of OmniPur® offerings.

For more information visit: www.merckmillipore.com/OmniPur

Calbiochem® OmniPur® Grade Agarose PCR Plus

Superior resolution of DNA fragments

OmniPur® products represent a grade of molecular biology reagents that are of the highest quality and deliver consistent performance from lot to lot. OmniPur® grade reagents are tested for the absence of DNase, RNase, and protease for safe use in tissue and cell culture applications.

OmniPur® Agarose PCR Plus features average gel strength and standard melting and gelling ranges. It is specifically designed to prevent smearing or high fluorescence backgrounds. Plus, this low electroendosmosis (EEO) agarose offers high electrophoretic mobility for shorter electrophoretic runs.

Features & Benefits

- Optimized for resolution of less than 1000 bp fragments
- Prevents smearing or high fluorescence backgrounds
- DNase-, RNase-, protease-tested for best results

Applications

Nucleic Acid Detection

Ordering information

Description	Qty/Pk	Catalogue No.
OmniPur® Agarose PCR Plus	25 g	2005-25GM
	100 g	2010-100GM
	500 g	2020-500GM
Related Products		
OmniPur® Agarose	100 g	2120-100GM
	500 g	2125-500GM
OmniPur® Agarose, super-fine resolution	100 g	2081-100GM
	250 g	2082-250GM
OmniPur® Agarose, high gel strength	100 g	2090-100GM
OmniPur® Agarose, low melting	100 g	2070-100GM

For more information visit: www.merckmillipore.com/OmniPur

A novel reagent enables live cell RNA detection and enhances sorting capabilities

Detecting gene expression has traditionally been limited to technologies that examine expression in lysed or fixed cell populations. The ability to detect RNAs in individual, live cells can enable an unequivocal assessment of gene expression, changes that occur in direct response to specified perturbations. Determining which genes are up- or down-regulated in these perturbed cells provides insight into the relationships between gene expression networks and cell functions. We developed SmartFlare™ RNA Detection Probes, capable of detecting specific mRNAs and miRNAs in live, intact cells (Figure 1). This technology allows for carrier-free cellular endocytosis of the reagent, followed by detection and relative quantitative analysis of RNA levels.

Achieve multiparametric, predictive cell analysis with no sample prep, cell lysis or toxicity.

Because the SmartFlare™ probe leaves the cell after the detection event, the same sample can be used for any downstream analysis, enabling the measurement of multiple biomarkers or downstream functionalities in the same cells. Additionally, this reagent requires no upfront sample preparation, has no toxic effects on cellular fate and no known nonspecific, off-target effects. Compared to currently used methods for interrogating RNA that involve examination of non-native, amplified RNA targets, SmartFlare™ probes can provide results that show greater correlation to *in vivo* observations.

Sort cells based on intracellular gene expression.

Separating cells based on intracellular markers typically requires fixing or permeabilizing cells, resulting in poor recovery of viable sort products. SmartFlare™ technology enables users to sort cells based on the level of specific RNAs with high recovery, providing a new opportunity to study cellular functions and identify rare cell types such as certain tumor cells and cancer stem cells. Not only does this technology facilitate the sorting of cell populations that were previously difficult to sort, but it also improves sorting accuracy by using biologically relevant intracellular markers. As shown in Figure 2, SmartFlare™ probes were successfully used to sort a mixed cell population based on miRNA expression, and sort products could then be tested for functional differences.

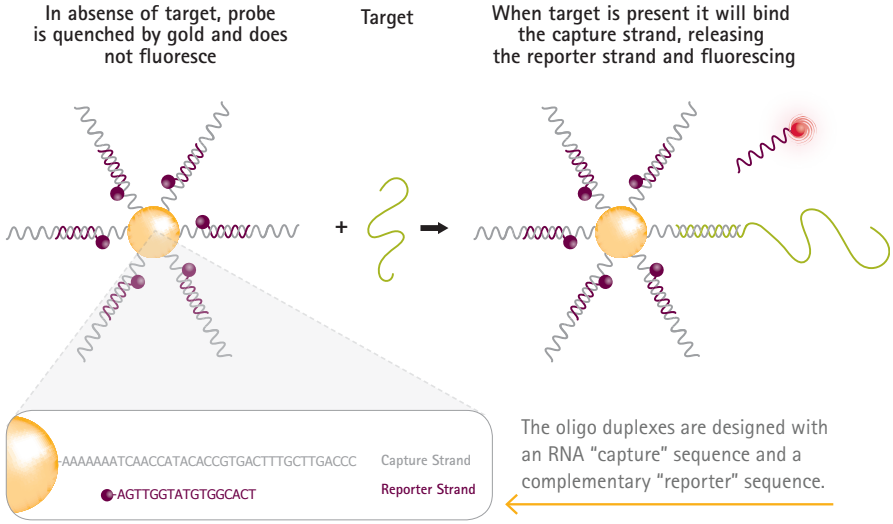


Figure 1. Molecular mechanism of SmartFlare™ detection probes.

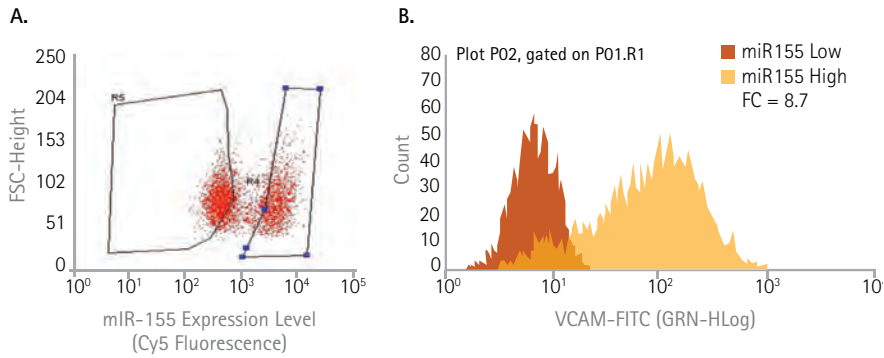


Figure 2. (A) Sorting based on miR-155 expression level differences in HeLa and HUVEC cells. (B) Overlay of TNFα-stimulated miR-155 low and high sort products showed an 8.7 fold difference in VCAM expression, as expected, because HeLa cells lack TNFα receptors.

Measure RNAi-mediated knockdown in live cells

Detecting changes in gene expression in individual, live cells is crucial when performing RNAi-mediated gene knockdown studies, in which it has traditionally been difficult to determine the cause of incomplete knockdown. Traditional methods of RNA detection (which measure average RNA levels) cannot distinguish between inefficient knockdown due to a poorly designed siRNA sequence, inefficient entry of the siRNA into target cells, or vast differences in endogenous gene expression within the target cells.

In contrast, SmartFlare™ RNA Detection Probes detect RNA at single cell resolution (Figure 3), thereby providing information on cell-to-cell variations in expression, knockdown and efficiency of siRNA entry. Such information may greatly facilitate the interpretation of analyses performed subsequent to RNAi treatment.

Also, SmartFlare™ technology makes it possible to sort cells and use them in downstream analyses, such as immunocytochemistry, flow cytometry and xenografts, potentially increasing the strength of observed correlations between gene expression and cell phenotype.

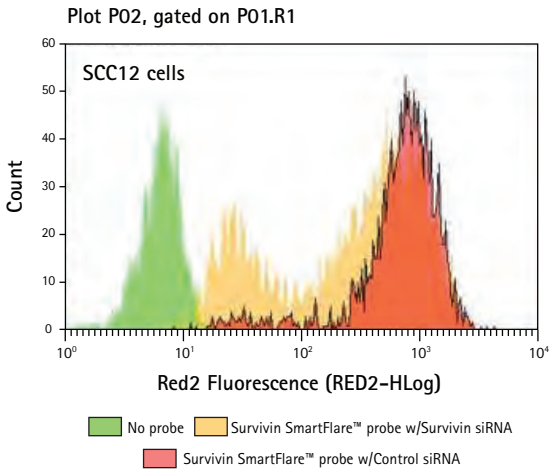


Figure 3.
Survivin mRNA levels detected in live, siRNA-treated SCC12 cells (yellow) using SmartFlare™ probes and flow cytometry reveals a bimodal distribution of survivin expression.

Endless possibilities, countless applications.

We and our customers are discovering the virtually limitless potential of SmartFlare™ probes. Our ever-expanding catalogue of ready-to-order probes include mRNAs and miRNAs relevant to cancer, development, signaling, epigenetics, neuroscience and more. We've used them for simultaneous detection of multiple RNAs, as well as for detection of both nucleic acids and proteins in the same live cells, providing links between the transcriptome and the proteome that were missing until now.

Visit our website to view more performance data, browse our complete selection of ready-to-order SmartFlare™ probes, or design your own.
www.merckmillipore.com/smartflare

Four steps to better chromatin immunoprecipitation

Chromatin immunoprecipitation (ChIP) is a powerful technique for studying protein-DNA complexes. Specific antibodies enrich for regions of chromatin that contain the protein of interest, and various detection methods are employed to detect specific DNA sequences within the enriched chromatin.

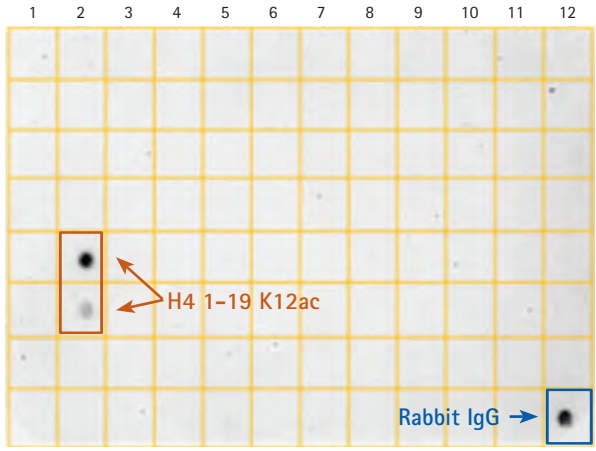
Accurate, reproducible ChIP results start with high quality chromatin and require robust and specific antibodies, reliable controls, and approaches that provide high levels of enrichment with low backgrounds. With an R&D group focused on ChIP innovation and improvement, Merck Millipore has developed the products for optimizing every step:

Step 1. Start with high-quality chromatin specifically optimized for ChIP.

PureEpi™ Chromatin Preparation and Optimization Kit: Discover the first kit specifically designed to produce high-quality chromatin for ChIP experiments. The PureEpi™ approach is detailed in the kit protocol, which addresses multiple chromatin isolation and fragmentation parameters that impact ChIP performance.

Step 2. Select the best performing antibodies and controls proven for ChIP.

ChIPAb+™ Antibodies: Get more than just standard ChIP antibodies with ChIPAb+™ kits. All ChIPAb+™ antibodies are rigorously validated in-house and quality controlled in ChIP, and include a matched negative control IgG antibody and a set of qPCR primers to a positive locus for guaranteed success in ChIP.



Specificity screening of anti-Acetyl Histone H4 (Lys12) using AbSurance™ arrays. The Histone H2A, H2B, H4 Array (Cat. No. 16-665) was probed with anti-acetyl histone H4 (Lys12) antibody (1:2000 dilution, Cat. No. 04-119). Peptides were visualized using a donkey anti-rabbit IgG, peroxidase-conjugated, H+L secondary antibody (Cat. No. AP182P) and a chemiluminescence detection system. Signal was only detected in replicate spots containing the target peptide and rabbit IgG positive control.

Step 3. Verify specificity of your antibody.

AbSurance™ Histone Antibody Specificity Arrays: Unlike Merck Millipore, not all suppliers rigorously evaluate the specificity of their antibodies. This simple dot blot approach allows any lab to evaluate histone antibody specificity in advance of critical experiments.

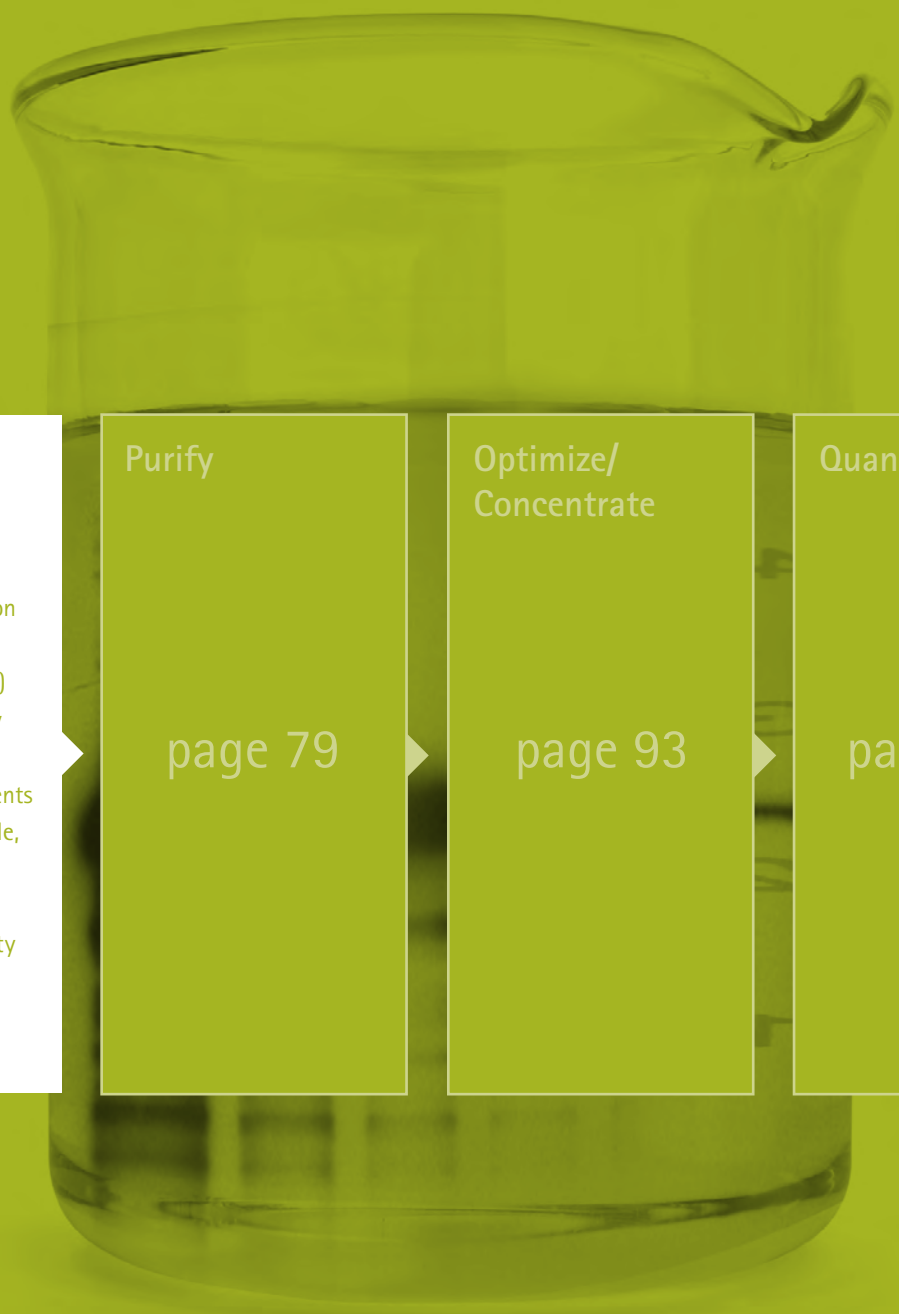
Step 4. Use a flexible immunoprecipitation approach that gives high levels of enrichment and low background.

Magna ChIP® HiSens Kit: This specialized A/G blend of Magna ChIP® beads and advanced SCW buffer system included in the new Magna ChIP® HiSens Kits deliver high signal and low noise from thousands of cells—or a million. Engineered to outperform any competing kit, and with proven performance for a range of sample types and amounts, the Magna ChIP® HiSens Kit may likely be the only ChIP kit you'll ever need.

See the complete selection of kits, assay, and antibodies for chromatin, DNA methylation and RNA analysis at: **www.merckmillipore.com/epigenetics**

Protein Sample Preparation

High purity and recovery mean better discovery—so start with the best tools for protein purification and preparation. Instead of arduous protocols, focus your efforts on exciting proteome analyses. From protein extraction and protein purification, to protein concentration and desalting, we facilitate every step of your sample preparation workflow with ultrafiltration devices, magnetic beads, extraction kits and more.



Extract

Choosing the right protein extraction protocol can depend on your sample type and your protein analyte(s) of interest. That's why we offer a complete, diverse range of reagents and enzymes for gentle, efficient cell lysis and protein extraction, preserving the integrity and activity of your target protein.

Purify

page 79

Optimize/ Concentrate

page 93

Quantify/Detect

page 111

Protein Extraction Reagents Application Guide

Product	Starting Material: Total Culture	Starting Material: Cell Pellet	Applications: HT Compatible	Applications: Analysis: 1D PAGE	Applications: Analysis: 2D PAGE	Applications: Analysis: IEF	Applications: Analysis: MS	Applications: Analysis: Western Blot	Applications: Analysis: Activity Assay	Applications: Purification	Comments
E. coli											
BugBuster® Protein Extraction Reagent		✔		✔	✔	✔		✔	✔	✔	Efficient protein extraction from *E. coli* under non-denaturing conditions. Extraction enhanced by the addition of rLysozyme™ Solution and Benzonase® Nuclease. Can be used on cell pellets from any size culture.
BugBuster® HT Protein Extraction Reagent		✔	✔	✔	✔	✔		✔	✔	✔	Rapid protein extraction and nucleic acid degradation. Ideal for processing many samples of any volume. Benzonase® Nuclease is premixed in the lysis reagent. Extraction enhanced by the addition of rLysozyme™ Solution.
BugBuster® Master Mix		✔	✔	✔	✔	✔		✔	✔	✔	BugBuster® Master Mix combines BugBuster® Protein Extraction Reagent with Benzonase® Nuclease and rLysozyme™ Solution. Convenient, all-in-one protein extraction reagent efficiently lyses bacteria and digests nucleic acids.
BugBuster® (primary amine-free) Extraction Reagent		✔		✔	✔	✔		✔	✔	✔	Ideal as an extraction method for purifying metal-dependent proteins or proteins to be used for immobilization or crosslinking. Extraction enhanced by the addition of rLysozyme™ Solution and Benzonase® Nuclease.
BugBuster® 10X Protein Extraction Reagent		✔		✔	✔	✔		✔	✔	✔	A concentrated form of BugBuster® Protein Extraction Reagent. Ideal for extraction when a specific buffer is required for protein stability. Extraction enhanced by the addition of rLysozyme™ Solution and Benzonase® Nuclease.
PopCulture® Reagent	✔		✔	✔				✔	✔	✔	Protein extraction from cells directly in the culture medium; no centrifugation required. Designed for small volumes. Extraction enhanced by the addition of rLysozyme™ Solution and Benzonase® Nuclease.
Yeast											
YeastBuster™ Protein Extraction Reagent		✔		✔				✔	✔	✔	Efficient protein extraction from yeast under non-denaturing conditions from any volume of culture. Add 0.5 M THP Solution (included) and Benzonase® Nuclease for enhanced efficiency.
Insect											
CytoBuster™ Protein Extraction Reagent		✔ +		✔	✔ **	✔ **		✔	✔	✔	Gentle lysis of insect cells with retention of protein activity for assays and purification. Can use with monolayers or pellets derived from suspension cultures.
Reportasol™ Extraction Buffer		✔ +	✔	✔	✔ **	✔ **		✔	✔ R		Optimized for maximal activity of reporter enzymes (β-gal, firefly, and *Renilla* luciferases). Passive lysis of monolayers.
Insect PopCulture® Reagent	✔		✔	✔				✔	✔	✔	Lysis of insect cells directly in serum-free medium. Ideal for expression screening of many small samples. Compatible with affinity purification.

Key:

1D PAGE = One-dimensional Polyacrylamide Gel Electrophoresis
MS = Mass Spectrometry
R = Reporter Assay
2D PAGE = Two-dimensional Polyacrylamide Gel Electrophoresis

+ = Cell pellet or adherent cells
* = SDS must be removed before IEF
IEF = Isoelectric Focusing G = Gel Shift
** = Salt must be removed before IEF

Protein Extraction Reagents Application Guide

Product	Starting Material: Total Culture	Starting Material: Cell Pellet	Applications: HT Compatible	Applications: Analysis: 1D PAGE	Applications: Analysis: 2D PAGE	Applications: Analysis: IEF	Applications: Analysis: MS	Applications: Analysis: Western Blot	Applications: Analysis: Activity Assay	Applications: Purification	Comments
Mammalian											
CytoBuster™ Protein Extraction Reagent		✔ +		✔	✔ **	✔ **		✔	✔	✔	Gentle lysis of mammalian cells with retention of protein activity for assays and purification. Can use with monolayers or pellets derived from suspension cultures.
Reportasol™ Extraction Buffer		✔ +	✔	✔	✔ **	✔ **		✔	✔		Optimized for maximal activity of reporter enzymes (β-gal, firefly, and *Renilla* luciferases). Passive lysis of adherent cells.
PhosphoSafe™ Extraction Reagent		✔ +	✔	✔	✔ **	✔ **	✔	✔	✔	✔	Ideal for extraction of phosphorylated proteins.
NucBuster™ Protein Extraction Kit		✔		✔ G	✔ **	✔ **		✔	✔	✔	Rapid isolation of nuclear protein fraction from mammalian cells. Ideal for electrophoretic mobility shift assays.
ProteoExtract® Mammalian Complete Proteome Extraction Kit		✔		✔	✔ *	✔ *	✔ *	✔			Total proteome extracted into one fraction.
ProteoExtract® Transmembrane Protein Extraction Kit		✔		✔	✔	✔	✔	✔	✔		Enables mild and efficient extraction of transmembrane proteins such as GPCRs.
ProteoExtract® Subcellular Proteome Extraction Kit		✔		✔	✔ (*)	✔ (*)	✔ (*)	✔	✔		Produces four native protein fractions based on subcellular localization.
ProteoExtract® Native Membrane Proteome Extraction Kit		✔		✔	✔	✔	✔	✔	✔		Produces two native protein fractions, membrane and non-membrane.
Lysis and Extraction Enhancement											
Gram-negative bacteria (*E. coli*)	rLysozyme™ Solution	✔	✔	✔	✔				✔	✔	✔	Cleaves bond in peptidoglycan layer of *E. coli* cell wall. Use alone or combined with BugBuster® or PopCulture® reagents for improved protein extraction. Use with Benzonase® Nuclease to reduce sample viscosity and degrade nucleic acids.
	Lysonase™ Bioprocessing Reagent	✔	✔	✔	✔				✔	✔	✔	Convenient mixture of rLysozyme™ Solution and Benzonase® Nuclease minimizes pipetting steps.
Gram-positive bacteria	Chicken Egg White Lysozyme Solution	✔	✔	✔	✔				✔	✔	✔	Cleaves bond in peptidoglycan layer of bacterial cell wall.
All cells	Benzonase® Nuclease	✔	✔	✔	✔				✔	✔	✔	Degrades all types of nucleic acids for more efficient protein extraction, faster chromotagraphy, and reduced interference in assays.

Key:

1D PAGE = One-dimensional Polyacrylamide Gel Electrophoresis
MS = Mass Spectrometry
R = Reporter Assay
2D PAGE = Two-dimensional Polyacrylamide Gel Electrophoresis

+ = Cell pellet or adherent cells
* = SDS must be removed before IEF
IEF = Isoelectric Focusing G = Gel Shift
** = Salt must be removed before IEF

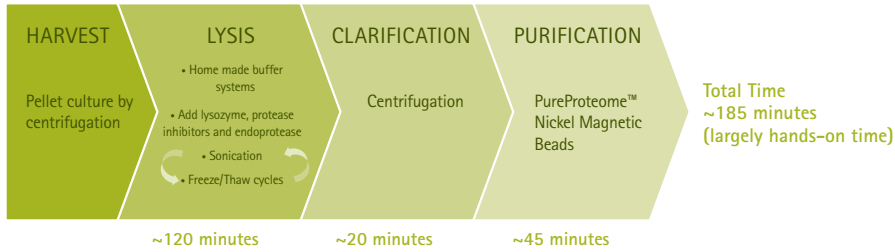
Automated purification of proteins from non-clarified lysate

We developed a one-step lysis protocol using BugBuster® Master Mix to gently disrupt the *E. coli* cell wall while simultaneously reducing lysate viscosity. Subsequently, PureProteome™ Nickel Magnetic Beads could be used to purify recombinant His-tagged proteins without lysate clarification. This "condensed" purification workflow can be automated on systems such as the KingFisher® particle processors, providing fast and reproducible results.

- Reproducible results with minimal hands-on time
- Significant time savings with high yields compared to the traditional workflow
- Magnetic beads eliminate the need to clarify lysates by centrifugation
- Automatable on platforms such as the KingFisher® particle processor

Learn more at:
www.merckmillipore.com/pureproteome

Panel A. Traditional recombinant protein purification workflow with mechanical lysis and clarification.



Panel B. Integrated lysis and purification of non-clarified lysate with magnetic beads.

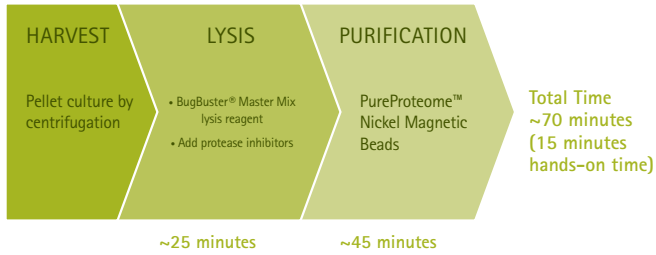


Figure 1. One-step lysate preparation without clarification (Panel B) saves considerable time compared to traditional recombinant protein purification, which requires manual lysis and lysate clarification (Panel A).

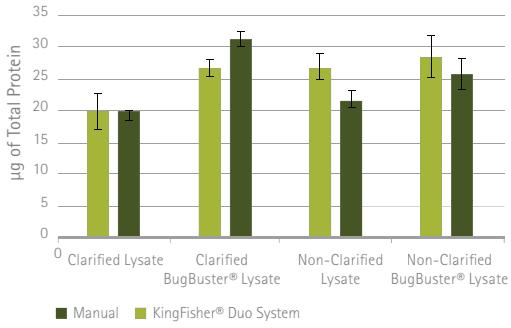


Figure 2. BugBuster® Master Mix generates higher yields of total protein upon purification. Automated processing generated yields comparable to manual processing, and omitting the clarification step provided similar yields.

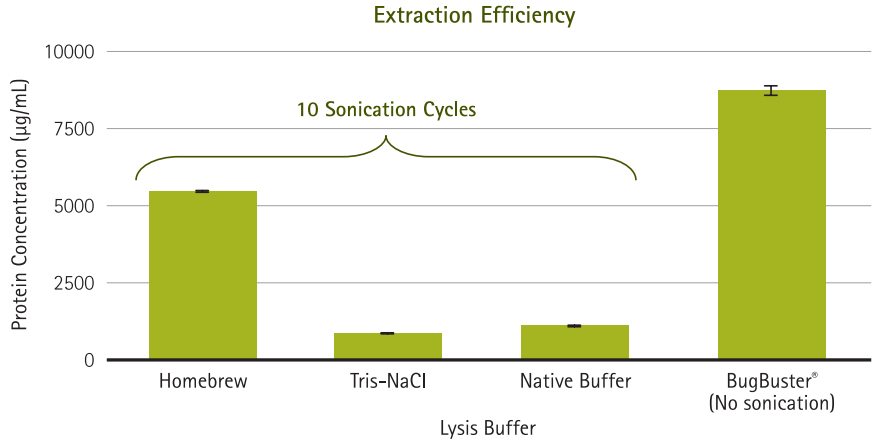
For BugBuster® Master Mix ordering information, please refer to page 71.
For EDTA-free inhibitor cocktail ordering information, please refer to page 76.

BugBuster® Protein Extraction Reagents

Bacterial cell lysis

For gentle, efficient, non-mechanical extraction of soluble proteins from bacterial cells, use BugBuster® Protein Extraction Reagents. This proprietary, innovative, Tris-buffer based mixture of non-ionic and zwitterionic detergents and other ingredients is capable of perforating cell walls without denaturing protein. It provides a simple, rapid, low-cost alternative to mechanical methods, such as French Press or sonication, for releasing expressed target protein for purification or other applications. Simply add the BugBuster® Reagent to your cell pellet and incubate at room temperature for 10 minutes.

Product Performance



Higher extraction efficiency of BugBuster® reagent (with added Benzonase® nuclease and rLysozyme™ solution), even without sonication, compared to three other lysis buffers that were used with 10 cycles of sonication. Cleared cell lysates were spotted on assay cards and quantified using the Direct Detect® spectrometer. Bars represent mean and standard deviation (n=3).

Features & Benefits

- No special sample preparation or instruments are needed
- Standard reagent is supplied as a Tris-buffered "1X" ready-to-use liquid
- Stable at room temperature
- Performance can be enhanced using Benzonase® Nuclease and rLysozyme™ Solution
- Fully compatible with GST•Bind™, Ni-NTA His•Bind®, S•Tag™, Strep•Tactin, and T7•Tag® Resins, or several other chromatography matrices for affinity purification

Applications

Protein Extraction, Protein Sample Preparation, Bacterial Cell Lysis

Ordering Information

Description	Components	Qty/Pk	Catalogue No.
BugBuster® Master Mix	BugBuster® Protein Extraction Reagent, Benzonase® Nuclease, and rLysozyme™ solution in one convenient reagent. For 20 g cell paste	100 mL	71456-3
	BugBuster® Protein Extraction Reagent, Benzonase® Nuclease, and rLysozyme™ solution in one convenient reagent. For 100 g cell paste	500 mL	71456-4
BugBuster® Protein Extraction Reagent	Tris-buffered 1X	100 mL	70584-3
		500 mL	70584-4
BugBuster® Reagent Plus Benzonase® Nuclease	500 mL BugBuster® Reagent and 10 KU Benzonase® Nuclease, Purity >90%. Benzonase® Nuclease is supplied in 50% glycerol containing 50 mM Tris-HCl, 20 mM NaCl, and 2 mM $MgCl_2$, pH 8.0.	1 kit	70750-3
BugBuster® Plus Lysonase™ Kit	100 mL BugBuster® Reagent and 0.2 mL Lysonase™ Bioprocessing Reagent. Use 5 mL BugBuster® Reagent with 10 µL Lysonase™ Reagent. For 20 g cell paste.	1 kit	71370-3
	500 mL BuBuster® Reagent and 1 mL Lysonase™ Bioprocessing Reagent. Use 5 mL BugBuster® Reagent with 10 µL Lysonase™ Reagent. For 100 g cell paste.	1 kit	71370-4
BugBuster® HT Protein Extraction Reagent	BugBuster® Protein Extraction Reagent and Benzonase® Nuclease in one convenient reagent; ideally suited for high-throughput protein purifications.	100 mL	70922-3
		500 mL	70922-4
		1 L	70922-5
BugBuster® (Primary Amine-Free) Extraction Reagent	PIPPS-buffered 1X; will not complex metal ions	100 mL	70923-3
		500 mL	70923-4
BugBuster® 10X Protein Extraction Reagent	10X concentrated formulation of proprietary detergents employed in BugBuster® Reagent without buffer components, allowing user-defined dilution to control pH, reagent concentration, and buffer additives.	10 mL	70921-3
		50 mL	70921-4
		100 mL	70921-5
BugBuster® GST•Bind™ Purification Kit	2 x 100 mL BugBuster® Protein Extraction Reagent; 10,000 U Benzonase® Nuclease, purity >90%; 10 mL GST•Bind™ resin; pkg/4 Chromatography Columns; 2 x 100 mL 10X GST•Bind™/ Wash Buffer; 40 mL 10X Glutathione Reconstitution Buffer; 1 g Glutathione, reduced	1 kit	70794-3

Ordering Information – Continued

Description	Components	Qty/Pk	Catalogue No.
BugBuster® His•Bind® Purification Kit	2 x 100 mL BugBuster® Protein Extraction Reagent; 10,000 U Benzonase® Nuclease, purity >90%; 10 mL His•Bind® resin; 1 His•Bind® Buffer kit; pkg/4 Chromatography Columns	1 kit	70793-3
BugBuster® Ni-NTA His•Bind® Purification Kit	2 x 100 mL BugBuster® Protein Extraction Reagent; 10,000 U Benzonase® Nuclease, purity >90%; 10 mL Ni-NTA His•Bind® resin; pkg/4 Chromatography Columns	1 kit	70751-3
PopCulture® Reagent	Buffered mixture of concentrated detergents formulated to extract proteins from *E. coli* cells directly in their culture medium.	15 mL	71092-3
		75 mL	71092-4
		250 mL	71092-5

Note: BugBuster® Protein Extraction Reagent is compatible with Protease Inhibitors.

For more information visit: www.merckmillipore.com/psp

CytoBuster™ Protein Extraction Reagent

Mammalian and insect cell lysis

Optimized for efficient extraction of soluble, functionally active proteins from mammalian and insect cells, CytoBuster™ Reagent is a gentle, non-ionic formulation that eliminates the need for sonication or freeze/thaw cycling. CytoBuster™ Reagent has been specifically formulated for Western blotting, immunoprecipitation and kinase/phosphatase assays. The reagent is compatible with protease, kinase and phosphatase inhibitors. Related products include the NucBuster™ Kit for nuclear protein extraction in less than 30 minutes, PhosphoSafe™ Reagent for extracting cytosolic proteins while preserving their phosphorylation state and Reportasol™ Buffer for extracting maximal reporter enzyme activity.

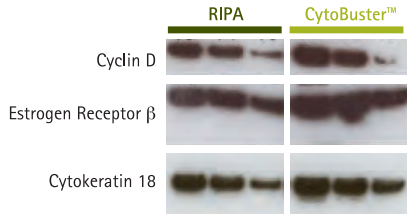
Features & Benefits

- Obtain extracts of native protein from mammalian and insect cells in 5 minutes
- Stable at room temperature
- No need for sonication or freeze/thaw steps

Applications

Protein Extraction, Protein Sample Preparation, Mammalian Cell Lysis, Insect Cell Lysis

Product Performance



More efficient release and/or preservation of breast cancer biomarkers from MCF-7 cells using CytoBuster™ reagent. Immunodetection of cyclin D1 (top panel), estrogen receptor β (middle panel) and cytokeratin 18 (bottom panel) in MCF-7 cell lysates prepared with RIPA buffer or CytoBuster™ reagent.

Ordering Information

Description	Applications	Components	Qty/Pk	Catalogue No.
CytoBuster™ Protein Extraction Reagent*	Mammalian and insect cells	1 bottle	50 mL	71009-3
		5 bottles	100 mL	71009-4
NucBuster™ Protein Extraction Reagent	100 preparations of nuclear extract from 1 x 10^7 to 5 x 10^7 mammalian cells	2 x 7.5 mL NucBuster™ Extraction Reagent 1; 7.5 mL NucBuster™ Extraction Reagent 2; 100 µL 100 mM DTT; 1 set Protease Inhibitor Cocktail Set 1 (lyophilized, makes 100 µL)	1 kit	71183-3
PhosphoSafe™ Extraction Reagent**	Mammalian and insect cells	1 bottle	25 mL	71296-3
		5 bottles	125 mL	71296-4
Reportasol™ Extraction Buffer	Mammalian and insect cells	1 bottle	25 mL	70909-3
		5 bottles	125 mL	70909-4
Insect PopCulture® Reagent	Insect cells	Buffered mixture of concentrated detergents formulated to extract proteins from insect cells directly in their culture medium.	50 mL	71187-3
			250 mL	71187-4

*CytoBuster™ Protein Extraction Reagent is compatible with protease, kinase, and phosphatase inhibitors.

**Phosphosafe™ Reagent includes 4 phosphatase inhibitors: sodium fluoride, sodium vanadate, β-glycerophosphate, and sodium pyrophosphate. Compatible with kinase assays and other applications.

For more information visit: www.merckmillipore.com/psp

YeastBuster™ Protein Extraction Reagent

Yeast cell lysis

For fast, reproducible and gentle extraction of active proteins from yeast and plant cells, use YeastBuster™ Protein Extraction Reagent. This reagent avoids the harsh conditions of vigorous mechanical or chemical treatment that often result in degradation of target proteins. Harvest cells and resuspend in YeastBuster™ protein extraction reagent, incubate for 15 minutes and then remove cell debris by centrifugation. Your extract is now ready to use. The reagent has been tested with *Saccharomyces cerevisiae*, *Pichia pastoris*, *P. stipidis*, and *Schizosaccharomyces pombe* strains and with plant cells.

Features & Benefits

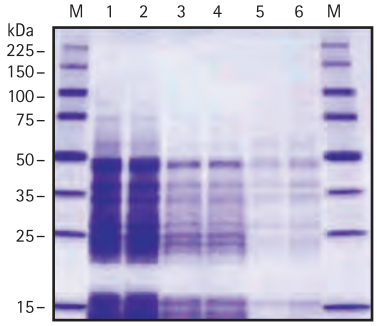
- Eliminates the inconsistencies associated with abrasive grinding, ultrasonication, and pressure disruption of yeast cells
- Higher yield of total and enzymatically active proteins
- Efficient protein extraction from yeast under non-denaturing conditions from any volume of culture
- Add 0.5 M THP Solution (included) and Benzonase® Nuclease for enhanced efficiency
- Fully compatible with Ni-NTA His•Bind® and GST•Bind™ affinity purification method

Applications

Protein Extraction, Protein Sample Preparation, Yeast Cell Lysis, Plant Cell Lysis

Product Performance

A. SDS-PAGE



Lane	Sample
M	Perfect Protein™ Markers, 10-225 kDa
1	5 µL YeastBuster™ Extract
2	5 µL YeastBuster™ Extract
3	5 µL Competitor Reagent Extract
4	5 µL Competitor Reagent Extract
5	5 µL Glass Bead Extract
6	5 µL Glass Bead Extract

B. Protein and Reporter Assays

	YeastBuster™	Competitor	Glass Beads
Protein (mg/mL)	6.1	3.2	0.65
GST (ΔA_{310}/min)	0.071	0.023	0.007
β-gal (ΔA_{310}/min)	0.113	0.003	0.187

YeastBuster™ Protein Extraction Reagent releases more total protein and more recombinant protein activity than another commercial reagent and glass bead extraction. (A) *S. cerevisiae* cells containing a recombinant plasmid expressing a 35.6 kDa GST•Tag/His•Tag fusion protein were grown at 30 °C, induced and harvested at OD_{600} of 1.2. Equal volumes of cells were aliquoted and pelleted. Pellets were resuspended in respective extraction reagents supplemented with protease inhibitors. The YeastBuster™ Reagent also included 0.01 volume 100X THP Solution. After initial resuspension by pipetting, samples were agitated at room temperature for 20 min. For glass bead extraction, pellets were resuspended in lysis buffer and ~50 µL glass beads, and vortexed on high for 4 min with intermittent chilling on ice. Samples were centrifuged at 16,000 × g for 5 min prior to SDS-PAGE. (B) Total protein extracted by the three methods was determined using Non-Interfering Protein Assay™ Kit. GST activity was determined using GST•Tag Assay Kit. β-gal activity was determined using the host expressing *lac*Z. Samples of the extracts were assayed using the BetaRed™ β-Gal Assay Kit. Data reflect the average of duplicate assays.

Ordering Information

Description	Components	Qty/Pk	Catalogue No.
YeastBuster™ Protein Extraction Reagent*	100 mL YeastBuster™ Protein Extraction Reagent 1 mL 100X THP Solution	100 mL	71186-3
	500 mL YeastBuster™ Protein Extraction Reagent 5 mL 100X THP Solution	500 mL	71186-4
0.5 M THP Solution	0.5 M Solution in water, >80% purity by NMR	1 mL	71194-3
	0.5 M Solution in water, >80% purity by NMR	5 x 1 mL	71194-4

*YeastBuster™ extracts are fully compatible with GST•Bind™ and Ni-NTA His•Bind® IMAC purification methods.

For more information visit: www.merckmillipore.com/psp

Benzonase® Nuclease and rLysozyme™ Solution for Extraction

Enhancers of cell lysis and nucleic acid removal

Remove nucleic acids from and reduce viscosity of protein extracts with Benzonase® Nuclease, a genetically engineered endonuclease from *Serratia marcescens*. It eliminates all forms of DNA and RNA (single-stranded, double-stranded, circular or linear) more efficiently than DNase I without affecting proteins. The enzyme is functional over a wide range of conditions and possesses an exceptionally high specific activity. Adding rLysozyme™ Solution, a highly purified recombinant lysozyme, which degrades bacterial cell walls, enhances extraction efficiency, especially for larger proteins. rLysozyme™ Solution exhibits 250 times higher specific activity than chicken egg white lysozyme.

Features & Benefits

- Increase protein extraction efficiency and facilitate downstream processing of protein extracts with the combined activities of rLysozyme™ Solution and Benzonase® Nuclease
- Effectively reduce viscosity and remove nucleic acids from protein solutions
- Effective over a wide range of conditions and has an exceptionally high specific activity
- Convenient: Available in two purity grades (ultrapure >99% and pure >90%) and in two concentrations (standard at 25 U/µL and high concentration, HC, 250 U/µL)
- Versatile: Compatible with a variety of lysis reagents such as BugBuster® and CytoBuster™ reagents to eliminate viscosity and increase protein yields

Applications

Elimination of Nucleic Acids and Viscosity From Recombinant Proteins, Enhanced Protein Purification, Increased Gel Resolution, Prevention of Cell Clumping

Specifications

Description	Product Details	Concentration	Specific Activity
Benzonase® Nuclease, purity >99%	Effective viscosity reduction and removal of nucleic acids from protein solutions	25 U/µL	1 x 10^6 units/mg protein
Benzonase® Nuclease HC, purity >99%		250 U/µL	1 x 10^6 units/mg protein
Benzonase® Nuclease, purity >90%		25 U/µL	1 x 10^6 units/mg protein
Benzonase® Nuclease HC, purity >90%		250 U/µL	1 x 10^6 units/mg protein
rLysozyme™ Solution	Stabilized recombinant lysozyme	30 KU/µL	250X greater than chicken egg white lysozyme
Chicken Egg White Lysozyme Solution	Ready-to-use, stabilized lysozyme solution	10 mg/mL	
Lysonase™ Bio-Processing Reagent	Convenient blend of rLysozyme™ Solution and Benzonase® Nuclease		

Ordering Information

Description	Qty/Pk	Catalogue No.
Benzonase® Nuclease, purity >99%	10 KU	70664-3
Benzonase® Nuclease HC, purity >99%	25 KU	71206-3
Benzonase® Nuclease, purity >90%	10 KU	70746-3
	2.5 KU	70746-4
Benzonase® Nuclease HC, purity >90%	25 KU	71205-3
rLysozyme™ Solution	300 KU	71110-3
	1200 KU	71110-4
	6000 KU	71110-5
Chicken Egg White Lysozyme Solution	10 x 1 mL	71412-3
Lysonase™ BioProcessing Reagent	0.2 mL	71230-3
	1 mL	71230-4
	5 x 1 mL	71230-5

Note: Benzonase® Nuclease is available in bulk quantities. Please inquire.

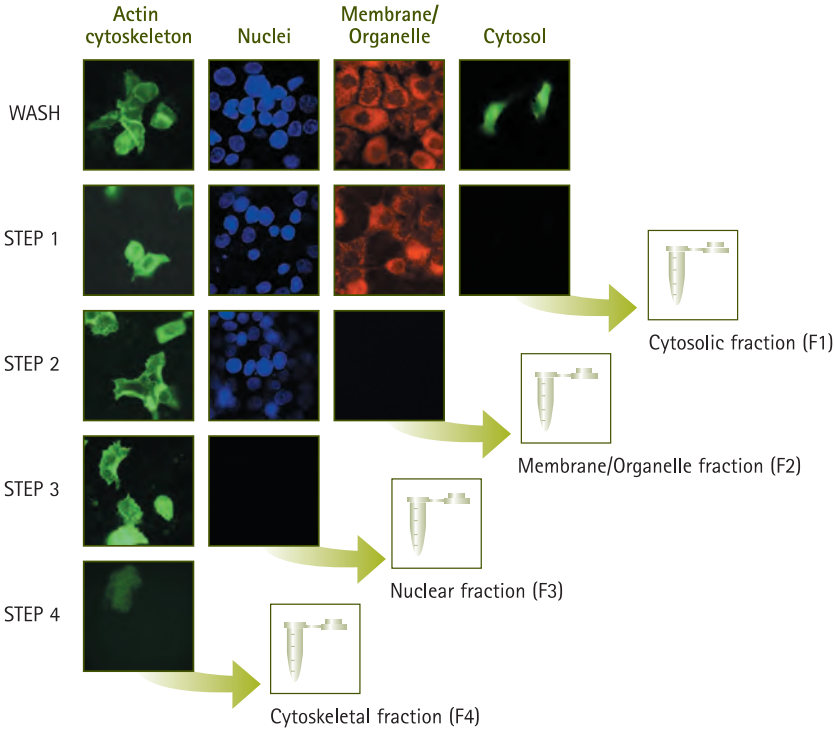
For more information visit: www.merckmillipore.com/psp

ProteoExtract® and ProteoEnrich™ Kits

Sample preparation for proteomics

The ProteoExtract® and ProteoEnrich™ kits cover the different steps in proteomics sample preparation, from protein extraction and abundant protein removal to concentration of protein mixtures, removal of interfering substances, digestion of proteins, selective capturing of phosphorylated peptides, and selective enrichment for specific protein classes. All kits are compatible with each other. Many kits are designed to produce samples that can be used directly in applications such as activity assays, protein microarrays, SDS-PAGE, immunoblotting, ELISA, 2D gel electrophoresis, mass spectrometry (MS; including MS/MS, LC-MS, MALDI-MS, SELDI-MS, and ESI-MS), and others.

Product Performance



Four distinct protein fractions separated using S-PEK. A431 cells were incubated with DAPI (nuclei), phallicidin (to stain actin) and MitoTracker™, extracted and monitored by fluorescence microscopy. These results show that the sequential extraction results in a stepwise degradation of the cell's structure yielding 4 subcellular fractions. In cases where a loss of signal was observed following the extraction, phase contrast images were recorded of the identical field to prove that cells or cell remnants were still present.

Features & Benefits

- Efficient and reproducible protein extraction
- Protease inhibitor cocktail improves results in 2D gel electrophoresis
- Better spot resolution facilitated by nucleic acid digestion with protease-free Benzonase® nuclease
- Designed for compatibility with many applications including activity assays, Western blots, 1D and 2D PAGE, and mass spectrometry
- Optimized protocols for different biological samples

Applications

Cell Fractionation and Organelle Isolation, Membrane Protein Extraction, Subcellular Protein Fractionation, Cytosol/Mitochondria Protein Fractionation, Cytoskeleton Enrichment, Enhancing Resolution of Low-Abundance Proteins, Abundant Protein Removal, Albumin/IgG Depletion, Glycopeptide and Phosphopeptide Enrichment

Ordering Information

Description	Applications	Qty/Pk	Catalogue No.
ProteoExtract® Subcellular Protein Extraction Kit	Organelle Fractionation	20 reactions	539790
ProteoExtract® S-PEK Antibody Control Kit	Organelle Fractionation	1 kit	71771-3
ProteoExtract® Complete Mammalian Protein Extraction Kit	Organelle Fractionation	20 reactions	539779
ProteoExtract® Cytosol/Mitochondria Fractionation Kit	Organelle Fractionation	100 extractions	QIA88
ProteoExtract® Native Cytoskeleton Enrichment Kit	Organelle Fractionation	32 assays	17-10210
ProteoExtract® Cytoskeleton Enrichment and Isolation Kit	Organelle Fractionation	15 reactions	17-10195
ProteoExtract® Native Membrane Protein Extraction Kit	Membrane Proteins	20 reactions	444810
ProteoExtract® Transmembrane Protein Extraction Kit	Membrane Proteins	20 reactions	71772
ProteoExtract® All-in-One Trypsin Digestion Kit	Mass Spec Peptide Enrichment	100 digests	650212

Ordering Information – Continued

Description	Applications	Qty/Pk	Catalogue No.
ProteoExtract® Glycopeptide Enrichment Kit	Mass Spec Peptide Enrichment	50 enrichment reactions	72103
ProteoExtract® Phosphopeptide Enrichment TiO_2 Kit	Mass Spec Peptide Enrichment	100 reactions	539722
ProteoEnrich® CAT-X Kit	Mass Spec Peptide Enrichment	2 cartridges; each resuable up to 10x	71532-3
ProteoExtract® Albumin Removal Kit	Albumin and IgG Depletion	12 samples	122640
ProteoExtract® Albumin Removal Kit Maxi	Albumin and IgG Depletion	20 samples	122641
ProteoExtract® Albumin/IgG Removal Kit	Albumin and IgG Depletion	12 samples	122642
ProteoExtract® Albumin/IgG Removal Kit Maxi	Albumin and IgG Depletion	20 samples	122643
ProteoExtract® Tissue Dissociation Buffer Kit	Other	10 reactions	539720
ProteoExtract® Collagenase Set	Other	1 kit	71777-3
ProteoExtract® Protein Precipitation Kit	Other	200 precipitations	539180

For more information visit: www.merckmillipore.com/psp

Calbiochem® Protease and Phosphatase Inhibitor Cocktails

Pre-mixed cocktails preserve protein sample integrity

Protease and phosphatase inhibitors are essential for maintenance of expressed proteins and subsequently for their characterization, biomarker discovery, mapping of post-translational modifications and protein quantification. Calbiochem® protease and phosphatase inhibitor cocktails are provided as ready-to-use, no-waste liquid stock solutions with complete formulation details. Choose the product that's designed for your specific application.

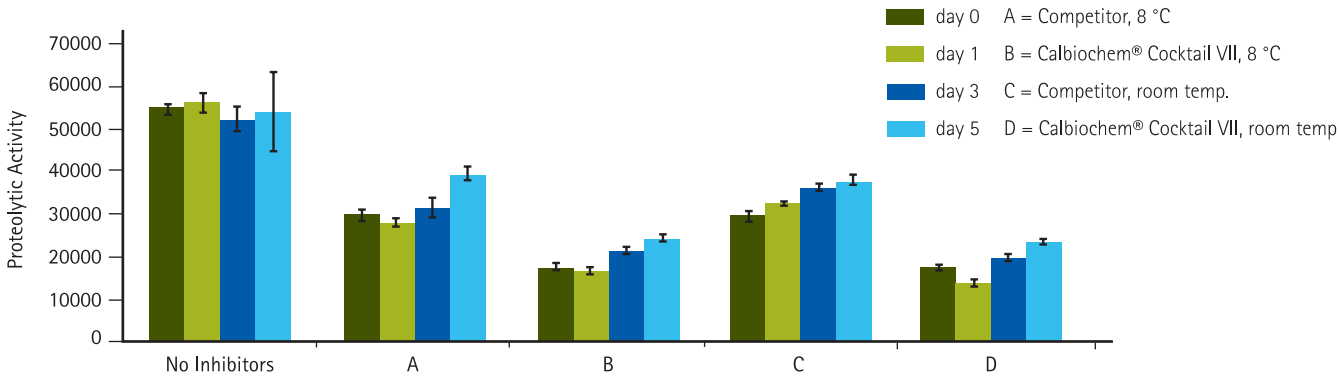
Features & Benefits

- Ready-to-use, waste-free liquid formulations for greater convenience
- Stringent quality control for reproducibility and excellent inhibition over a wide range of protease classes
- Full disclosure of formulations and a comprehensive selection of specific cocktails optimized for most tissue or cell type extracts ensures greater experimental flexibility

Applications

Protein Sample Preparation and Preservation, Signal Transduction Studies, Western Blotting

Product Performance



Increased efficiency and stability of Calbiochem® protease inhibitor dilutions compared to a competitor tablet. Protease inhibitors (Competitor or Calbiochem® Cocktail VII, Catalogue No. 539138)were diluted to their working concentration in BugBuster® lysis reagent.Addition of protease inhibitor cocktails inhibits the protease PRONASE®(Cat. No. 537088), resulting in reduced fluorescence when measured using the Universal HT Protease Assay. On day 1, for samples incubated at 8 °C, the competitor tablet inhibited the proteolytic activity by 50% and the Calbiochem® Cocktail VII inhibited it by 70%. On day 5, for samples incubated at 8 °C, the competitor tablet caused a 29% decrease in proteolytic activity in comparison to the Calbiochem® cocktail VII, which caused a 57% decrease.

Ordering Information

Description	Recommended Applications	Catalogue No.
Protease Inhibitor Cocktail Set I	General use	539131
Protease Inhibitor Cocktail Set II	Bacterial cell extracts (except those intended for metal chelation chromatography)	539132
Protease Inhibitor Cocktail Set III, EDTA-Free	Mammalian cells and tissue extracts purified using metal chelation chromatography; samples to be analyzed by 2D gel electrophoresis	539134
Protease Inhibitor Cocktail Set IV	Fungal and yeast cell extracts	539136
Protease Inhibitor Cocktail Set V, EDTA-Free	Mammalian cells and tissue extracts purified using metal chelation chromatography; samples to be analyzed by 2D gel electrophoresis	539137
Protease Inhibitor Cocktail Set VI	Plant cell extracts	539133
Protease Inhibitor Cocktail Set VII	Proteins containing His•Tag® sequences	539138
Serine Protease Inhibitor Cocktail Set I	Broad-range serine protease inhibition	565000
Phosphatase Inhibitor Cocktail Set I	Protection against alkaline phosphatases and Ser/Thr phosphatases such as PP1 and PP2A	524624
Phosphatase Inhibitor Cocktail Set II	Protection against acid and alkaline phosphatases and Protein Tyrosine Phosphatases (PTPs)	524625
Phosphatase Inhibitor Cocktail Set III	Protection against acid, alkaline and Ser/Thr phosphatases and PTPs	524627
Phosphatase Inhibitor Cocktail Set IV	Protection against alkaline phosphatases and Ser/Thr phosphatases such as PP1 and PP2A	524628
PhosphoSafe™ Extraction Reagent	Protection against Ser/Thr phosphatases and PTPs	71296

For more information visit: www.merckmillipore.com/inhibitors

Calbiochem® Buffers and Detergents for Protein Extraction

Don't just rely on good fortune, use high quality products you can trust

Benefit from a wide selection of Calbiochem® buffers and detergents, each tailored for specific applications. For greater flexibility some buffers and detergents can be purchased either as solids or as ready-to-use solutions.

Features & Benefits

- Wide selection of buffers and detergents tailored for specific applications
- Stringent quality testing to ensure lot-to-lot consistency
- Suitable for research labs, as well as production facilities

Applications

Protein Sample Preparation, Western Blotting

Ordering Information

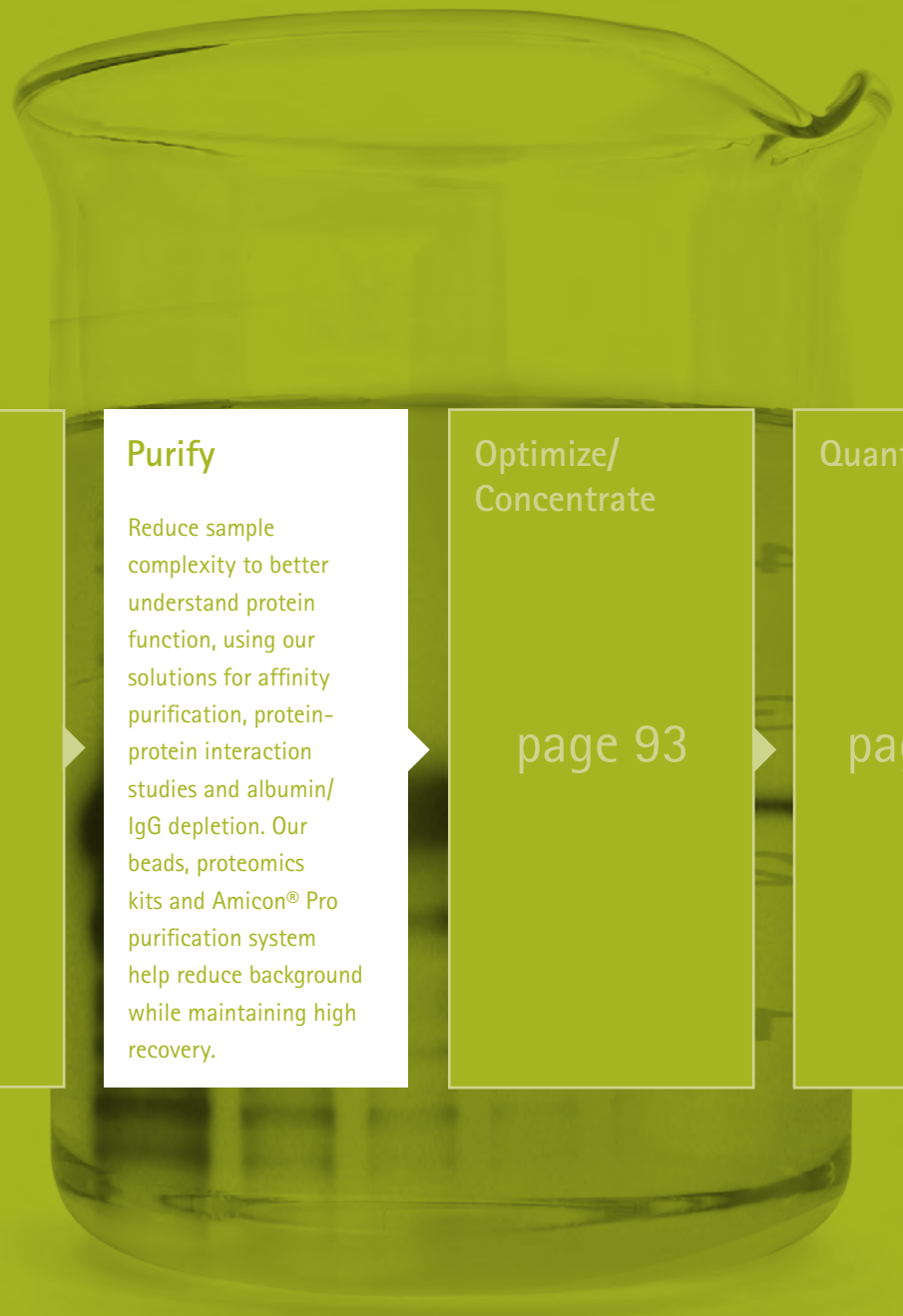
Description	Qty/Pk	Catalogue No.
Calbiochem® Buffers		
Triethylammonium Acetate, 1M solution	1 L	625718
HEPES, free acid, ULTROL® grade solution	25 g, 100 g, 500 g, 1 kg, 5 kg	391338
PBS Tablets	10 tablets	524650
Calbiochem® Detergents		
ZWITTERGENT® 3-14 Detergent	5 g, 25 g, 100 g, 500 g	693017
Digitonin, high purity	250 mg, 1 g, 5 g	300410
CHAPS	1 g, 5 g, 10 g, 25 g, 250 g, 1 kg	220201

Note: Visit our website for a complete product listing.

For more information visit: www.merckmillipore.com/biochemicals


50,000
NMWCO
µL
1500
1000
500
250

Protein Sample Preparation



Extract

page 67

Purify

Reduce sample complexity to better understand protein function, using our solutions for affinity purification, protein-protein interaction studies and albumin/IgG depletion. Our beads, proteomics kits and Amicon® Pro purification system help reduce background while maintaining high recovery.

Optimize/ Concentrate

page 93

Quantify/Detect

page 111

Amicon® Pro Purification System

Purify, exchange buffer and concentrate in one device

Traditional protein purification is a long process with many steps and multiple devices. Avoid the risks associated with sample transfer and reduce hands-on time when you bind, wash, elute and/or concentrate your protein in the all-in-one Amicon® Pro purification system. The device combines affinity-based spin column purification with downstream sample concentration and buffer exchange. Featuring a large reservoir that accommodates a range of sample volumes, the device reduces the need for multiple centrifugation steps. Simply attach the included Amicon® Ultra filter for simultaneous elution, concentration and highly efficient buffer exchange (>99%) in a single spin.

Features & Benefits

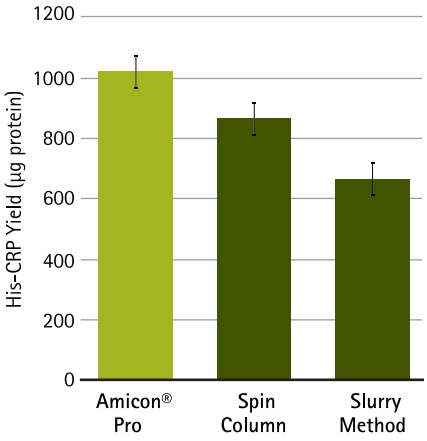
- High yield: No sample transfer means no sample loss
- Gentle: Novel design enables gentle, continuous flow for efficient buffer exchange
- Fast: Go from lysate to purified protein, in buffer of your choice, in just 5 spins
- Flexible: Configure the modular device to fit a range of sample prep needs

Applications

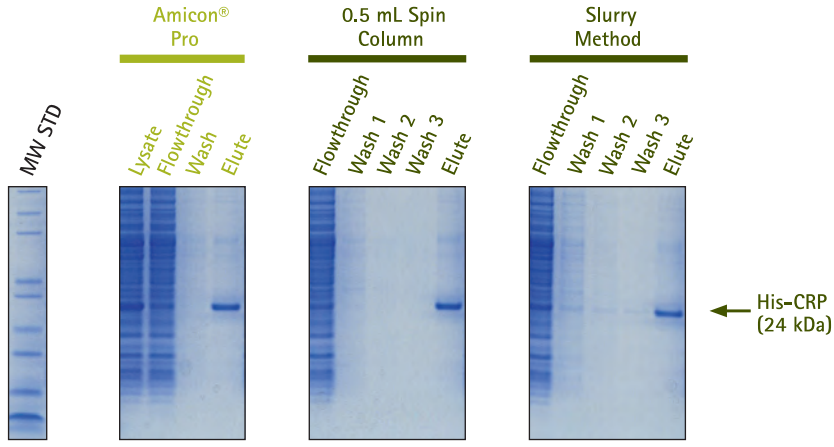
Affinity Purification, Depletion of Abundant Proteins, Protein Enrichment, Buffer Exchange, Desalting, Clean-up of Antibody Labeling Reactions

Product Performance

A.



B.



Better yield, equal protein purity from Amicon® Pro purification compared to two traditional affinity purification schemes. In each case, 100 µL settled resin was used to purify His-CRP from 0.5 mL *E coli* lysate. (A) The graph shows the difference in total protein yield (His-CRP) from the three different bind-wash-elute methods. Bars represent the average of 12 (Amicon® Pro), 6 (0.5 mL spin column), or 4 (slurry method) independent tests. (B) A representative gel showing the various fractions derived during purification using the three methods being compared.

Specifications

Amicon® Pro Application	Protocol Steps	Maximum Capacity	Benefits[4]
Purification with Buffer Exchange and/ or Concentration	Bind Clear and Wash Elute/Concentrate +/- Buffer Exchange	200 µL packed resin[1]	Speed No sample transfer - No loss Improved yield
Purification Only	Bind Clear and Wash Elute	1000 µL packed resin[2]	Range of sample volumes can be processed
Buffer Exchange	Buffer Exchange +/- Concentrate	Variable input[3]	Speed Improved activity of purified protein
Antibody Labeling	Buffer Exchange Labeling Reaction Wash and Concentrate +/- Buffer Exchange	Variable antibody input[3]	Speed No sample transfer - No loss Improved yield Read application note
Depletion or Enrichment	Bind Deplete/Concentrate +/- Wash/Concentrate +/- Buffer Exchange	200 µL packed resin[1]	Speed No sample transfer - No loss

[1] The assay capacity is dictated by the processing limitations of the Amicon® Ultra 0.5 mL device.

[2] The Bind-Wash-Elute protocol is linearly scalable (50-1000 µL).

[3] Capacity depends on diafiltration centrifugation protocol.

[4] Benefits are relative to other current methods.

Ordering Information

Description	MWCO	Qty/Pk	Catalogue No.
Amicon® Pro Purification Kits			
Amicon® Pro Affinity Concentration Kit Ni-NTA	3,000	12	ACK5003NT
	10,000	12	ACK5010NT
	30,000	12	ACK5030NT
	50,000	12	ACK5050NT
	100,000	12	ACK5100NT
Amicon® Pro Affinity Concentration Kit Protein A	3,000	12	ACK5003PA
	10,000	12	ACK5010PA
	30,000	12	ACK5030PA
	50,000	12	ACK5050PA
	100,000	12	ACK5100PA
Amicon® Pro Affinity Concentration Kit Protein G	3,000	12	ACK5003PG
	10,000	12	ACK5010PG
	30,000	12	ACK5030PG
	50,000	12	ACK5050PG
	100,000	12	ACK5100PG
Amicon® Pro Affinity Concentration Kit GST	3,000	12	ACK5003GS
	10,000	12	ACK5010GS
	30,000	12	ACK5030GS
	50,000	12	ACK5050GS
	100,000	12	ACK5100GS

Description	MWCO	Qty/Pk	Catalogue No.
Amicon® Pro Purification System – No Reagents Included			
Amicon® Pro Purification System	3,000	12	ACS500312
		24	ACS500324
	10,000	12	ACS501012
		24	ACS501024
	30,000	12	ACS503012
		24	ACS503024
	50,000	12	ACS505012
		24	ACS505024
	100,000	12	ACS510012
		24	ACS510024
Amicon® Pro Purification System – No Filters Included			
Amicon® Pro Purification System (excluding filter)	N/A	24	ACS500024
Reagent Kit Only			
Ni-NTA Reagent Kit	N/A	1	ACR5000NT
Protein A Reagent Kit	N/A	1	ACR5000PA
Protein G Reagent Kit	N/A	1	ACR5000PG
GST Reagent Kit	N/A	1	ACR5000GS

For more information visit: **www.merckmillipore.com/amiconpro**

Simultaneous lysis and capture using the Amicon® Pro system expedites purification of bacterially expressed recombinant proteins

The standard protein purification workflow involves extraction, affinity-based capture, and sample optimization (Figure 1). Traditional mechanical lysis methods are tedious and harsh, leading to diminished protein integrity and prep-to-prep variability. Gravity-driven agarose columns are frequently used for affinity purification. While easy to manipulate, columns may clog due to debris or high lysate viscosity, so necessitating the clarification of the lysate before it is added to the column. Moreover, final optimization of buffer composition and protein concentration requires a separate device, increasing the risk of sample loss. Here, we demonstrate a condensed workflow, combining the bacterial cell lysis and affinity capture steps (Figure 1). This is made possible by the gentle, detergent-based BugBuster® Master Mix lysis reagent, which includes Benzonase® nuclease for reducing lysate viscosity, and the Amicon® Pro purification system, which directly links affinity-based spin column purification with buffer exchange and concentration.

Following resuspension of bacterial cell pellets in BugBuster® Master Mix, all steps were performed within the Amicon® Pro device. Cell pellets were converted to purified, concentrated protein in the correct buffer for downstream application. This workflow requires fewer process steps and less total time without sacrificing yield or sample purity (Figures 2 and 3). Confining the sample to a single device reduces loss and minimizes inter-prep variation.

For Amicon® Pro System ordering information, see page 80.
For BugBuster® Master Mix ordering information, see page 71.

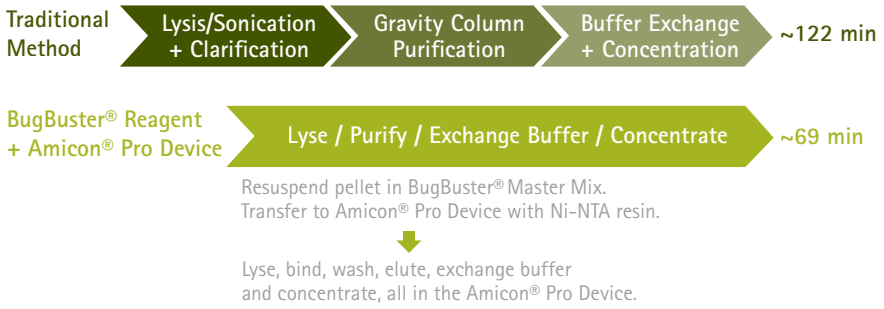


Figure 1. Condensing the recombinant protein purification workflow. Compared to traditional purification involving mechanical lysis (sonication), affinity purification using gravity columns, plus additional devices for final sample formulation, less time is required for combined chemical lysis/capture/sample optimization, using BugBuster® Master Mix and the Amicon® Pro system.

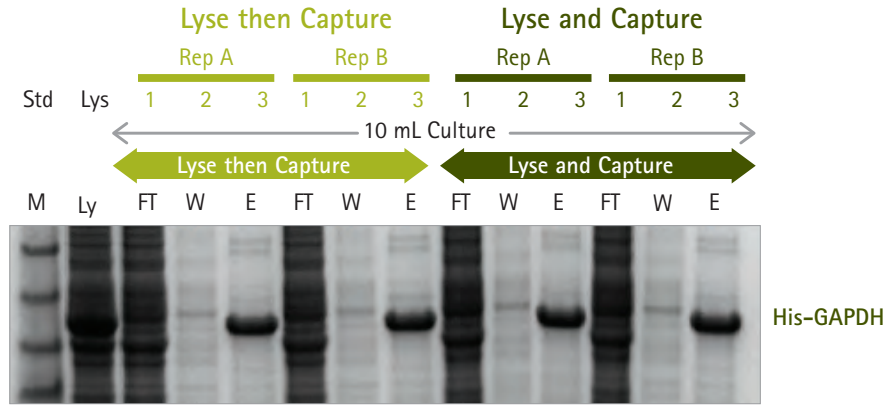


Figure 2. Combined lysis and capture maintains protein yield and purity. For "Lyse then Capture", a cell pellet was resuspended in BugBuster® Master Mix, lysed by agitation, clarified by centrifugation and purified in the Amicon® Pro device. For "Lyse and Capture," a replicate pellet was resuspended in BugBuster® Master Mix and then mixed with resin in the Amicon® Pro device without clarification. Fractions were analyzed by SDS-PAGE. **Lanes:** Std - molecular weight standard, Lys - lysate pre-passage, 1 - flowthrough, 2 – wash fraction, and 3 – elution fraction.

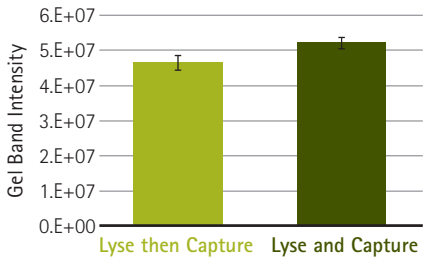


Figure 3. Relative protein recovery in the respective elution fractions was determined by gel densitometry. For each method, the bar represents the average of four individual replicate purifications. On average, for a 10 mL pellet, "Lyse and Capture" resulted in approximately 10% greater his-GAPDH yield than the "Lyse then Capture" method.

Agarose-Based Affinity Purification

IP and antibody purification

Protein A and Protein G are proteins of microbial origin that bind specifically but differently to mammalian immunoglobulins. When coupled to agarose, they provide an efficient tool for purification and immunoprecipitation (IP) of antibodies. Protein A agarose binds to the Fc region of IgG from a variety of species and can be used to purify classes, subclasses, and fragments of Igs and to isolate immune complexes. Protein G agarose is useful for binding to Igs that do not bind Protein A and can be used for antibody IP for purifying Igs and IgG fractions. Combining Protein A and Protein G agarose is a good strategy for exploiting the power of both Ig binding affinities in a single reagent.

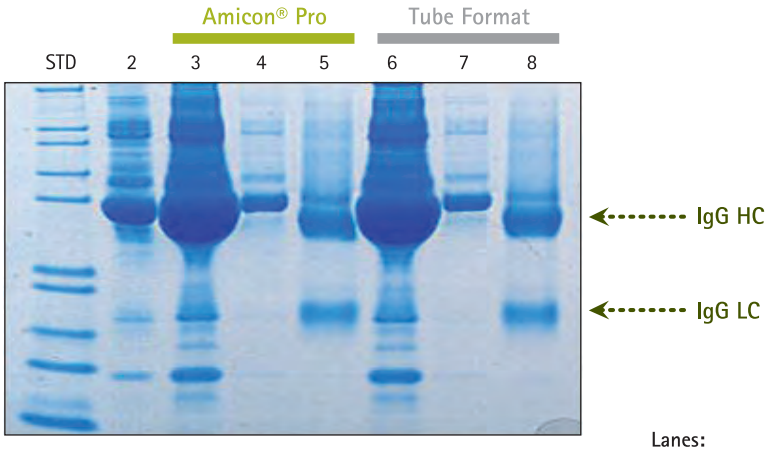
Features & Benefits

- Agarose beads with either immobilized Protein A, Protein G, or a mixture of Protein A and G for optimal affinity
- Compatible with Amicon® Pro purification system
- High binding capacity and low ligand leaching
- Two convenient formats, one for purification in column or batch mode and the other is a ready to-use suspension containing BSA for IP applications

Applications

Immunoprecipitation, Affinity Purification, Antibody Purification

Product Performance



100 µL Protein A beads were mixed with 1 mL rabbit serum (1:10 diluted) and IgG was purified by standard tube protocol or using an Amicon® Pro device. IgG purification was near complete using either method.

Lanes:
2: Serum,
3 and 6: Flowthrough
4 and 7: Wash fraction
5 and 8: Eluted fraction

Ordering Information

Description	Product Details	Qty/Pk	Catalogue No.
Protein A			
Protein A Agarose Suspension	Pre-blocked for IP	1.5 mL	IP02-1.5ML
Protein A Agarose	Purification of mouse IgG_{2a} and IgG_{2b}	10 mL	16-125
Protein A Agarose Fast Flow	Purification of mouse IgG_{2a} and IgG_{2b}	10 mL	16-156
Protein G			
Protein G Agarose Fast Flow	Purification of mouse IgG_1 and IgG_3 and rat IgG	10 mL	16-266
Protein G Plus Agarose Suspension	Pre-blocked for IP	1.5 mL	IP04-1.5ML
Protein A/G Mix			
Protein G Plus/Protein A Suspension	Pre-blocked for IP	1.5 mL	IP05-1.5ML
Protein G Plus/Protein A	Purification of mouse IgG and rat IgG	10 mL	IP10-10ML
Montage® Antibody Purification Kits			
Montage® Antibody Purification Kit with PROSEP®-A Media	High capacity pre-packed spin columns	20 purifications	LSK2ABA20
Montage® Antibody Purification Kit with PROSEP®-G Media	High capacity pre-packed spin columns	20 purifications	LSK2ABG20

For more information visit: www.merckmillipore.com/psp

Agarose Selector Guide

Description	Size	Recommended for Amicon® Pro System	Supplied As:	Binding Capacity	Application	Cat No.
Protein A Agarose Suspension	1.5 mL	+	30% slurry	Use 15 µL suspension/ µg antibody	IP: pre-blocked with BSA. Not for purification	IP02-1.5ML
Protein A Agarose	10 mL	++	50% slurry	20 ± 2 mg human IgG/mL settled agarose	IP; affinity purification	16-125
Protein A Agarose Fast Flow	10 mL	+	50% slurry; highly cross-linked 6% agarose beads	40 mg human IgG/mL agarose	Medium and low pressure chromatography (flow rates 50 - 300 cm/h)	16-156
Protein G Agarose Fast Flow	10 mL	++	50% slurry; highly cross-linked 4% agarose beads	20 mg human IgG/mL agarose	Medium and low pressure chromatography (flow rates 50 - 300 cm/h)	16-266
Protein G Plus Agarose Suspension	1.5 mL	+	30% slurry	Use 15 µL suspension/ µg antibody	IP: pre-blocked with BSA. Not for purification	IP04-1.5ML
Protein G Plus/ Protein A Suspension	1.5 mL	+	30% slurry	Use 15 µL suspension/ µg antibody	IP: pre-blocked with BSA. Not for purification	IP05-1.5ML
Protein G Plus/ Protein A Agarose	10 mL	+	50% slurry	Use 5-10 mL of packed beads per mL serum	Antibody purification	IP10-10ML
Streptavidin Agarose	10 mL	+	50% slurry	1.5 to 2.5 mg/mL of biotinylated rabbit IgG	IP; column or batch purification of biotinylated molecules	16-126
Streptavidin Agarose	5 mL	+	50% slurry	> 85 nmol free biotin/mL	IP; column or batch purification of biotinylated molecules	69203-3
His•Bind® Resin	10 mL	+	Uncharged IDA agarose resin	8 mg/mL bed volume	Uncharged resin: User can charge with metal ion of choice. Small to medium scale purifications using either gravity flow columns or batch method	69670-3
	50 mL	+				69670-4
	100 mL	+				69670-5
His•Bind® Buffer Kit	1 kit	+	**Separate vials of:** Bind, Wash, Elution, Stripping, and Charging Buffers	n/a	Solutions are included for Ni^{2+} charging, binding, washing and elution of up to ten 2.5 mL columns	69755-3
His•Bind® Purification Kit	1 kit	(comes with chromatography columns)	• 10 mL His•Bind® Resin • 1 His•Bind® Buffer Kit • pkg/4 Chromatography Columns	8 mg/mL bed volume	Small scale purifications using gravity flow columns	70239-3
Ni-NTA His•Bind® Resin	10 mL	++	50% slurry	5–10 mg His•Tag® fusion protein per mL resin	One-step gravity flow purification of proteins containing a His•Tag® sequence	70666-3
	25 mL	++				70666-4
	100 mL	++				70666-5
Ni-NTA His•Bind® Superflow™ Resin	10 mL	+	50% slurry		Compatible with FPLC	70691-3
	25 mL	+				70691-4
	100 mL	+				70691-5
BugBuster® Ni-NTA His•Bind® Purification Kit	1 kit	(comes with chromatography columns)	**Separate vials of**: BugBuster® Protein Extraction Reagent; Benzonase® Nuclease, purity >90%; Ni-NTA His•Bind® Resin; Chromatography Columns	5–10 mg His•Tag® fusion protein per mL resin	Gentle lysis of *E. coli* to release soluble protein and one-step gravity flow purification of proteins containing a His•Tag® sequence	70751-3
BugBuster® His•Bind® Purification Kit	1 kit	(comes with chromatography columns)	**Separate vials of**: BugBuster® Protein Extraction Reagent; Benzonase® Nuclease, Purity >90%; His•Bind® Resin; His•Bind® Buffer Kit; Chromatography Columns	8 mg/mL bed volume	Gentle lysis of *E. coli* to release soluble protein and one-step gravity flow purification of proteins containing a His•Tag® sequence	70793-3
Ni-NTA Buffer Kit	1 kit	++	**Separate vials of**: Ni-NTA Bind Buffer, Ni-NTA Wash Buffer, Ni-NTA Elute Buffer	n/a	Set of buffers optimized for purification of His•Tag® fusion proteins on Ni-NTA His•Bind® Resin. These phosphate-buffered solutions differ from the Tris-based solutions used in the His•Bind® Buffer Kit	70899-3

■ Tested
■ Recommended, but not tested

Agarose Selector Guide

Description	Size	Recommended for Amicon® Pro System	Supplied As:	Binding Capacity	Application	Cat No.
GST•Bind™ Resin	10 mL	++	50% slurry	5–8 mg GST•Tag™ fusion protein per 1 mL settled resin	Column or batch format purification of recombinant glutathione S-transferase (GST) fusion proteins or native glutathione S-transferase or glutathione-binding proteins	70541-3
	50 mL	++				70541-4
	25 mL	++				70541-5
BugBuster® GST•Bind™ Purification Kit	1 kit	(comes with chromatography columns)	**Separate vials of**: BugBuster® Protein Extraction Reagent; Benzonase® Nuclease; GST•Bind™ Resin; Chromatography Columns; GST Bind/Wash and Reconsititution Buffers Glutathione, Reduced		Gentle lysis of *E. coli* to release soluble protein and purification of recombinant glutathione S-transferase (GST) fusion proteins or native glutathione S-transferase or glutathione-binding proteins	70794-3
GST•Bind™ Buffer Kit	1 kit	++	**Separate vials of**: GST Bind/Wash Buffer; Glutathione Reconstitution Buffer; Glutathione, Reduced	n/a	Set of pretested buffers for binding, washing and elution of GST•Tag fusion proteins from GST•Bind™ Resin or GST•Mag™ Agarose Beads	70534-3
Strep•Tactin Superflow Agarose	2 mL	+	50% slurry	50-100 nmol/mL settled resin, or up to 3 mg of 30 kDa protein per mL settled resin	Low pressure and FPLC chromatography	71592-3
	10 mL	+				71592-4
Strep•Tactin Buffer Kit	1 kit	+	**Separate vials of**: Strep•Tactin Wash, Elution, and Regeneration Buffers	n/a	Pretested buffers for use with Strep•Tactin Resins to purity Strep•Tag® II fusion proteins	71613-3
Strep•Tactin SpinPrep™ Kit	1 kit	(prepacked mini spin columns)	• 25 Strep•Tactin SpinPrep™ Columns and Collection Tubes • Separate vials of Strep•Tactin Wash Buffer and Elution Buffer	Each column purifies up to 150 µg of Strep•Tag® II fusion protein	Purification of Strep•Tag® II fusion proteins using mini spin columns	71608-3
D-Desthiobiotin	1 g	+	lyophilized powder	n/a	Gentle elution of Strep•Tag® II proteins from the biotin-binding site of Strep•Tactin® resins	71610-3
T7•Tag® Affinity Purification Kit	1 kit	(comes with chromatography columns)	**Separate vials of**: T7•Tag® Antibody Agarose; T7•Tag® Bind/Wash Buffer, Elution Buffer, and Neutralization Buffer; Chromatography Column	> 300 µg T7•Tag® β-galactosidase per mL of settled resin	Rapid immunoaffinity purification of target proteins that carry the T7•Tag® sequence (i.e., the amino terminal 11 aa of the T7 gene 10 protein)	69025-3
T7•Tag® Antibody Agarose	2 mL	+	50% slurry			69026-3
S-Protein Agarose	2 mL	+	50% slurry	The capacity varies and is based on the size and folding characteristics of a given target protein	Purification of S•Tag™ fusion proteins	69704-3
	10 mL	+				69704-4
S•Tag™ Thrombin Purification Kit	1 kit	(comes with spin columns)	**Separate vials of**: S-protein Agarose; Bind/Wash Buffer; Thrombin Cleavage Buffer; Biotinylated Thrombin; Streptavidin Agarose; Spin Filters			69232-3
S•Tag™ rEK Purification Kit	1 kit	(comes with spin columns)	**Separate vials of**: S-protein Agarose; Bind/Wash Buffer; rEK Dilution/Storage Buffer; Recombinant Enterokinase; EKapture™ Agarose; Spin Filters			69065-3

■ Tested
■ Recommended, but not tested

Agarose Purification of Recombinant Fusion Proteins

His•Tag®, GST•Tag, S•Tag™, Strep•Tag II, and T7•Tag®

For recombinant proteins, the addition of fusion tags using appropriate expression vectors enables affinity purification by a number of strategies. Here we showcase products specifically designed for the rapid purification of fusion proteins containing His•Tag®, GST•Tag, S•Tag™, Strep•Tag II, and T7•Tag® sequences. These products are optimized for purification of proteins expressed in bacterial, yeast, insect, or mammalian systems. Reagents and kits are available in a variety of configurations, providing convenient options.

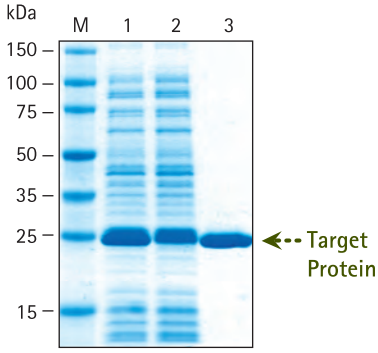
Features & Benefits

- Resins available for purification of a variety of fusion tags
- Compatible with Amicon® Pro purification system
- Optimized for purification of proteins expressed in bacterial, yeast, insect, or mammalian systems
- Convenient variety of kits and resin formats available
- Premium quality fusion tag monoclonal antibodies and Western blot kits also available

Applications

Affinity Purification of Tagged Recombinant Fusion Proteins

Product Performance



Lane M: Marker
Lane 1: BugBuster® Extract
Lane 2: Flowthrough
Lane 3: Eluate

GST•Bind™ purification. A crude extract containing unfused GST was applied to a 2 mL GST•Bind™ Resin column. Total protein yield after purification was 8 mg/mL resin.

Ordering Information

Description	Product Details	Qty/Pk	Catalogue No.
His-Tag Purification			
His•Bind® Resin	Easily charged with metal ion of choice. Reusable many times. Compatible with His•Bind® Buffer Kit. Compatible with 1 mM THP	10 mL	69670-3
		50 mL	69670-4
		100 mL	69670-5
His•Bind® Buffer Kit	Solutions for up to ten 2.5-mL columns	1 kit	69755-3
His•Bind® Purification Kit	Contains resin and buffers for small scale purification using gravity-flow columns	1 kit	70239-3
BugBuster® His•Bind® Purification Kit	Convenient preparation of extracts and affinity purification of His•Tag® fusion proteins	1 kit	70793-3
Ni-NTA His•Bind® Resin	Minimal Ni^{2+} leaching. Compatible with 20 mM 2-ME and 1 mM THP. Compatible with Ni-NTA Buffer Kit	10 mL	70666-3
		25 mL	70666-4
		100 mL	70666-5
Ni-NTA His•Bind® Superflow™ Resin	Minimal Ni^{2+} leaching. Compatible with 20 mM 2-ME and 1 mM THP. Compatible with Ni-NTA Buffer Kit. High flow rates and pressures	10 mL	70691-3
		25 mL	70691-4
		100 mL	70691-5
Ni-NTA Buffer Kit	Set of 4X pretested buffers compatible with Ni-NTA His•Bind® resins	1 kit	70899-3
BugBuster® Ni-NTA His•Bind® Purification Kit	Convenient preparation of extracts and affinity purification of His•Tag® fusion proteins	1 kit	70751-3

Ordering Information – Continued

Description	Product Details	Qty/Pk	Catalogue No.
GST-Tag Purification			
GST•Bind™ Resin	Can be reused up to 6 times without loss of capacity	10 mL	70541-3
		50 mL	70541-4
		25 mL	70541-5
BugBuster® GST•Bind™ Purification Kit	Convenient preparation of soluble extracts and affinity purification of GST•Tag fusion proteins	1 kit	70794-3
GST•Bind™ Buffer Kit	Sufficient components for up to ten 2.5-mL GST•Bind™ columns	1 kit	70534-3
Strep-Tag II Purification			
Strep•Tactin Superflow Agarose	Resuable 3-6 times. Compatible with 1 M urea or guanidine, 2% Triton® X-100, 0.1% SDS, and 50 mM DTT or 2-ME	2 mL	71592-3
		10 mL	71592-4
Strep•Tactin Buffer Kit	Set of 10X pretested buffers for use with Strep•Tactin resins	1 kit	71613-3
Strep•Tactin SpinPrep™ Kit	Compatible with 1 M urea or guanidine, 2% Triton® X-100, 0.1% SDS, and 50 mM DTT or 2-ME	1 kit	71608-3
D-DESTHIOBIOTIN	Lyophilized powder	1 g	71610-3
T7-Tag Purification			
T7•Tag® Affinity Purification Kit	Buffer included to limit protein exposure to low pH. Beads are reusable >5 times without loss of binding activity	1 kit	69025-3
T7•Tag® Antibody Agarose	Column or batch purification methods. Beads are reusable >5 times without loss of binding activity	2 mL	69026-3
S-Tag Purification			
S-Protein Agarose	Specifically retains S•Tag™ fusion proteins	2 mL	69704-3
		10 mL	69704-4
S•Tag™ Thrombin Purification Kit	Sufficient reagents provided for purification of up to 1 mg target protein under native or denaturing conditions	1 kit	69232-3
S•Tag™ rEK Purification Kit	Sufficient reagents provided for purification of up to 1 mg target protein under native or denaturing conditions	1 kit	69065-3
Streptavidin			
Streptavidin Agarose Conjugate	Routinely evaluated by immunoprecipitating tyrosine-phosphorylated proteins from a RIPA lysate prepared from EGF-stimulated A431 cells with a biotinylated monoclonal phosphotyrosine antibody (Catalogue No. 16-103)	10 mL	16-126
Streptavidin Agarose	No detectable protease, DNase, or RNase contamination	5 mL	69203-3

For more information visit: **www.merckmillipore.com/psp**

PureProteome™ Magnetic Beads

Magnetic bead-based isolation of proteins

For extremely fast and easy protein purification, stick with PureProteome™ magnetic beads. These magnetic bead purification systems feature low, non-specific binding and minimal sample loss. Conventional purification methods require centrifugation to pellet, followed by careful aspiration to avoid losing sample. Magnetic beads are isolated using a magnetic stand, enabling total removal of buffers and complete recovery of beads with no sample loss.

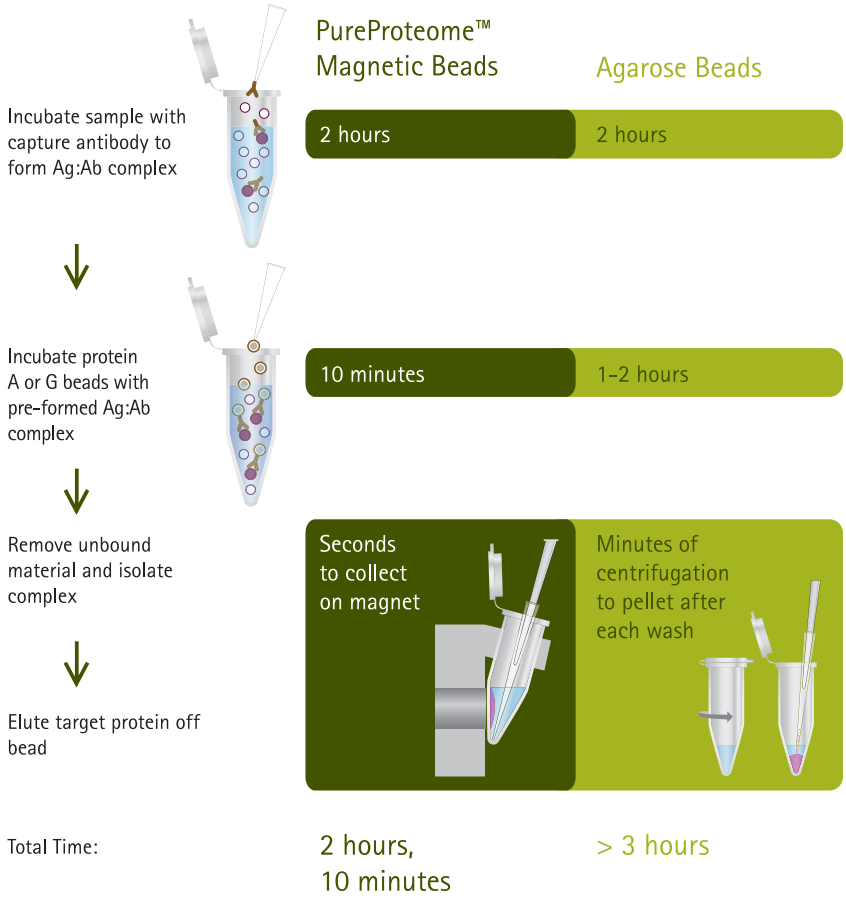
Features & Benefits

- High capacity: Advanced chemistry combined with high surface area provides more binding sites for proteins
- Consistent results with no sample loss: Particles visible as they adhere to side of tube for quick and easy aspiration and complete buffer removal
- Fast processing time: Beads are immobilized in seconds. Increased kinetics of bead-protein binding enables shorter incubations
- Economical: Significantly more affordable than competitive magnetic beads

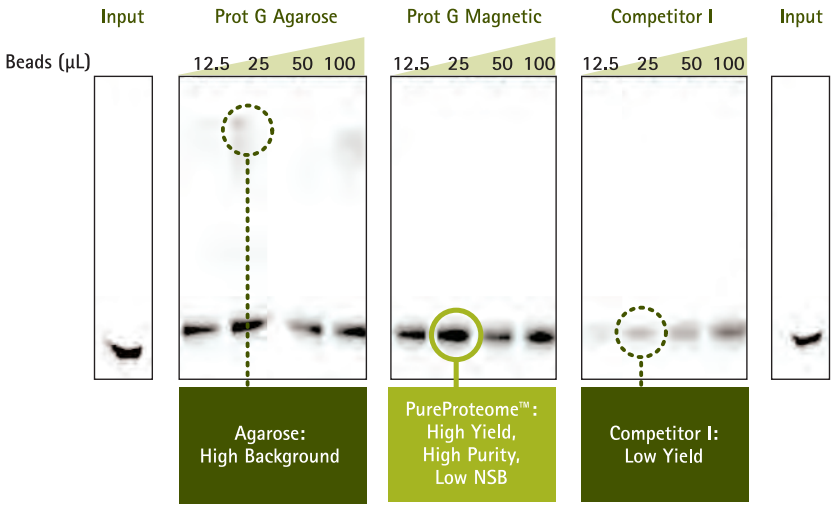
Applications

Immunoprecipitation, Affinity Purification, Recombinant Protein Purification, Biotinylated Molecule Isolation, Depletion/Enrichment, Antibody Purification, Fab Purification

Product Performance



High speed immunoprecipitation with magnetic beads compared to agarose. In parallel indirect immunoprecipitations, PureProteome™ magnetic beads offered a 50% reduction in incubation time while yielding results equivalent to agarose beads.



PureProteome™ Protein G magnetic beads outperform the competition in immunoprecipitation. Compared to traditional agarose beads and Competitor I Protein G magnetic beads, PureProteome™ magnetic beads provide higher protein yield with virtually no background binding. HEK293 cells were transfected with a ~20 kDa protein. Cell lysates were mixed with various volumes of protein G beads and rabbit serum containing antibody specific to the 20 kDa protein. After overnight incubation at 4 °C, beads were washed and resuspended in sample buffer. The bead-bound protein fraction was detected by Western blotting. Data courtesy of University of Washington (Department of Pharmacology) Seattle, WA.

Ordering Information

Description	Qty/Pk	Catalogue No.
Conjugated Beads		
PureProteome™ Protein A Magnetic Bead System	2 x 1 mL	LSKMAGA02
	10 mL	LSKMAGA10
PureProteome™ Protein G Magnetic Bead System	2 x 1 mL	LSKMAGG02
	10 mL	LSKMAGG10
PureProteome™ Protein A/G Mix Magnetic Beads	2 x 1 mL	LSKMAGAG02
	10 mL	LSKMAGAG10
PureProteome™ Albumin Magnetic Beads	10 mL	LSKMAGL10
PureProteome™ Kappa Ig Binder Magnetic Beads	2 x 1 mL	LSKMAGKP02
PureProteome™ Lambda Ig Binder Magnetic Beads	2 x 1 mL	LSKMAGLM02
PureProteome™ Nickel Magnetic Bead System	2 x 1 mL	LSKMAGH02
	10 mL	LSKMAGH10
PureProteome™ Streptavidin Magnetic Bead System	2 x 1 mL	LSKMAGT02
	10 mL	LSKMAGT10
Active Chemistry Beads		
PureProteome™ NHS FlexiBind Magnetic Beads Kit	0.5 mL	LSKMAGN01
PureProteome™ NHS FlexiBind Magnetic Bead System	4 x 0.5 mL	LSKMAGN04
PureProteome™ 0.3 µm Carboxy FlexiBind Magnetic Bead System	2 x 1 mL	LSKMAG03CBX02
	10 mL	LSKMAG03CBX10
PureProteome™ 1.0 µm Carboxy FlexiBind Magnetic Bead System	2 x 1 mL	LSKMAG1CBX02
	10 mL	LSKMAG1CBX10
PureProteome™ 2.5 µm Carboxy FlexiBind Magnetic Bead System	2 x 1 mL	LSKMAG25CBX02
	10 mL	LSKMAG25CBX10
Depletion Kits		
PureProteome™ Human Albumin/Immunoglobulin Depletion Kit	1 kit	LSKMAGHDKIT
PureProteome™ Albumin/IgG Depletion Kit	1 kit	LSKMAGD12
Magnetic Stands		
PureProteome™ Magnetic Stand, 8 tube capacity	1	LSKMAGS08
PureProteome™ Magnetic Stand, 2 x 15 mL tube capacity	1	LSKMAGS15

For more information visit:
www.merckmillipore.com/pureproteome

Site-Specific Proteases and Cleavage Capture Kits

Factor Xa, Thrombin, rEnterokinase, HRV 3C

Remove fusion tags with restriction-grade site-specific proteases (e.g., Thrombin, Biotinylated Thrombin, Factor Xa, HRV 3C protease, Tag•off™ High Activity recombinant enterokinase [rEK], and rEK) and cleavage capture kits. EKapture™ and Xarrest™ agaroses are used for the removal of rEKs and Factor Xa, respectively, following cleavage of fusion proteins. Biotinylated thrombin is removed with streptavidin agarose and HRV 3C is removed with Ni-NTA agarose.

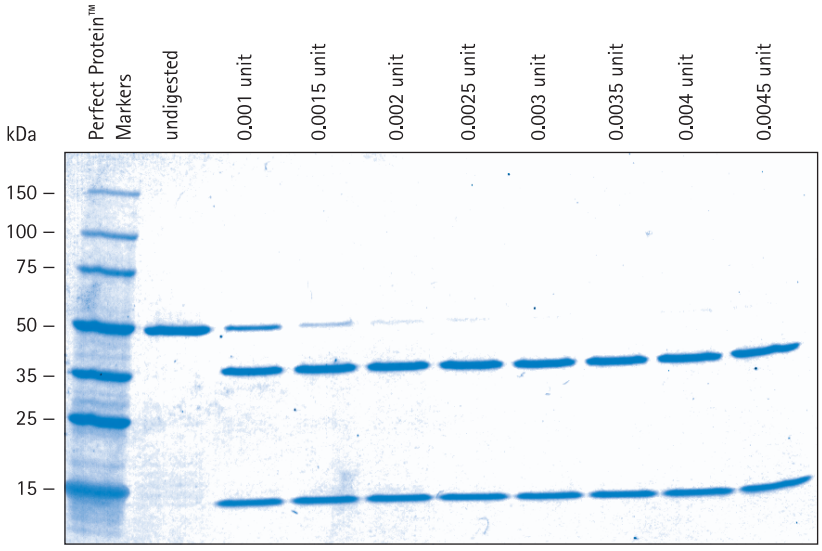
Features & Benefits

- Highly efficient, specific cleavage of fusion proteins
- Recombinant proteases (such as rEK) have higher activity than native protein
- Highly purified
- Functionally tested for activity, free of detectable contaminating proteases
- Supplied with cleavage control protein and buffers
- Capture kits also available

Applications

Removal of Fusion Tags

Product Performance



Biotinylated Thrombin cleavage. The indicated amounts of Biotinylated Thrombin were used to cleave 2 µg of Cleavage Control Protein in an overnight digestion. Samples were analyzed by SDS-PAGE (4–20% gradient gel) followed by staining with Coomassie blue. The 0.0045-unit lane represents a 2.25-fold over-digestion.

Specifications

Description	Components	Unit Definition	Recognition Sequence
Thrombin			
Restriction-Grade Thrombin	50 U Thrombin; 1 mL 10X Thrombin Cleavage Buffer; 2 mL 1X Thrombin Dilution/Storage Buffer; 10 µg Cleavage Control Protein	One unit is defined as the amount of enzyme needed to cleave 1 mg of fusion protein in 16 hours at 20 °C in a 200 µL reaction containing 20 mM Tris-HCl pH 8.4, 150 mM NaCl, 2.5 mM $CaCl_2$, 50 µg fusion protein.	LeuValProArg ↓ GlySer
Biotinylated Thrombin	50 U Biotinylated Thrombin; 1 mL 10X Thrombin Cleavage Buffer; 2 mL 1X Thrombin Dilution/Storage Buffer; 10 µg Cleavage Control Protein		
Thrombin Cleavage Capture Kit	50 U Biotinylated Thrombin; 5 x 1 mL 10X Thrombin Cleavage Buffer; 2 mL 1X Thrombin Dilution/Storage Buffer; 2 x 0.4 mL Streptavidin Agarose; 10 µg Cleavage Control Protein; pkg/10 Spin Filters, 2 mL capacity		

Specifications – Continued

Description	Components	Unit Definition	Recognition Sequence
Restriction Grade Bovine Factor Xa			
Restriction-Grade Factor Xa	100 µg Restriction Grade Factor Xa; 2 mL Factor Xa Dilution/Storage Buffer; 1 mL 10X Factor Xa Cleavage Buffer; 10 µg Xa Cleavage Control Protein	One µg of Restriction Grade Factor Xa cleaves 50 µg Xa Cleavage Control Protein to >95% completion in 16 hours at 25 °C in a buffer containing 50 mM Tris-HCl pH 8.0, 100 mM NaCl, and 5 mM $CaCl_2$.	IleGluGlyArg ↓
Factor Xa Cleavage Capture Kit	100 µg Restriction Grade Factor Xa ; 2 mL Factor Xa Dilution/Storage Buffer ; 5 mL 10X Factor Xa Cleavage/Capture Buffer; 2 × 2.5 mL Xarrest™ Agarose; 10 µg Xa Cleavage Control Protein; pkg/10 Spin Filters, 2 mL capacity		
Recombinant Bovine Enterokinase			
Recombinant Enterokinase	50 U Recombinant Enterokinase; 2 mL 1X rEK Dilution/Storage Buffer; 1 mL 10X rEK Cleavage Buffer; 10 µg Cleavage Control Protein	One unit is defined as the amount of enzyme that will cleave 50 µg of fusion protein in 16 hours at 23 °C, in a buffer containing 20 mM Tris-HCl pH 7.4, 50 mM NaCl, 2 mM $CaCl_2$.	AspAspAspAspLys ↓
Enterokinase Cleavage Capture Kit	50 U Recombinant Enterokinase; 2 mL 1X rEK Dilution/Storage Buffer; 5 mL 10X rEK Cleavage/Capture Buffer; 1.5 mL EKapture™ Agarose ; 10 µg Cleavage Control Protein; pkg/10 Spin Filters, 2 mL capacity		
Tag•off High Activity rEK	50 U Tag•Off™ High-activity rEK; 10 µg Cleavage Control Protein; 2 mL 1X rEK Dilution/Storage Buffer; 1 mL 10X rEK Cleavage Buffer	One unit of Tag•off™ High Activity rEK is defined as the amount of enzyme needed to cleave 50 µg of fusion protein in 16 hours at 23 °C in a buffer containing 20 mM Tris-HCl, 50 mM NaCl, and 2 mM $CaCl_2$, pH 7.4.	AspAspAspAspLys ↓
Tag•off rEK Cleavage Capture Kit	50 U Tag•off™ High Activity rEK; 10 µg Cleavage Control Protein; 2 mL 1X rEK Dilution/Storage Buffer; 5 mL 10X rEK Cleavage/Capture Buffer; 1.5 mL EKapture™ Agarose; 10 Spin Filter, 2 mL		
HRV 3C Protease			
HRV 3C Protease	500 U HRV 3C Protease; 10 µg HRV 3C Cleavage Control Protein; 10 mL 10X HRV 3C Cleavage Buffer	One unit of HRV 3C protease is defined as the amount of enzyme that willl cleave >95% of 100 µg His•Tag® fusion control protein in 50 mM Tris-HCl, 150 mM NaCl, pH 7.5 at 4 °C for 16 h.	LeuGluValLeuPheGln ↓ GlyPro

Ordering Information

Description	Qty/Pk	Catalogue No.
Restriction-Grade Thrombin*	50 U	69671-3
Biotinylated Thrombin*	50 U	69672-3
Thrombin Cleavage Capture Kit	1 kit	69022-3
Cleavage Control Protein	10 µg	69069-3
Restriction-Grade Factor Xa*	100 µg	69036-3
Factor Xa Cleavage Capture Kit	1 kit	69037-3
Xa Cleavage Control Protein	10 µg	69051-3
Xarrast™ Agarose	5 mL	69038-3
Recombinant Enterokinase*	50 U	69066-3
Enterokinase Cleavage Capture Kit	1 kit	69067-3
EKapture™ Agarose	1.5 mL	69068-3
EKapture™ Agarose	10 mL	69068-4
Tag•off™ High Activity rEK*	50 U	71537-3
Tag•off™ rEK Cleavage Capture Kit	1 kit	71540-3
HRV 3C Protease*	500 U	71493-3

*Bulk quantities available. Please inquire.

For more information visit: www.merckmillipore.com/psp

ZipTip® Pipette Tips

Concentrating and purifying samples for MALDI-ToF MS

The ZipTip® pipette tip is a 10 µL tip with a 0.6 or 0.2 µL bed of chromatography media fixed at its end. It is ideal for concentrating and purifying samples for sensitive analyses such as MALDI-ToF MS. The ZipTip® pipette tip provides a reproducible, high-recovery method for concentrating and purifying femtomoles to picomoles of peptides, proteins and oligonucleotides for improved analytical data. To simplify your analysis even further, you can fractionate complex peptide mixtures by step elution.

Features & Benefits

- Single-step desalting, concentration, and purification
- Fractionate complex samples for more meaningful data
- Ideal for peptides, proteins, nucleic acids, and more
- No dead volume for maximum recovery
- Eliminates time-consuming chromatography

Applications

MALDI-ToF MS Sample Preparation

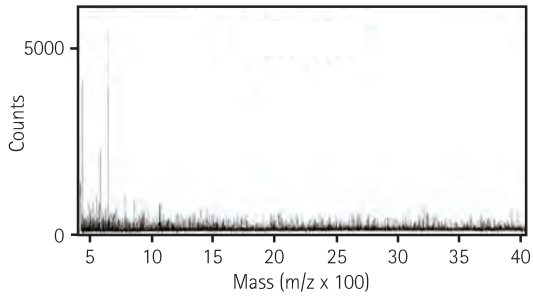
Product Performance

ZipTip® pipette tips increase sensitivity of mass spectrometric analysis. MALDI-ToF MS spectra of a tryptic peptide digest from an in-gel 2D gel digest.

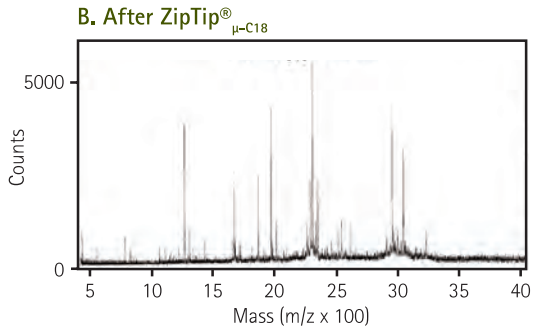
Top spectrum: contaminated sample before clean-up.

Lower spectrum: sample following ZipTip® treatment.

A. Direct Spotting



B. After ZipTip®$_{\mu\text{-C18}}$



Specifications

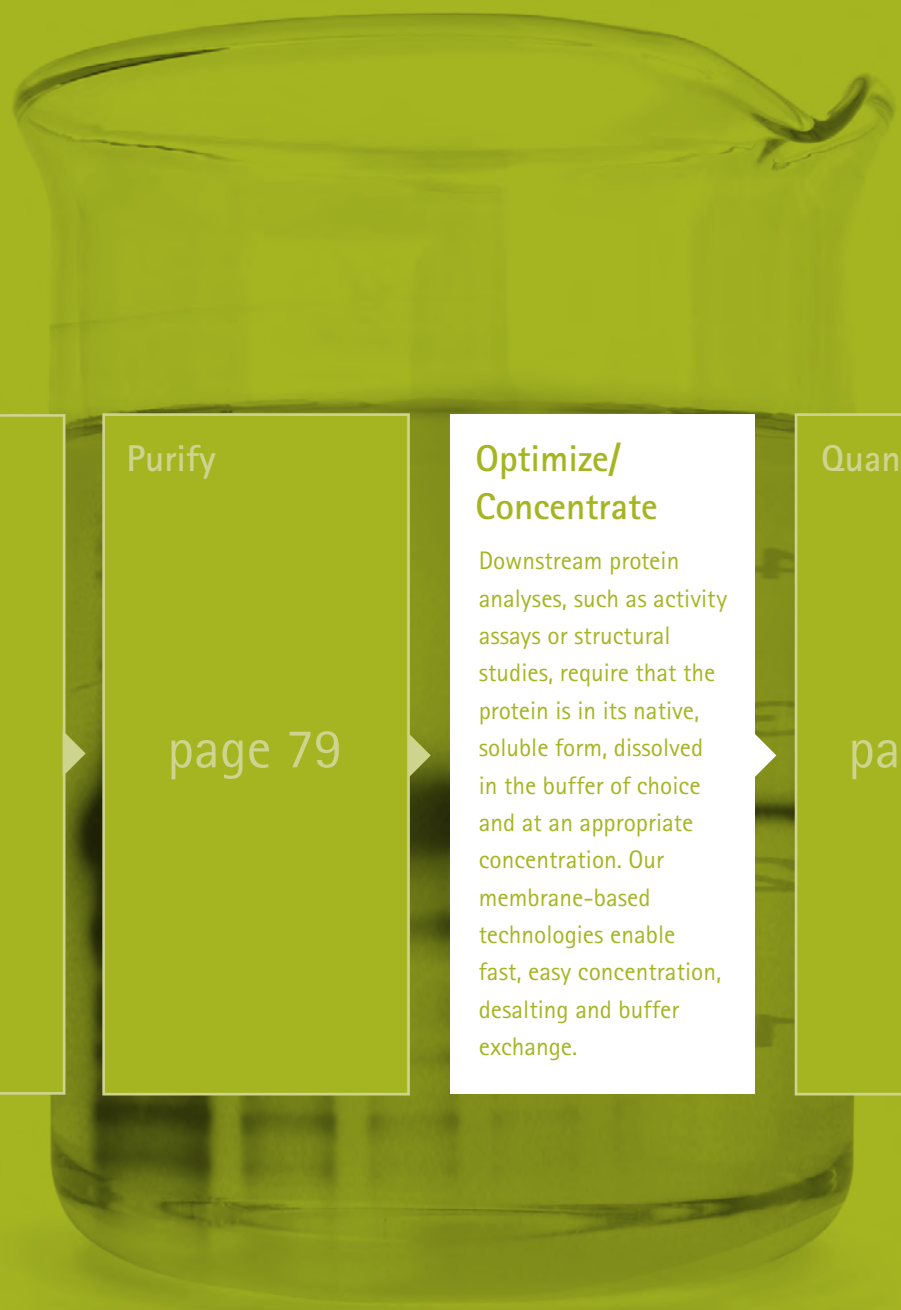
Materials	
Pipette Tip	Polypropylene
C_{18} and µ-C_{18} Resin	Silica, 15 µm, 200 Å pore size
C_4 Resin	Silica, 15 µm, 300 Å pore size
SCX Resin	Strong cation exchange, 12 µm, 300 Å pore size
Volumes, µL	
Pipette Tip	10
Resin Bed	0.2 or 0.6
Capacity	
ZipTip®$_{C18}$ Tip	Typically 5 µg when used with saturating amounts of analyte
ZipTip®$_{\mu\text{-C18}}$ Tip	Typically 2.0 µg when used with saturating amounts of analyte
ZipTip®$_{C4}$ Tip	Typically 3.3 µg when used with saturating amounts of analyte
Dimensions	
Tip Length, mm	31
Tip ID (top), mm	3.375
Tip OD (top), mm	5.8
Temperature, °C	4–70
pH Range	1.5–13.5; 2–12 for 24-hour exposure

Ordering Information

Description	Qty/Pk	Catalogue No.
ZipTip® Pipette Tip, with 0.6 µL C18 resin	8	ZTC18S008
	96	ZTC18S096
	960	ZTC18S960
ZipTip® Pipette Tip, with 0.6 µL C4 resin	8	ZTC04S008
	96	ZTC04S096
	960	ZTC04S960
ZipTip® Pipette Tip, with 0.2 µL C18 resin	8	ZTC18M008
	96	ZTC18M096
	960	ZTC18M960
ZipTip® Pipette Tip, with 0.6 µL strong cation resin (SCX)	8	ZTSCXS008
	96	ZTSCXS096

For more information visit: www.merckmillipore.com/ziptips

Protein Sample Preparation



Extract

page 67

Purify

page 79

Optimize/ Concentrate

Downstream protein analyses, such as activity assays or structural studies, require that the protein is in its native, soluble form, dissolved in the buffer of choice and at an appropriate concentration. Our membrane-based technologies enable fast, easy concentration, desalting and buffer exchange.

Quantify/Detect

page 111

Exchange buffer and concentrate protein solutions over a wide range of sample types and volumes

The limitations of traditional buffer exchange methods include lengthy process times, large volumes of exchange buffer, and risk of sample loss. Merck Millipore's wide selection of sample preparation devices are designed to meets the needs of specific applications. For large sample volumes or proteins that may aggregate if over-concentrated, D-Tube™ dialyzers provide a faster, less tedious alternative to standard dialysis cassettes (Table 1). Amicon® Ultra 4 and 15 mL centrifugal filters are perfectly suited for the concentration of biomarkers from biological fluids with high recovery. The Amicon® Ultra 0.5 mL filter gives the best balance in time and recovery for PCR product cleanup or protein removal prior to analytical HPLC. All Amicon® Ultra filters offer desalting capability with high sample retention. Finally, the Amicon® Pro device enables concentration of a wide range of volumes as well as gentle buffer exchange in a single spin.

Designed for continuous diafiltration (Figure 1), the Amicon® Pro device not only offers speed and efficiency, but also greatly reduces the likelihood of protein aggregation, precipitation or loss of activity. While dialysis is slow and gentle, most spin-based desalting methods involve small devices and multiple rounds of buffer exchange, which can alter protein stability. The Amicon® Pro device's large upper reservoir permits continuous buffer exchange and therefore maintains the sample at constant volume (and concentration), preserving specific activity (Table 1).

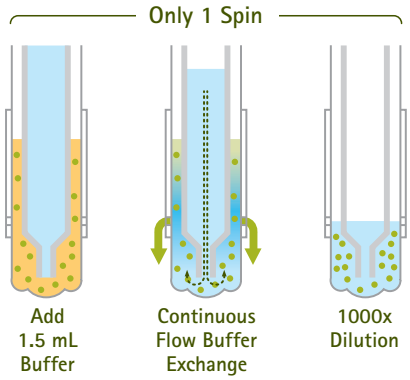


Figure 1. The Amicon® Pro device enables effective desalting or buffer exchange in a single spin, because it features: (1) large, 10 mL buffer reservoir, (2) minimal spacing between the Amicon® Pro device and the attached Amicon® Ultra filter, and (3) tapered exchange tip for optimal buffering. These features ensure that fresh buffer (blue) is slowly but consistently metered in, mixed with sample (green dots in yellow buffer), and expelled through the membrane (green arrows). Because this is a continuous process, the sample does not undergo concentration until buffer exchange is completed.

	Dialysis		Gravity	Centrifugal Diafiltration		
	3 mL Cassette	D-Tube™ Dialyzer	2 mL Column	Device A (0.5 mL)	Amicon® Ultra-0.5 Filter	Amicon® Pro Device
% Salt removal	99.9	99.5	99.6	99.4 (3 spins)	100 (3 spins)	100 (1 spin)
% Protein retention	84.1	87.5	53.3	90.0	92.2	98.4
Process Time	16 Hr	5 Hr	40 min	45-60 min *	45-60 min *	15-30 min *
Specific Activity	4.2	NA	3.4	3.7	3.9	4.3
Concentration required	Yes	Yes	Yes	No	No	No

Table 1. Comparative performance analysis of representative buffer exchange devices. Data represent the results of three independent trials. The Amicon® Pro device provided the most efficient and effective buffer exchange. Dialysis was the most time-consuming, while gravity-driven columns demonstrated significant sample loss, due to fraction pooling and sample transfer. *Process Time depends on whether initial centrifugation was required to concentrate the sample.

For Amicon® Pro System ordering information, see page 80.
For Amicon® Ultra Filter ordering information, see page 98.
For D-Tube™ Dialyzer ordering information, see page 95.

D-Tube™ Dialyzers

High-recovery dialysis of protein and nucleic acids

Easy to handle, D-Tube™ Dialyzers are in a centrifuge tube format with dialysis membrane windows for buffer exchange. Just add or remove your sample with a standard laboratory pipette and obtain >97% sample volume recovery. Available molecular weight cut-offs range from 3.5 to 14 kDa and there are six volume capacities: mini (10–250 µL), midi (50–800 µL), maxi (100– 3000 µL), and mega (10, 15, and 20 mL). The regenerated cellulose membrane is sulfur- and heavy metal-free. Each kit contains 10 D-Tube™ Dialyzers (mega kits also offered in 50/pk) and one floating rack to hold devices in the exchange buffer. Use D-Tube™ Dialyzers for electroelution using the optional accessory kit.

Features & Benefits

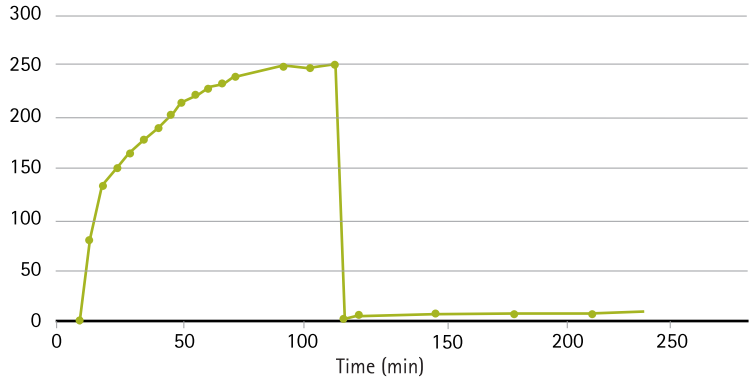
- Ideal for buffer exchange and removal of urea and detergents for samples ranging from 10 µL to 20 mL
- One-step dialysis procedure (no syringes or special equipment)
- Efficient sample recovery
- Protease-, RNase- and DNase-free

Applications

Electroelution of Proteins, Protein-DNA Complexes, DNA, and RNA from Polyacrylamide and Agarose Gels, Dialysis Upstream of MALDI-MS, Functional Assays and HPLC

Product Performance

Experimental Conditions:
Device: D-Tube™ Dialyzer Midi 6,500 MWCO
Sample: BSA 5 mg/mL in 2M NaCl
Volume: 0.5 mL
Exchange buffer volume: 500 mL Milli-Q® water
Conductivity standard curve using NaCl
Protein recovery after 5 hours: 89%
Volume recovery after 5 hours: 115%
Sample conductivity before dialysis: 149 mS/cm/2 M NaCl
Sample conductivity after dialysis: 182 µS/cm/1.6 mM NaCl
99.9% salt reduction



D-Tube™ Dialyzers provide gentle, efficient desalting and excellent protein recovery. A bovine serum albumin (BSA) solution in 2M NaCl was dialyzed against water while water conductivity was monitored. After 100 minutes, conductivity of the water stopped increasing, and it was replaced with fresh water. After 5 hours, 89% of the protein was recovered, and 99.9% of the salt had been removed.

Ordering Information

Description	Volume	MWCO	Qty/Pk	Catalogue No.
Mini	10 - 250 µL	6,000-8,000	10	71504-3
		12,000-14,000	10	71505-3
Midi	50 - 800 µL	3,500	10	71506-3
		6,000-8,000	10	71507-3
Maxi	100 to 3,000 µL	3,500	10	71508-3
		6,000-8,000	10	71509-3
		12,000-14,000	10	71510-3
Mega	10 mL	3,500	10	71739-3
			50	71739-4
		6,000-8,000	10	71740-3
			50	71740-4
Mega	15 mL	3,500	10	71742-3
			50	71742-4
		6,000-8,000	10	71743-3
			50	71743-4

Description	Volume	MWCO	Qty/Pk	Catalogue No.
Mega	20 mL	3,500	10	71745-3
			50	71745-4
		6,000-8,000	10	71746-3
			50	71746-4
D-Tube96™ Dialyzer, 6-8 kDa	10 - 250 µL	6,000-8,000	96 dialyzers	71712-3
D-Tube96™ Dialyzer, 12-14 kDa	10 - 250 µL	12,000-14,000	96 dialyzers	71713-3
D-Tube™ Electroelution Accessory Kit	N/A	N/A	1 kit	71511-3
Mini Floating Racks	N/A	N/A	10	71512-3
Midi Floating Racks	N/A	N/A	10	71513-3
Maxi Floating Racks	N/A	N/A	10	71514-3
Mega Floating Racks	N/A	N/A	10	71748-3

For more information visit: www.merckmillipore.com/psp

Selecting an Ultrafiltration Device

Protein Concentration Devices by Filtration Capacity

Device	Membrane Type	Membrane Orientation	Filtration Capacity 0.5 mL	1 mL	2 mL	4 mL	15 mL	50 mL	70 mL	200 mL	400 mL	Page Number
Small Volume Filtration Devices												
Microcon® Centrifugal Filter	U	H	●									100
Amicon® Ultra-0.5 Centrifugal Filter	U	V	●									98
Amicon® Pro System	U	V	●									80
Ultrafree®-MC Centrifugal Filter	M	H	●									101
Centrifree® Centrifugal Filter	U	H		●								104
Medium Volume Filtration Devices												
Amicon® Ultra-2 Centrifugal Filter	U	V			●							98
Ultrafree®-CL Centrifugal Filter	M	H			●							101
Amicon® Ultra-4 Centrifugal Filter	U	V				●						98
Centriprep® Centrifugal Filter	U	H					●					102
Amicon® Ultra-15 Centrifugal Filter	U	V					●					98
Large Volume Filtration Devices												
8050 Amicon® Stirred Cells	U	H						●				105
Centricon® Plus-70 Centrifugal Device	U	V							●			105
8200 Amicon® Stirred Cells	U	H								●		105
8400 Amicon® Stirred Cells	U	H									●	105

Membrane Type: (U) ultrafiltration vs. (M) microfiltration
Membrane Orientation: (H) horizontal vs. (V) vertical

Selecting an Ultrafiltration Membrane

Application	Ultrafiltration Membrane Nominal Molecular Weight Limit (NMWL) 3,000	10,000	30,000	50,000	100,000
Protein concentration	●	●	●	●	●
Protein purification/desalting/buffer exchange	●	●	●	●	●
Desalting of column fractions	●	●	●	●	●
Protein isolation from cell lysates		●	●		
Peptide concentration/desalting/buffer exchange	●				
Antibody concentration			●	●	●
Virus concentration or removal				●	●
Nucleic acid concentration/desalting/buffer exchange	●	●	●	●	●
Oligonucleotide concentration/desalting/buffer exchange	●				
PCR cleanup				●	●
Remove linkers prior to cloning				●	●
Remove labeled, unincorporated nucleotides			●	●	●
Antibody purification from hybridoma cells			●		
Rapid restriction mapping					●
Natural product screening	●	●	●	●	●
Bound vs. free drugs from serum/plasma (protein removal)		●	●		
Removal of unincorporated label (e.g. fluorescein) from protein	●	●	●	●	●
Removal of imidazole from His-tagged fusion proteins	●	●	●	●	●

Choose the right Amicon® Ultra filter for your molecule of interest

		Amicon® Ultra -0.5	Amicon® Ultra-2	Amicon® Ultra-4	Amicon® Ultra-15
Product	Staring Volume	<0.5 mL	<2 mL	<4 mL	<15 mL
	Final Volume	15-20 µL	15-20 µL	50 µL	200 µL
	Concentration Factor	X25-X33	X100-X133	X80	X75
Rotor and G Force	Rotor Adaptor	Standard 1.5 mL	Standard 15 mL	Standard 15 mL	Standard 50 mL
	Fixed-Angle (35°) Rotor	14,000 g 1,000 g reverse spin	7,500 g 1,000 g reverse spin	5,000 g for 100 kDa 7,500 g for all other MWCO	5,000 g
	Swinging Bucket Rotor	N/A	4,000 g 1,000 g reverse spin	4,000 g	4,000 g

	Size	MWCO	Amicon® Ultra -0.5	Amicon® Ultra-2	Amicon® Ultra-4	Amicon® Ultra-15
Applications	**Protein**					
	6 < MW < 20k	3,000	30 min	60 min	40 min	40 min
	20 < MW < 60k	10,000	15 min	40 min	15 min	20 min
	60 < MW < 100k	30,000	10 min	20 min	10 min	20 min
	100 < MW < 200k	50,000	10 min	15 min	10 min	15 min
	200 < MW	100,000	10 min	30 min	10 min	15 min
	Nucleic Acid (single- & double-stranded)					
	137-1159 bp	30,000	10 min	20 min	10 min	20 min
	Nanoparticles					
	1.5 < dia < 3 nm	3,000	30 min	60 min	40 min	40 min
	3 < dia < 5 nm	10,000	15 min	40 min	15 min	20 min
	5 < dia < 7 nm	30,000	10 min	20 min	10 min	20 min
	7 < dia < 10 nm	50,000	10 min	15 min	10 min	15 min
	10 nm < dia	100,000	10 min	30 min	10 min	15 min

Amicon® Ultra Centrifugal Filters

Fast and easy sample concentration

- Broad chemical compatibility: Heat-sealed membrane eliminates adhesives and downstream extractables; compatible with pH 1 to 9
- Reverse spin recovery: Enables maximum protein recovery without introducing pipetting errors; low binding membrane and polypropylene housing for > 90% sample recovery
- Reliable: Spin precious samples with confidence in one robust, sleek unit that prevents leakage

Applications

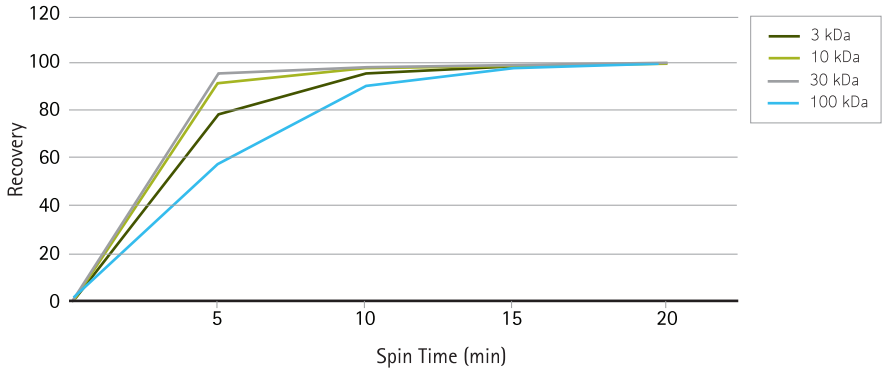
Protein Concentration, Nucleic Acid Concentraion, Buffer Exchange, Dialysis, Desalting

Amicon® Ultra centrifugal filters provide fast sample processing and promote high sample recoveries, even in dilute samples, through ultrafiltration. The unique features of the Amicon® Ultra centrifugal filters give you the fastest, most efficient concentration for sensitive downstream applications.

Features & Benefits

- Dead stop: Avoids spinning to dryness, provides a predictable concentration factor and no need to calibrate for several samples to run in parallel
- Vertical membranes: Aligned with filtrate rather than perpendicular for less clogging, less waste and faster filtration; capable of 25- to 80-fold concentration in a single step

Product Performance



Amicon® Ultra 4 mL filters provide fast spin times with excellent recovery. Solutions of four different proteins (3 kDa cytochrome C, 10 kDa cytochrome C, 30 kDa BSA and 100 kDa IgG) were concentrated using Amicon® Ultra 4 mL filters. Average percent recovery and spin times were recorded. Data show that more than 95% of all protein was recovered in 15 minutes or less.

Ordering Information

Description	Maximum Initial Sample Volume (mL)	Final Concentrate (Retentate) Volume (µL)	MWCO	Qty/Pk	Catalogue No.
Amicon® Ultra-0.5 Centrifugal Filters	0.5	15–20	3,000	8	UFC500308
				24	UFC500324
				96	UFC500396
				500	UFC5003BK
			10,000	8	UFC501008
				24	UFC501024
				96	UFC501096
				500	UFC5010BK
			30,000	8	UFC503008
				24	UFC503024
				96	UFC503096
				500	UFC5030BK
			50,000	8	UFC505008
				24	UFC505024
				96	UFC505096
				500	UFC5050BK
			100,000	8	UFC510008
				24	UFC510024
				96	UFC510096
				500	UFC5100BK

Ordering Information – Continued

Description	Maximum Initial Sample Volume (mL)	Final Concentrate (Retentate) Volume (µL)	MWCO	Qty/Pk	Catalogue No.
Amicon® Ultra-2 Centrifugal Filters	2	15–20	3,000	24	UFC200324
			10,000	24	UFC201024
			30,000	24	UFC203024
			50,000	24	UFC205024
			100,000	24	UFC210024
Amicon® Ultra-4 Centrifugal Filters	4	30–70	3,000	8	UFC800308
				24	UFC800324
				96	UFC800396
			10,000	8	UFC801008*
				24	UFC801024*
				96	UFC801096*
			30,000	8	UFC803008
				24	UFC803024
				96	UFC803096
			50,000	8	UFC805008
				24	UFC805024
				96	UFC805096
			100,000	8	UFC810008
				24	UFC810024
				96	UFC810096
Amicon® Ultra-15 Centrifugal Filters	15	150–300	3,000	8	UFC900308
				24	UFC900324
				96	UFC900396
			10,000	8	UFC901008*
				24	UFC901024*
				96	UFC901096*
			30,000	8	UFC903008
				24	UFC903024
				96	UFC903096
			50,000	8	UFC905008
				24	UFC905024
				96	UFC905096
			100,000	8	UFC910008
				24	UFC910024
				96	UFC910096

*Certified for clinical applications.

For more information visit: **www.merckmillipore.com/amicon**

Microcon® Centrifugal Filters

For DNA and protein concentration

Simply and efficiently concentrate and desalt solutions of any macromolecule, using any centrifuge that can accept 1.5 mL tubes. With the low-binding Ultracel® membrane, Microcon® filters offer typical recoveries of >95%, even for dilute solutions; reverse spin to maximize recovery, even in the smallest samples; convenient storage of filtrate or concentrated sample in standard microfuge tubes and concentration factors up to 100X.

Applications

Recovery of Genomic DNA for Forensic Applications, Concentration and Desalting of Nucleic Acids (high recovery alternative to ethanol precipitation), Removal of Primers from Amplified DNA, Protein Concentration

Features & Benefits

- High, easy recovery for small volumes with reverse spin (concentration factor <20X)
- Low-binding Ultracel® membrane
- Fast processing

Specifications

Volumes	
Maximum Initial Sample Volume	500 µL
Typical Final Concentration Volume	5 -50 µL
Active Membrane Area	0.32 cm^2
Hold-up Volume	≤10 µL
Optimal and Maximum Relative Centrifugal Force – Fixed Angle Rotor	Microcon® 10K devices - 14,000 x g Microcon® 30K devices - 14,000 x g Microcon® DNA Fast Flow - 500 x g 1,000 x g for recovery spin
Materials	
Filter Device	Polycarbonate
Membrane	Ultracel® low-binding regenerated cellulose
Collection Tube	Polypropylene
O-Ring	Medical-grade silicone rubber
Dimensions	
Diameter	12.3 mm (0.5 in.)
Length (filter device and tube in concentration mode)	45.0 mm (1.8 in.)
Length (filter device and tube in recovery mode)	48.2 mm (1.9 in.)

Ordering Information

Description	Volume (mL)	Min. final concentrate volume (µL)	Qty/Pk	Catalogue No.
Microcon® Filter, Ultracel® membrane, 10 kDa	0.5	5-50	100	MRCPRT010
Microcon® Filter, Ultracel® membrane, 30 kDa	0.5	5-50	100	MRCF0R030
Microcon® Filter, Ultracel® DNA Fast Flow Membrane	0.5	5-50	100	MRCF0R100
Microcon® Filter, Ultracel® DNA Fast Flow PCR Grade Membrane	0.5	5-50	20	MRCF0R100ET

For more information visit: www.merckmillipore.com/psp

Ultrafree®-MC and -CL Centrifugal Filter Units

Fast and easy microfiltration

Ultrafree®-MC (0.5 mL) and Ultrafree®-CL (2 mL) centrifugal devices are single-use, disposable filters used for removing particulates from aqueous biological solutions. These devices are available in two processing volumes with a range of microporous membranes (from 0.1 to 5.0 µm) for fast filtration and highly reproducible performance. Pre-sterilized units are also available. Use in fixed-angle rotors for 1.5 mL tubes (-MC) and 15 mL tubes (-CL).

Features & Benefits

- Five different pore sizes from 0.1 to 5.0 µm
- Available in Durapore® PVDF or hydrophilic PTFE membranes
- Pre-sterilized units also available
- Fast filtration and highly reproducible performance

Specifications

	Ultrafree®-MC Filter	Ultrafree®-CL Filter
Volumes		
Maximum Initial Sample Volume, mL	0.5	2
Hold-up Volume, µL	5	10
Centrifugal Force	12,000 x g	5,000 x g
Dimensions		
Active Membrane Area, cm^2	0.2	0.8
Diameter, mm	10.6	16.3
Length, mm	45	77
Materials		
Membrane	Hydrophilic PVDF or hydrophilic PTFE	Hydrophilic PVDF or hydrophilic PTFE
Device	Polypropylene	Polypropylene

Applications

Clarification of Aqueous and Some Solvent-based Samples, Protein and Nucleic Acid Sample Preparation

Ordering Information

Description	Pore Size (µm)	Color	Sterility	Qty/Pk	Catalogue No.
Filter Units with Microporous Durapore® PVDF Membrane					
Ultrafree®-MC Filter	0.1	Orange	Non-Sterile	25	UFC30VV25
				100	UFC30VV00
	0.22	Yellow	Non-Sterile	25	UFC30GV25
				100	UFC30GV00
				250	UFC30GVNB
			Sterile	50 (5 x 10)	UFC30GV0S
	0.45	Red	Non-Sterile	25	UFC30HV25
				100	UFC30HV00
				250	UFC30HVNB
	0.65	Purple	Non-Sterile	25	UFC30DV25
				100	UFC30DV00
			Sterile	50 (5 x 10)	UFC30DV0S
	5	Dark green	Non-Sterile	100	UFC30SV00
Ultrafree®-CL Filter	0.1	Orange	Non-Sterile	25	UFC40W25
				100	UFC40W00
	0.22	Yellow	Non-Sterile	25	UFC40GV25
				100	UFC40GV00
			Sterile	50 (5 x 10)	UFC40GV0S
	0.45	Red	Non-Sterile	25	UFC40HV25
				100	UFC40HV00
	0.65	Purple	Non-Sterile	25	UFC40DV25
	5	Dark Green	Non-Sterile	25	UFC40SV25

Ordering Information – Continued

Description	Pore Size (µm)	Color	Sterility	Qty/Pk	Catalogue No.
Filter Units with Microporous Hydrophilic PTFE Membrane					
Ultrafree®-MC Filter	0.22	Yellow	Non-Sterile	25	UFC30LG25
	0.45	Red	Non-Sterile	25	UFC30LH25
Ultrafree®-CL Filter	0.22	Yellow	Non-Sterile	25	UFC40LG25
	0.45	Red	Non-Sterile	25	UFC40LH25

For more information visit: www.merckmillipore.com/psp

Centriprep® Centrifugal Filters

Concentration of samples with high solute content

Centriprep® centrifugal filters are disposable ultrafiltration devices used for purifying, concentrating, and desalting biological samples in the 2–15 mL volume range. They may also be used for filtration applications. These complete, ready-to-use ultrafiltration devices are designed for operation in most centrifuges that can accommodate 50 mL centrifuge tubes. They are easy to use and offer a high flow rate. Centriprep® devices consist of a sample container with a twist-lock cap, a filtrate collector containing a low-adsorptive, Ultracel® regenerated cellulose membrane and an air-seal cap for sample isolation.

Features & Benefits

- For use with samples containing high levels of solutes
- Unique inverse flow mode of operation with large deadstop
- Fast sample processing
- Available with Ultracel® membranes: (3, 10, 30 and 50 kDa NMWL)
- Fits standard swinging-bucket rotor for 50 mL tubes

Applications

Concentration and Purification of Particle-laden Solutions, Solutions with High Solute Concentration, Separation of Low MW Solutes from Fermentation Broths, Cell Culture Media and Lysates

Ordering Information

Description	Volume (mL)	Min. Final Concentrate Volume (µL)	MWCO	Qty/Pk	Catalogue No.
Centriprep® Filter With Ultracel® Membrane, 3 kDa NMWL	15	700	3,000	24	4302
				96	4303
Centriprep® Filter With Ultracel® Membrane, 10 kDa NMWL*	15	700	10,000	24	4304
				96	4305
Centriprep® Filter With Ultracel® Membrane, 30 kDa NMWL*	15	700	30,000	24	4306
				96	4307
Centriprep® Filter With Ultracel® Membrane, 50 kDa NMWL	15	700	50,000	24	4310
				96	4311

*Centriprep® centrifugal filter devices with Ultracel® 10 kDa and 30 kDa membranes are approved for *in vitro* diagnostic use.

For more information visit: www.merckmillipore.com/psp

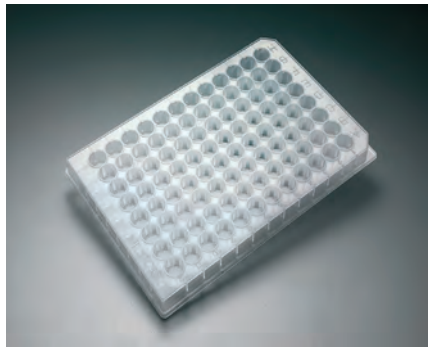
MultiScreen® Filter Plate with Ultracel®-10 Membrane

High-throughput ultrafiltration

The MultiScreen® ultrafiltration-based filter plate enables high-throughput, automation-compatible sample purification, concentration and desalting of biological solutions and protein removal from samples prior to analysis. The 96-well filter plate incorporates Ultracel® 10,000 nominal molecular weight limit regenerated cellulose ultrafiltration membrane for low-binding, high-recovery results. It is designed for use with centrifugation and is compatible with standard microtiter plate instrumentation and liquid handling equipment.

Features & Benefits

- High throughput: 96-well ultrafiltration plate
- Reliable: Designed for low protein binding, high protein retention and high well-to-well uniformity of performance
- Versatile: Allows for processing and collection of sample volumes from 50 to 500 µL and is compatible with a range of standard receiver 96-well microtiter plates



Applications

High-Throughput Protein Concentration and Desalting for Validation or Screening Assays, Removal of Large Molecular Weight Proteins Prior to Instrument Analysis

Specifications

Volumes	
Filter Plate Capacity, mL	0.5
Working Sample Volume Capacity	Limited to receiver plate. Compatible with standard 96-well microtiter plates (300 µL, 700 µL deep well, and 150 µL conical u-bottom).*
Centrifugal Force	Maximum 3,000 x g
Materials	
Membrane	Ultracel® regenerated cellulose
Device	Polyolefin
Dimensions	
Length, mm	128
Width, mm	85.2
Height, mm	14.2

*Recommended receiver plates sold separately.

Ordering Information

Description	Qty/Pk	Catalogue No.
MultiScreen® Filter Plate with Ultracel® Membrane, 10,000 NMWL	10	MAUF01010

Includes MultiScreen® filter plates and lids. Receiver plate must be purchased separately.

For more information visit: **www.merckmillipore.com/psp**

Centrifree® Ultrafiltration Device

Separate free from unbound solutes

The Centrifree® Ultrafiltration device with Ultracel® regenerated cellulose membrane is ideal for separating free from bound microsolutes in serum, plasma, and other biological samples. The device is licensed for research use and *in vitro* diagnostic use. The device holds a sample volume of 1 mL with a hold-up volume of 10 µL.

Features & Benefits

- Separate unbound (free) therapeutic drugs, testosterone, thyroxin, etc.
- Enables accuracy in binding studies
- Critical for new drug investigations
- Facilitates deproteinization to reduce complexity or matrix interference of biological samples
- For research and *in vitro* diagnostic use

Applications

Determination of Free Drugs, Testosterone, Thyroxin or Other Bioactives, Binding Studies, New Drug Investigations

Ordering Information

Description	Volume (mL)	Min. Final Concentrate Volume (µL)	Qty/Pk	Catalogue No.
Centrifree® Ultrafiltration Device with Ultracel® Membrane	1	50	50	4104

For more information visit: www.merckmillipore.com/psp

Minicon® Concentrators

Static concentration of bodily fluids

Use the Minicon® static concentrators to concentrate urine and cerebrospinal fluid to intensify proteins that indicate abnormal or pathological states prior to analysis by electrophoresis or immunoelectrophoresis. The B15 unit has 8 cells and can hold up to 5 mL of sample. The CS15 has 10 cells and is suited for volumes up to 2.5 mL. The absorbent pulls solvent and salts through the ultrafilter, concentrating the sample.

Features & Benefits

- Static concentrator, requiring no accessories
- Absorbent pulls solvent and salts through ultrafilter, concentrating sample
- Concentration factor up to 100X
- Low hold-up volume

Applications

Concentration of Urine and Cerebrospinal Fluid for Enrichment of Protein Analytes (e.g., Bence Jones Proteins in Urine)

Ordering Information

Description	MWCO	Volume (mL)	Min. Final Concentrate Volume (µL)	Qty/Pk	Catalogue No.
Minicon® B15 Concentrator, 8 Cells/Unit	15,000	5	50	40	9031
Minicon® CS15 Concentrator, 10 Cells/Unit	15,000	2.5	30	50	9051

For more information visit: www.merckmillipore.com/psp

Centricon® Plus-70 Centrifugal Filter Units

Large volume sample concentration

Concentrate samples in the 15 mL-70 mL volume range using Centricon® Plus-70 centrifugal filter units. The large deadstop volume of 350 µL prevents spinning samples to dryness. The Centricon® Plus-70 has two vertical regenerated cellulose membranes for fast, efficient tangential flow. The device is available with four different pore size membranes (3, 10, 30 and 100 kDa NMWL).

Features & Benefits

- 90% typical recovery
- 50X to 200X concentration
- Low hold-up volume
- Deadstop prevents spinning to dryness
- Polypropylene housing minimizes non-specific protein binding

Applications

Concentration and Desalting of Chromatography Column Eluates, Concentrating Monoclonal Antibodies, Concentrating Proteins or Viruses From Culture Supernatants, Clarifying Tissue Homogenates and Lysates, Buffer Exchange or Diafiltration

Ordering Information

Description	MWCO	Qty/Pk	Catalogue No.
Centricon® Plus-70 Filter With Ultracel® Membrane	3,000	8	UFC700308
	10,000	8	UFC701008
	30,000	8	UFC703008
	100,000	8	UFC710008

For more information visit: www.merckmillipore.com/psp

Stirred Cells

Pressure-based sample concentration

Need to concentrate your sample gently, without centrifugation? Amicon® stirred cells concentrate samples rapidly but gently, using magnetic stirring to minimize concentration polarization and shear stress-induced denaturation. Providing high flow rates with solutions up to 10% macrosolute concentration, Amicon® stirred cells also enable salt removal followed by concentration in the same unit. Complete product recoveries can generally be achieved using the diafiltration set-up. All stirred cells can be autoclaved. Amicon® stirred cells are available in five different sizes: 3 mL, 10 mL, 50 mL, 200 mL and 400 mL.

Features & Benefits

- Rapid concentration
- Available in five different sizes
- Simple, easy-to-use system
- Autoclavable
- Open platform is compatible with different membranes

Applications

Concentration, Buffer Exchange, Desalting

Specifications

Materials	
Cap and Tube Fitting Assembly	Nylon
Cylinder and Membrane Holder	Polysulfone
Stirring Assembly	Acetal, polysulfone
O-rings	Silicone rubber
Pressure Tube	Polyethylene
Filtrate Tube	Tygon® tubing
Retaining Stand	Anodized aluminum or nylon

Amicon® Stirred Cell	Model 8003 Cat. No. 5125	Model 8010 Cat. No. 5121	Model 8050 Cat. No. 5122	Model 8200 Cat. No. 5123	Model 8400 Cat. No. 5124
Max. Process Volume, mL	3	10	50	200	400
Min. Process Volume, mL	0.075	1.0	2.5	5.0	10.0
Membrane Diameter, mm	25	25	44.5	63.5	76
Effective Membrane Area, cm^2	0.9	4.1	13.4	28.7	41.8
Hold-up Volume, mL	0.07	0.2	0.5	1.2	1.5
Height, cm	7.7	7.7	9.8	12.8	15.5
Base, cm	6 x 6	6 x 6	7 x 7	9 x 9	11 x 11
Weight, kg	0.1	0.1	0.2	0.4	0.6
Maximum Operating Pressure, psi	75	75	75	75	75

Ordering Information

Description	Min. Volume (mL)	Max. Volume (mL)	Qty/Pk	Catalogue No.
Amicon® Stirred Cells	0.075	3	1	5125
	1.0	10	1	5121
	2.5	50	1	5122
	5.0	200	1	5123
	10	400	1	5124
Replacement Parts				
Small Replacement Parts for 8000 Series			1	8000SCPKIT
Large Replacement Parts for 8003 Series			1	8003SCPKIT
Large Replacement Parts for 8010 Series			1	8010SCPKIT
Large Replacement Parts for 8050 Series			1	8050SCPKIT
Large Replacement Parts for 8200 Series			1	8200SCPKIT
Large Replacement Parts for 8400 Series			1	8400SCPKIT
Accessories				
CDS10 Selector Valve			1	6003
MF2 Push-Button Manifold			1	6015
RC800 Mini-Reservoir			1	6028

For more information visit: www.merckmillipore.com/psp

Solvent-Resistant Stirred Cells

Concentration of samples in organic solvents

For concentration or buffer exchange of samples containing organic solvents, this stirred cell is available in two sizes, a 47 mm cell and a 76 mm cell. However, certain aldehydes, ketones (e.g., acetone) and aliphatic ethers/esters may reduce the life of the fluorocarbon O-rings.

Features & Benefits

- Borosilicate glass cylinder and PTFE components for broad compatibility
- Autoclavable with membrane in place
- Top plate opening provides access to contents without dismantling
- Few components, easy to clean and assemble
- For 47 or 76 mm disc filters

Applications

Concentration and Buffer Exchange Involving Organic Solvents

Specifications

Materials		
Top and base plate	316L stainless steel	
Cylinder	Borosilicate glass	
Stirring bar grip and coating	PTFE	
O-ring	Fluorocarbon	
Pressure tube	Nylon	
Filtrate tube	Silicone rubber	
Funnel	HDPE	
Volumes	**47 mm cell**	**76 mm cell**
Max. Process Volume, mL	75	300
Min. Process Volume, mL	2.5	10
Hold-up Volume, mL	0.3	1
Dimensions		
Filter Diameter, mm	47	76
Filtration Area, cm^2	15	40
Base Diameter, cm	8	11
Height, cm	12.2	16.5
Maximum Operating Pressure, bar (psi)	6.2 (90)	6.2 (90)

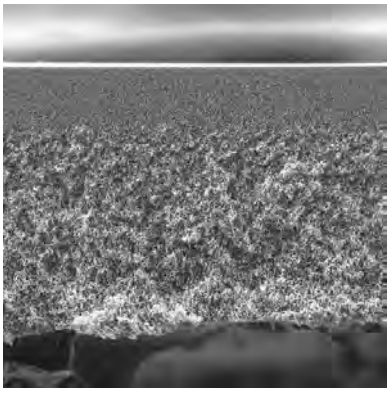
Ordering Information

Description	Minimum Volume (mL)	Maximum Volume (mL)	Qty/Pk	Catalogue No.
Solvent-resistant Stirred Cell, for 47 mm membranes	2.5	75	1	XFUF04701
Solvent-resistant Stirred Cell for, 76 mm membranes	10	300	1	XFUF07601
Replacement Parts				
Glass Cylinder for 47 mm Stirred Cell			1	XFUF04711
Glass Cylinder for 76 mm Stirred Cell			1	XFUF07611

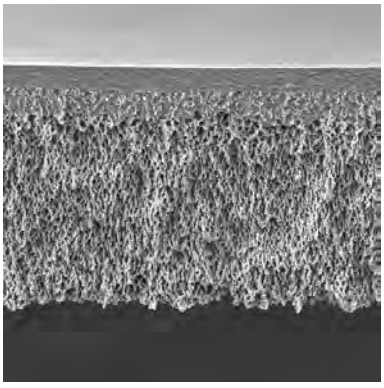
For more information visit: www.merckmillipore.com/psp

Ultrafiltration Discs

Membranes for use with stirred cells



Biomax® ultrafiltration membrane



Ultracel® ultrafiltration membrane

Assemble your stirred cell with the membrane of your choice. Amicon® Ultrafiltration cut disc membranes are available in regenerated cellulose and Biomax® polyethersulfone (PES). The membranes are available in a range of different pore sizes and diameters. Ultracel® regenerated cellulose membranes are recommended for concentrating or desalting dilute solutions. The hydrophilic, tight microstructure of Ultracel® membranes assures the highest possible retention with the lowest possible adsorption of protein, DNA or other macromolecules. Biomax® PES membranes are recommended for concentrating or desalting higher volumes of more concentrated samples such as serum, plasma, or conditioned tissue culture media.

Features & Benefits

- Disc diameters include: 25, 44.5, 47, 63.5, 76, 90 and 150 mm
- Both Ultracel® and Biomax® membranes are available in a wide range of pore sizes to meet your separation requirements
- Compatible with Amicon® Stirred Cells

Applications

Concentration, Buffer Exchange, Desalting

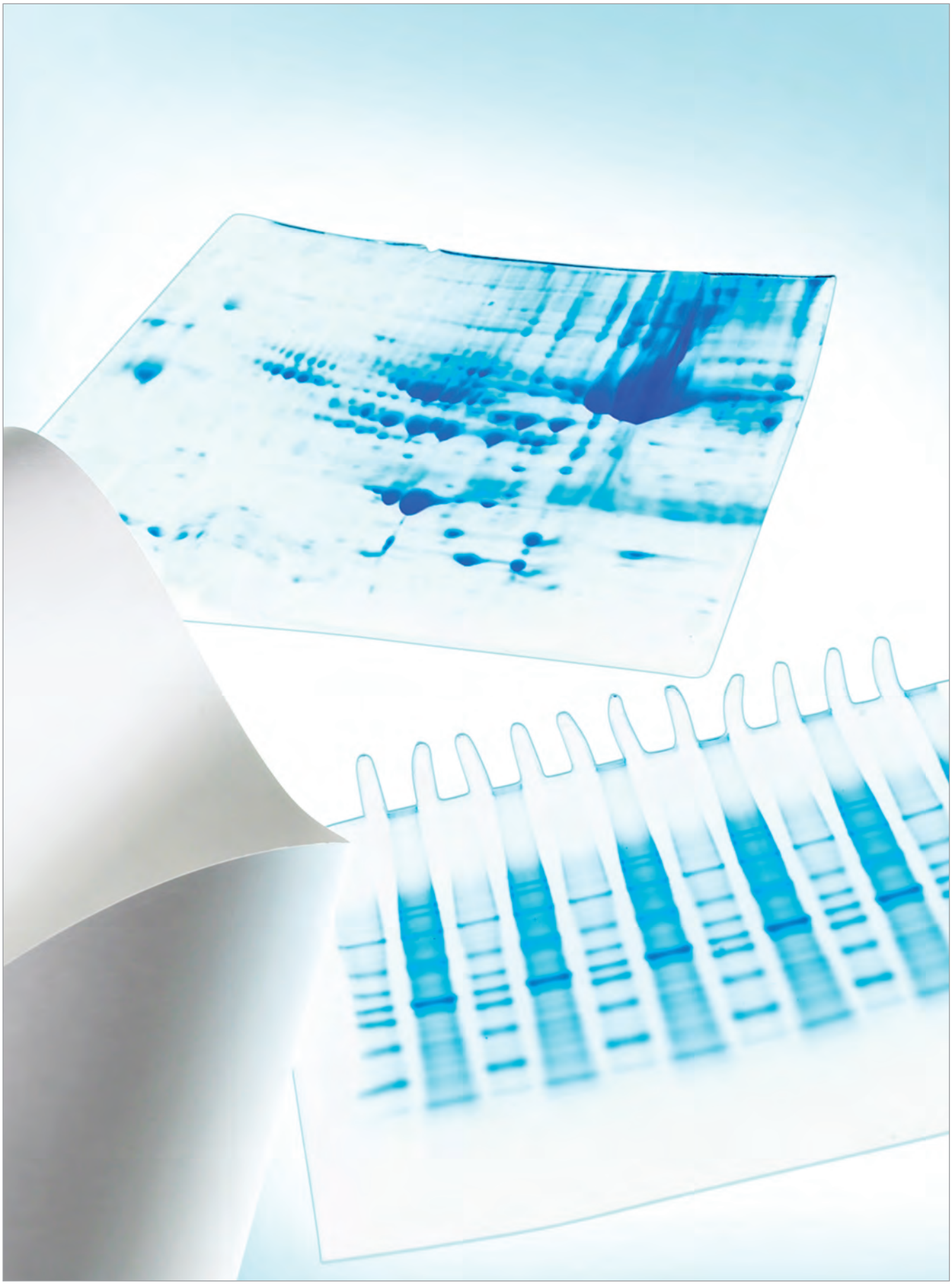
Ordering Information – Ultracel® Ultrafiltration Discs (Regenerated Cellulose)

Description	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Ultracel® Membrane, 1,000 MWCO	25	10	PLAC02510
	44.5	10	PLAC04310
	47	10	PLAC04710
	63.5	10	PLAC06210
	76	10	PLAC07610
	90	5	PLAC09005
	150	5	PLAC15005
Ultracel® Membrane, 3,000 MWCO	25	10	PLBC02510
	44.5	10	PLBC04310
	47	10	PLBC04710
	63.5	10	PLBC06210
	76	10	PLBC07610
	90	5	PLBC09005
	150	5	PLBC15005
Ultracel® Membrane, 5,000 MWCO	25	10	PLCC02510
	44.5	10	PLCC04310
	47	10	PLCC04710
	63.5	10	PLCC06210
	76	10	PLCC07610
	90	5	PLCC09005
	150	5	PLCC15005
Ultracel® Membrane, 10,000 MWCO	25	10	PLGC02510
	44.5	10	PLGC04310
	47	10	PLGC04710
	63.5	10	PLGC06210
	76	10	PLGC07610
	90	5	PLGC09005
	150	5	PLGC15005
Ultracel® Membrane, 30,000 MWCO	25	10	PLTK02510
	44.5	10	PLTK04310
	47	10	PLTK04710
	63.5	10	PLTK06210
	76	10	PLTK07610
	90	5	PLTK09005
	150	5	PLTK15005
Ultracel® Membrane, 100,000 MWCO	25	10	PLHK02510
	44.5	10	PLHK04310
	47	10	PLHK04710
	63.5	10	PLHK06210
	76	10	PLHK07610
	90	5	PLHK09005
	150	5	PLHK15005

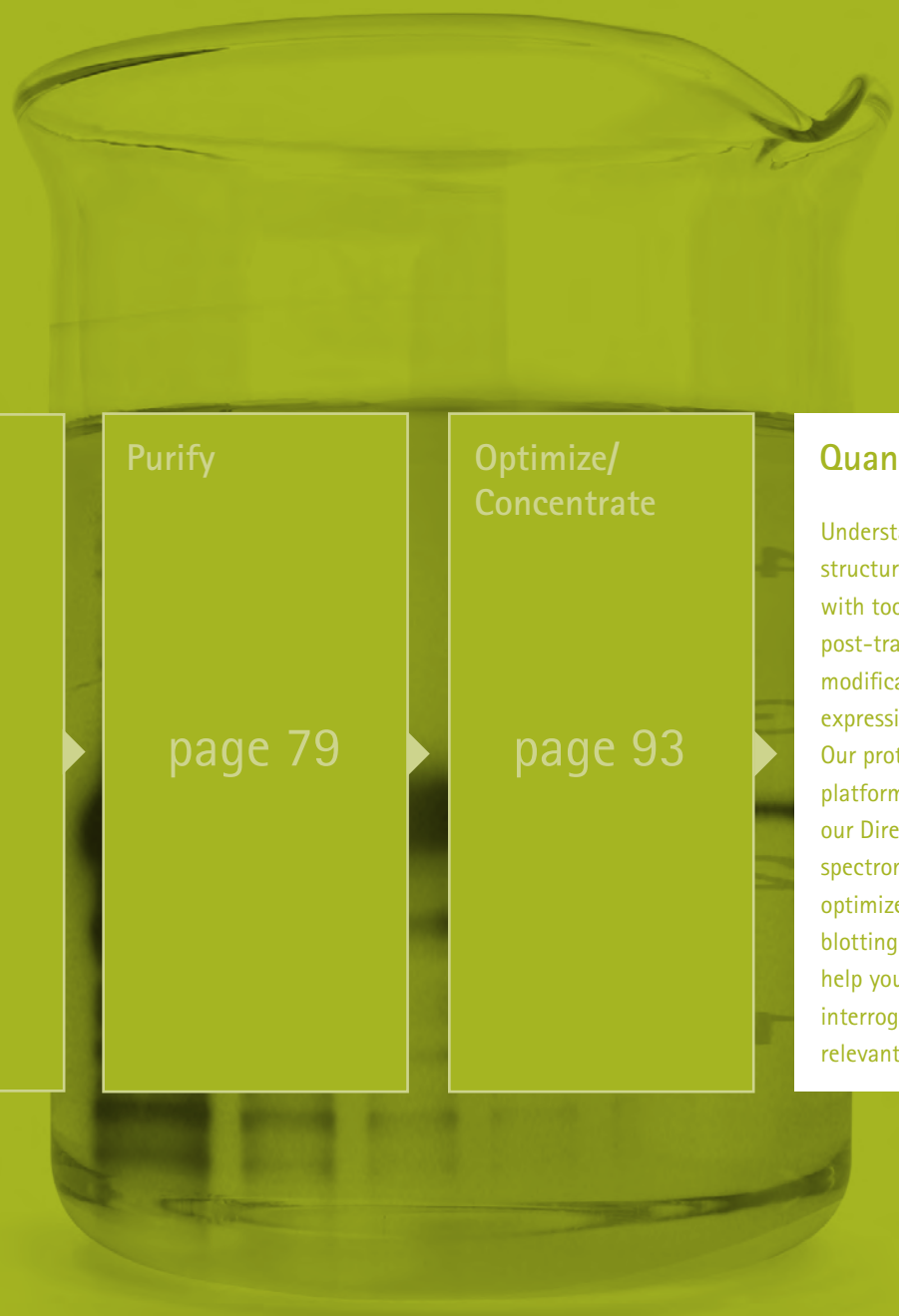
Ordering Information – Biomax® Ultrafiltration Discs (Polyethersulfone)

Description	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Biomax® Membrane, 5,000 MWCO	25	10	PBCC02510
	44.5	10	PBCC04310
	47	10	PBCC04710
	63.5	10	PBCC06210
	76	10	PBCC07610
Biomax® Membrane, 10,000 MWCO	25	10	PBGC02510
	44.5	10	PBGC04310
	47	10	PBGC04710
	63.5	10	PBGC06210
	76	10	PBGC07610
Biomax® Membrane, 30,000 MWCO	25	10	PBTK02510
	44.5	10	PBTK04310
	47	10	PBTK04710
	63.5	10	PBTK06210
	76	10	PBTK07610
Biomax® Membrane, 50,000 MWCO	25	10	PBQK02510
	44.5	10	PBQK04310
	47	10	PBQK04710
	63.5	10	PBQK06210
	76	10	PBQK07610
Biomax® Membrane, 100,000 MWCO	25	10	PBHK02510
	44.5	10	PBHK04310
	47	10	PBHK04710
	63.5	10	PBHK06210
	76	10	PBHK07610
Biomax® Membrane, 300,000 MWCO	25	10	PBMK02510
	44.5	10	PBMK04310
	47	10	PBMK04710
	63.5	10	PBMK06210
	76	10	PBMK07610
Biomax® Membrane, 500,000 MWCO	25	10	PBVK02510
	44.5	10	PBVK04310
	47	10	PBVK04710
	63.5	10	PBVK06210
	76	10	PBVK07610

For more information visit: **www.merckmillipore.com/psp**



Protein Sample Preparation



Extract

page 67

Purify

page 79

Optimize/ Concentrate

page 93

Quantify/Detect

Understand protein structure and function with tools to characterize post-translational modifications and expression control. Our protein detection platforms, including our Direct Detect® spectrometer and optimized Western blotting products, help you accurately interrogate the proteins relevant to your system.

Simplified analysis of lipid or detergent content in biological samples using the IR-based Direct Detect® Spectrometer

Despite the growth in lipid research, analytical methods applied for their characterization typically involve multistep procedures, requiring extensive sample manipulation and separation from other biomolecules, like proteins, before the analysis.

The infrared (IR)-based Direct Detect® spectrometer enables simultaneous protein quantitation and lipid analysis, directly from a biological sample. Given that each lipid possesses an IR signature uniquely defined by its chemical composition and structure, IR spectroscopy offers a means of qualitative lipid discrimination, as well as quantitation of known lipid(s) in cases where a viable standard curve has been determined.

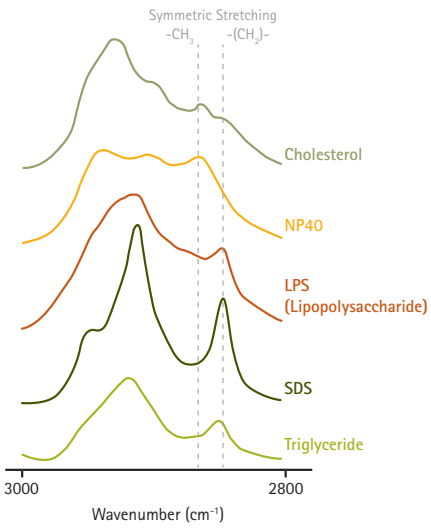


Figure 1. C-H symmetric stretching bands observed in the infrared spectra of lipids.

The Direct Detect® spectrometer utilizes the C-H symmetric stretching vibrational population between 2870 and 2840 cm^{-1} to determine lipid or detergent content (Figure 1). The Direct Detect® assay-free sample card enables analysis of aqueous-based biological samples, which are normally not compatible with infrared spectroscopy, due to their high water content. These assay-free cards are also compatible with many organic solvents.

Materials and Methods

Measurements of sample concentration were acquired using Direct Detect® assay-free sample cards (Merck Millipore, Cat. No. DDAC00010-8P) and the Direct Detect® spectrometer (Merck Millipore, Cat. No. DDHW00010-WW). Each assay-free card contains four polytetrafluoroethylene (PTFE) membrane positions, sized for easy sample application and analysis. All measurements were performed using 2 µL of sample solution per membrane position. Unknown lipid mixtures were analyzed in the "Relative Absorbance" mode, where the system delivers information based solely on IR signal strength. Empirical sample concentration values were determined by interpolation from calibration curves developed for each specific lipid or detergent. For the experiments reported here, the system was calibrated using Tetracosanoic Acid in chloroform and 3-[(3-cholamidopropyl)dimethylammonio]-1-propanesulfonate (CHAPS) in phosphate-buffered saline (PBS). A series of seven concentrations from 0.25 mg/mL to 1.75 mg/mL was used to generate an instrument calibration curve for Tetracosanoic Acid. For CHAPS, the calibration curve was formed using a series of seven concentration points spanning 0.25% to 4%. The strength of IR signal for each concentration was fitted to a regression line represented by linear equations $y = 0.04519x - 0.00679$ (lipid) and $y = 0.01774x + 0.00442$ (detergent). These equations were used by the Direct Detect® software to determine the concentration of Tetracosanoic Acid and CHAPS in subsequent samples.

Robustness of the Relative Absorbance mode was further demonstrated through simultaneous analysis of protein and lipid content in samples containing mixture of both biomolecules as well as in breast cancer tissue lysate. Frozen tissue, derived from a breast ductal carcinoma, was divided into 2 equal samples. Tissue was covered with 2 mL RIPA buffer (Merck Millipore, Cat. No. 20-188) or CytoBuster™ protein extraction reagent (Merck Millipore, Cat. No. 71009-50mL), both supplemented with an inhibitor cocktail, and disrupted with a glass tissue homogenizer. Effective removal of the fatty fraction from the resulting tissue homogenate by a series of centrifugation steps was also monitored by the Direct Detect® spectrometer.

Results

Accuracy of lipid and detergent quantitation

The accuracy of concentration estimation within the dynamic ranges established for Tetracosanoic Acid and CHAPS was assessed using 0.8 mg/mL Tetracosanoic Acid in chloroform and 1.8 % CHAPS in PBS. Within a well-defined calibration method, the instrument was capable of estimating lipid and detergent concentration with minimal error: the Direct Detect® spectrometer estimated the concentration of the Tetracosanoic Acid samples to be 0.853 ± 0.14 mg/mL (2.4%CV) and the CHAPS samples were estimated to be 1.8 ± 0.004% (2.3%CV).

Protein quantitation and lipid content analysis performed using the same measurement

IR spectral profiles of proteins and lipids are distinct, thereby enabling the simultaneous quantitation of proteins and analysis of lipids using the same measurement. Protein content can be quantified using one of the pre-loaded standard curves (all prepared in PBS pH 7.4)[2]. Lipid analysis can be performed, using the same spectra, in the "Relative Absorbance" mode. We analyzed phospholipids in a complex mixture (Figure 2). The protein in the sample was quantified at 2.8 mg/mL.

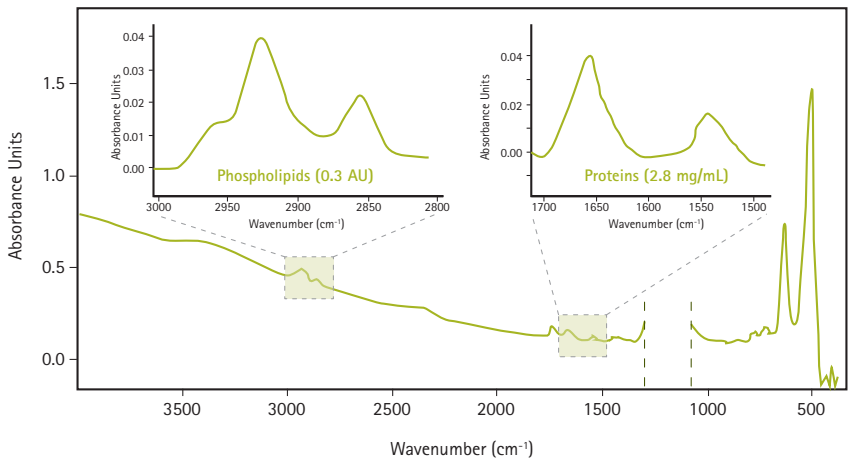


Figure 2. Analysis of protein and lipid content from a single sample measurement. Because the sample composition and ratio of individual components were unknown, the analysis of the phospholipids was performed using the "Relative Absorbance" mode.

Monitoring the lipid profile during the preparation of a breast cancer tissue lysate

Traditionally, quantitation of proteins and lipids in lysates has been tedious, requiring large sample volumes and specialized methodologies, and the results for either component obtained using classical methods may be obscured by cross-interference. The Direct Detect® spectrometer has enabled rapid analysis of total protein with simultaneous monitoring of lipid content, thereby simplifying and improving the analytical process[3]. Breast cancer tissue lysates were prepared using RIPA buffer and CytoBuster™ protein extraction reagent. Following tissue homogenization, the Direct Detect® spectrometer was used to monitor the efficiency of fat removal and total protein concentration during centrifugal extraction. Direct Detect® spectrometer data showed gradual removal of a fatty fraction from the samples (Figure 3). The same spectra were also used to determine the total protein recovery across the various fractions (Table 1). From this limited study, it is clear that the Direct Detect® system offers a means for in-line process optimization for maximal yield and/or purity.

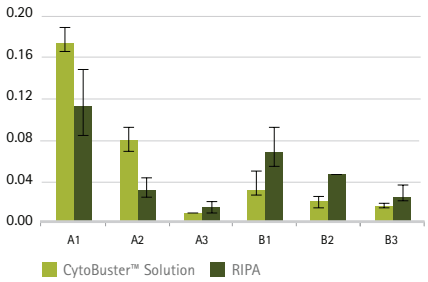


Figure 3. Lipid content as determined using the Direct Detect® spectrometer in the "Relative Absorbance" mode in 3 different fractions of breast cancer tissue lysates prepared with CytoBuster™ Protein Extraction Reagent or RIPA buffer.

Conclusions

The Direct Detect® spectrometer enables rapid analysis of lipids and detergents in addition to accurate and reproducible protein quantitation. The ability to simultaneously monitor protein concentration and fat removal during sample preparation provides a tool for assay optimization as well as greater confidence in final sample purity.

References
1. Pidgeon C., Apostol G. and Markovich R. Anal. Biochem. 1989, 181(1): 28-32.
2. Merck Millipore. Literature No. AB3355EN00, 2012.
3. Gutierrez, S. et al. Poster Presentation, Human Proteome Organization (HUPO) 11th Annual World Congress, Boston, MA, USA, September 2012.

Sample	Spin condition & fraction collected	Total protein content (mg/mL) CytoBuster™ Protein Extraction Reagent	RIPA
A1	spin @10,000 xg (top fatty fraction)	5.0	14.0
A2	spin @15,000 xg (top fatty fraction)	2.7	20.0
A3	spin @15,000 xg (bottom layer)	5.0	17.0
B1	spin @10,000 xg (top fatty fraction)	3.3	3.6
B2	spin @15,000 xg (top fatty fraction)	2.1	5.0
B3	spin @15,000 xg (bottom layer)	2.8	5.0

Table 1. Total protein recovery from breast cancer tissue lysed with RIPA buffer or CytoBuster™ protein extraction reagent measured using the Direct Detect® spectrometer.

For Direct Detect® spectrometer ordering information, see page 114.

Direct Detect® Spectrometer

IR-based protein quantitation

What if you never had to run another Bradford or BCA, ever? The Direct Detect® system provides more accurate results without the pitfalls of colorimetric assays. By measuring amide bonds in protein chains, the system accurately quantitates an intrinsic component of every protein without relying on amino acid composition, dye binding properties or reduction-oxidation (redox) potential. You can evaluate major components of complex mixtures separable from the Amide I & II region, like lipids and carbohydrates—making lysates and membrane preps easier than ever!

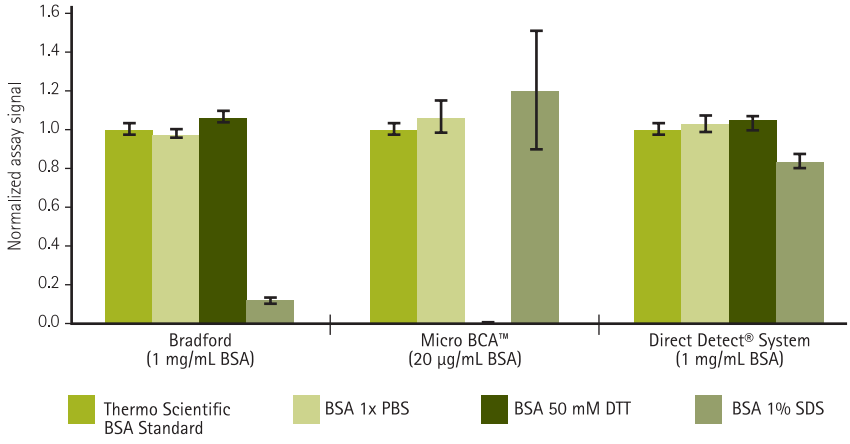
Features & Benefits

- IR spectrometry measures amide bond absorbance for more reproducible quantitation across all proteins and peptides
- Improves accuracy over traditional colorimetric assays
- More compatible with detergents, reducing agents and other buffer components that interfere with traditional protein quantitation assays, providing more information from your sample
- Preserves precious samples—requires only 2 µL per analysis
- New software module can now quantify long aliphatic chains in lipids and detergents

Applications

Protein Quantitation, Lipid Analysis, Peptide Quantitation

Product Performance



Direct Detect® spectrometer works where Bradford and BCA assays fail. The Direct Detect® spectrometer provides accurate and precise results, even in the presence of detergent (SDS) and reducing agent (DTT). Using the Direct Detect® system, calculated concentrations for all BSA samples matched the prediluted Thermo Scientific BSA Standard. In comparison, the Coomassie® Plus (Bradford) Assay results differed greatly in the presence of 1% SDS, and the Micro BCA™ assay could not provide data in the presence of 50 mM DTT.

Specifications

Quantitation Approach	Assay Range	Sample Volume (tube/plate)
Direct Detect® System	250-5,000 µg/mL	2 µL
Bradford Assay	20-2,000 µg/mL	50 µL/25 µL
Micro BCA™ Assay	2-4 µg/mL	500 µL/150 µL
Lowry Assay	10-1,500 µg/mL	200 µL/40 µL

Ordering Information

Description	Qty/Pk	Catalogue No.
Direct Detect® Spectrometer and Starter Kit	1	DDHW00010-WW
Includes:		
Direct Detect® Spectrometer	1	
Universal Power Adapter	1	
Dell Latitude® 2120 Netbook and Power Adapter	1	
Direct Detect® Software	1	
Netbook Stand	1	
Spotting Tray	1	
Ethernet Cable	1	
Direct Detect® Assay-free Cards (50/pk)	1	
Consumables		
Direct Detect® Assay-free Cards (50/pk)	1	DDAC00010-GR
Direct Detect® Assay-free Cards (50/pk)	4	DDAC00010-4P
Direct Detect® Assay-free Cards (50/pk)	8	DDAC00010-8P
Direct Detect® Desiccant Pack	5	DDSP00010-DE

For more information visit: www.merckmillipore.com/directdetect

Immobilon® Membranes, Sandwiches and Blotting Filter Paper

PVDF transfer membranes for Western blotting

Immobilon® PVDF membranes are offered in three types, each optimized for a different protein blotting application. Convenient blotting sandwiches feature pre-cut sheets of membrane and blotting filter paper. Immobilon® PVDF membranes have high protein adsorption, so you won't lose proteins during transfer or reprobing. The open pore structure makes it easy to access bound proteins and remove unbound probes. In addition, Immobilon® PVDF membranes optimized for fluorescent blots dramatically increase signal-to-noise ratios for high sensitivity in quantitative, multiplexing applications.

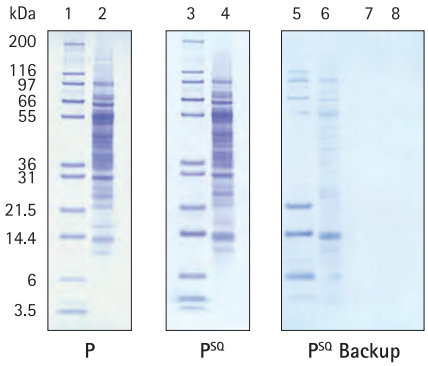
Features & Benefits

- Won't crack, curl or fracture when cut
- Low background
- Superior staining capabilities
- Can be reprobed multiple times

Applications

Western Blotting, Dot Blotting, Protein Sequencing; Compatible with Radioactive, Chromogenic, Chemiluminescent, Fluorescent, and Chemifluorescent Detection

Product Performance



Immobilon®-PSQ membrane prevents the proteins from blowing through the membrane, increasing protein signal. Molecular weight standards (lanes 1 and 3) and calf liver lysate (lanes 2 and 4) were transferred to Immobilon®-P or Immobilon®-PSQ membranes. A sheet of Immobilon®-PSQ membrane was placed behind the primary membranes to capture proteins that passed through (lanes 5 and 6 behind Immobilon®-P membrane; lanes 7 and 8 behind Immobilon®-PSQ membrane).

Specifications

	Immobilon®- P Membrane	Immobilon®-P^{SQ} Membrane	Immobilon®-FL Membrane
Filter Material	Hydrophobic PVDF	Hydrophobic PVDF	Hydrophobic PVDF
Filter Pore Size, µm	0.45	0.2	0.45
Protein Binding Capacity, µg/cm²			
Insulin	160	262	155
BSA	215	340	205
Goat IgG	294	448	300

Ordering Information

Description	Filter Dimensions (cm x cm)	Qty/Pk	Catalogue No.
Immobilon®-P PVDF Transfer Membrane, 0.45 µm			
Immobilon®-P Transfer Membrane	7 x 8.4	50	IPVH07850
	8 x 10	10	IPVH08100
	8.5 x 13.5	10	IPVH08130
	9 x 12	10	IPVH09120
	10 x 10	10	IPVH10100
	15 x 15	10	IPVH15150
	20 x 20	10	IPVH20200
	26 x 26	10	IPVH304F0
Immobilon®-P Transfer Membrane Roll	26.5 x 375	1	IPVH00010
Immobilon®-P^{SQ} PVDF Transfer Membrane, 0.2 µm			
Immobilon®-P^{SQ} Transfer Membrane	7 x 8.4	50	ISEQ07850
	8 x 10	10	ISEQ08100
	8.5 x 13.5	10	ISEQ08130
	9 x 12	10	ISEQ09120
	10 x 10	10	ISEQ10100
	15 x 15	10	ISEQ15150
	20 x 20	10	ISEQ20200
	26 x 26	10	ISEQ26260
Immobilon®-P^{SQ} Transfer Membrane Roll	26.5 x 375	1	ISEQ00010
Immobilon®-FL Membrane, 0.45 µm for Fluorescent Westerns			
Immobilon®-FL Transfer Membrane	10 x 10	10	IPFL10100
	20 x 20	10	IPFL20200
	26.5 x 375	1	IPFL00010
	7 X 8.4	10	IPFL07810
Immobilon® Blotting Sandwiches			
Immobilon®-P Blotting Sandwich	7 x 8.4	20	IPSN07852
	8.5 x 13.5	20	IPSN08132
Immobilon®-P Blotting Filter Paper	7 x 8.4	100	IBFP0785C
	8.5 x 13.5	100	IBFP0813C

For more information visit: www.merckmillipore.com/westernblotting

Detection: Fluorescent Westerns
Immobilon®-FL transfer membrane

Fluorescence-based detection of Western blots, while increasing in popularity due to multiplex detection capabilities, requires specialized tools to obtain optimal results. Merck Millipore's solutions for fluorescent Westerns, including Immobilon®-FL membrane, are designed to work together for fast, reproducible protein detection.

Publications citing Immobilon®-FL: ~9,000

How does Immobilon®-FL membrane work?

This 0.45 µm membrane is the first transfer membrane specifically optimized for fluorescence-based detection of Western blots. Its extremely low background autofluorescence improves sensitivity of all fluorescence detection protocols.

Key Benefits

- The only membrane that works at near-infrared wavelengths (700-800 nm)
- Strong signals due to higher protein adsorption & retention on the membrane
- Low background to detect even faint bands
- High tensile strength for multiple stripping and reprobing cycles

For more information, visit:
www.merckmillipore.com/flwestern

For product ordering information, see page 115.

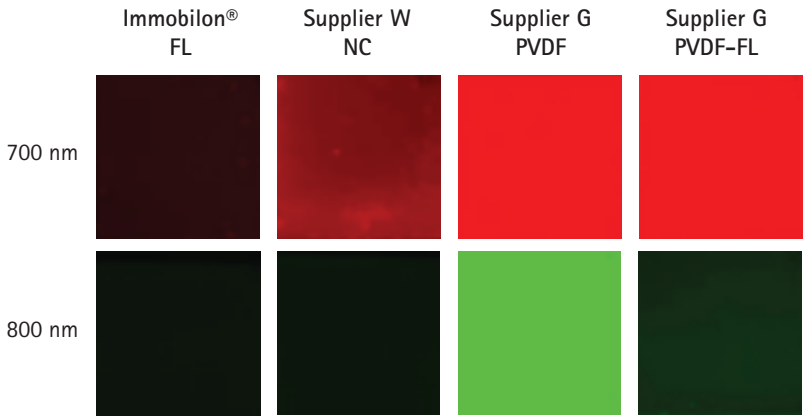


Figure 1. Lowest background fluorescence. Compared to nitrocellulose (NC) and PVDF membranes from other suppliers, Immobilon®-FL membrane exhibits the lowest background fluorescence at both wavelengths.

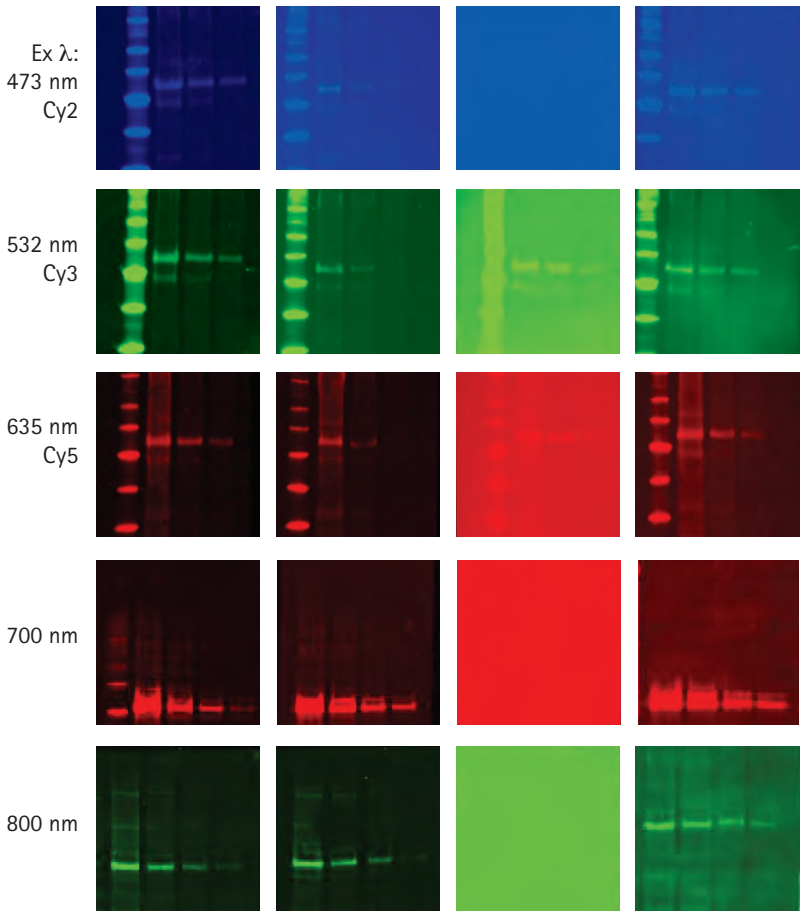


Figure 2. Highest sensitivity. Compared to other membranes, Immobilon®-FL membrane enables detection of smaller amounts of protein at all wavelengths, including near-infrared.

SNAP i.d.® 2.0 Protein Detection System

Rapid system takes protein detection to new dimensions

Unlike conventional Western blotting, where diffusion is the primary means of reagent transport, the SNAP i.d.® 2.0 system uses a vacuum to actively drive reagents through the membrane, enabling thorough washing and reducing the blocking, antibody incubation and wash steps to 30 minutes total. The SNAP i.d.® 2.0 system adds exciting new capabilities for Western blotting and requires no additional reagent consumption (e.g., antigen, antibody or detection reagents). The system's unique design enables the use of small volumes for antibody incubations with either polyvinylidene difluoride (PVDF) or nitrocellulose blotting membranes.

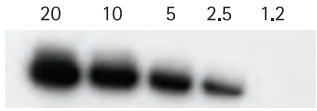
Features & Benefits

- Superior: Increased antibody-antigen binding, enhanced washes, and antibody recollection
- Flexible: Two gel sizes, mini (7.5 x 8.4 cm) and midi (8.7 x 13.5 cm)
- Fast: 30-minute immunodetection

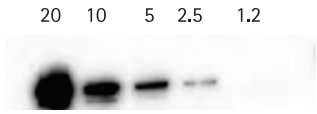
Applications

Western Blotting using Nitrocellulose or PVDF Membrane; Compatible with Radioactive, Chromogenic, Chemiluminescent, Fluorescent, and Chemifluorescent Detection

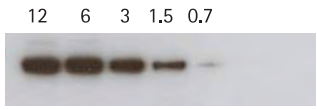
Product Performance



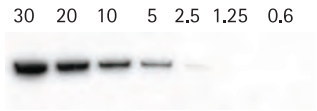
Anti-Huntingtin Protein (Catalogue No. MAB2166)
1:400 dilution of this antibody detected Huntingtin protein in rat brain lysate (20 - 1.2 µg).
Proteins were detected using Luminata™ Forte HRP detection reagent. Exposure of the blots to X-ray film time varies from 20 sec. to 30 min.



Anti-Metabotropic Glutamate Receptor 5 (Catalogue No. AB5675)
1:200 dilution of this antibody detected Metabotropic Glutamate Receptor 5 in rat brain lysate (20 - 1.2 µg).
Proteins were detected using Luminata™ Forte HRP detection reagent. Exposure of the blots to X-ray film time varies from 20 sec. to 30 min.



Anti-erbB2 (intracellular domain) (Catalogue No. 04-291)
1:200 dilution of this antibody detected erbB2 in A431 lysate (12 - 0.7 µg).
Proteins were detected using Luminata™ Forte HRP detection reagent and blots. Exposure of the blots to X-ray film varies from 20 sec. to 30 min.



Anti-Pyk2 (Catalogue No. 06-559)
1:200 dilution of this antibody detected Pyk2 protein in rat brain lysate (30 - 0.6 µg).
Proteins were detected using Luminata™ Forte HRP detection reagent and blots. Exposure of the blots to X-ray film varies from 20 sec. to 30 min.

The SNAP i.d.® 2.0 protein detection system enables sensitive, specific detection of diverse targets, using various antibodies.

Ordering Information

Description	Dimensions (cm)	Qty/Pk	Catalogue No.
SNAP i.d.® 2.0 Systems			
SNAP i.d.® 2.0 System-Mini	7.5 x 8.4	1	SNAP2MINI
SNAP i.d.® 2.0 System-Midi	8.5 x 13.5	1	SNAP2MIDI
SNAP i.d.® 2.0 System-Mini and Midi		1	SNAP2MM
SNAP i.d.® 2.0 Consumables			
SNAP i.d.® 2.0 Mini Blot Holders	7.5 x 8.4	100	SNAP2BHMN0100
SNAP i.d.® 2.0 Midi Blot Holders	8.5 x 13.5	100	SNAP2BHMD0100
SNAP i.d.® 2.0 Accessories			
SNAP i.d.® 2.0 Antibody Collection Tray		20	SNAPABTR
SNAP i.d.® 2.0 Blot Roller		1	SNAP2RL
SNAP i.d.® 2.0 Mini Blot Holding Frames		2	SNAP2FRMN02
SNAP i.d.® 2.0 Midi Blot Holding Frames (double pack)		2	SNAP2FRMD02
SNAP i.d.® 2.0 Mini Blot Holding Frame (single pack)		1	SNAP2FRMN01
SNAP i.d.® 2.0 Midi Blot Holding Frame (single pack)		1	SNAP2FRMD01
Accessories			
Chemical Duty Pump, 100 V/50-60 Hz		1	WP6110060
Chemical Duty Pump, 115 V/60 Hz		1	WP6111560
Chemical Duty Pump, 220 V/60 Hz		1	WP6122050
Vacuum Filtering Flask, 1 L		1	XX1004705
No. 8 Perforated Stopper, silicone		1	XX1004708
Filter Forceps, blunt end, stainless steel		3	XX6200006P

For more information visit: **www.merckmillipore.com/westernblotting**

Antibody recovery and reuse in the SNAP i.d.® 2.0 immunodetection system

Introduction

Antibody reuse for Western blotting is a common practice. While many antibodies lose potency with time or degrade even faster due to improper storage conditions, there is high potential value of recovering the primary antibody for possible reuse in some experiments.

Here, we compare antibody recovery and reuse in the standard immunodetection protocol with the antibody recovery and reuse in the SNAP i.d.® 2.0 system using the extended protocol and the original SNAP i.d.® protocol.

1. Assemble blot in blot holder/frame
2. Add blocking solution
3. Apply vacuum until completely dry
4. Turn vacuum off
5. Remove blot holder frame
6. Wipe any residual liquid at the bottom of the frame
7. **Place antibody collection tray**
8. Add primary antibody and incubate for 10 min or more
9. After incubation, turn vacuum on and wait for 1 min
10. Turn vacuum off and remove collection tray
11. Turn vacuum on for washing
12. Continue with the SNAP i.d.® protocol

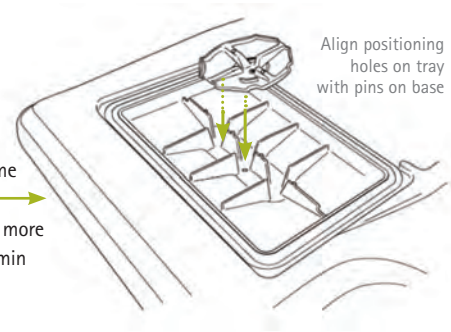


Figure 1. SNAP i.d.® 2.0 protocol, including antibody collection.

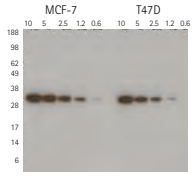
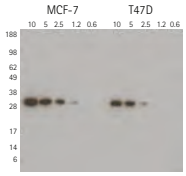
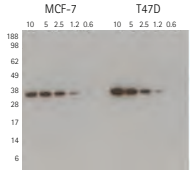
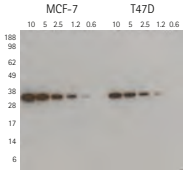
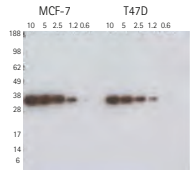
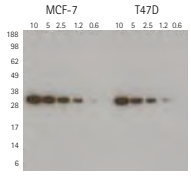
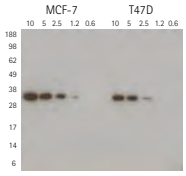
Method	Processing time	Blot processed with freshly diluted antibody	Blot processed with collected antibody	Processing time	Blot processed with antibody used for the third time
Standard/ Traditional Immunodetection Method	Blocking = 1 h Primary Ab =1 h Secondary Ab =1h 6 washes (5 min each) = ½ h **Total = 3.5 h**				
SNAP i.d.® Extended Protocol (Extended incubation of primary Ab only)	Blocking = 20 s Primary Ab = 1 h Secondary Ab =10 min 8 washes (20 s each) = 2 min 40 s **Total = 1 h 13 min**			Blocking = 20 s Primary Ab = Overnight Secondary Ab =10 min 8 washes (20 s each) = 2 min 40 s **Total = 14 hr 12 min**	
SNAP i.d.® Original Protocol	Blocking = 20 s Primary Ab = 10 min Secondary Ab =10 min 8 washes (20 s each) = 2 min 40 s **Total = 23 min**				

Figure 2. Two-fold dilution series of breast cancer cell lysates (MCF-7 and T47D, 10 to 0.6 µg total protein) were subjected to SDS-PAGE and transferred to blotting membranes in seven identical blots using three different immunodetection protocols as described above. The seven blots were probed with anti-PP2A, which was either freshly diluted, collected or recovered for a second time.

Conclusion

The SNAP i.d.® 2.0 Protein Detection System not only reduces Western blot processing time by as much as 80%, but it also conserves precious antibodies by providing a rapid and convenient method for the collection of primary antibodies for future reuse. Greater than 90% of the primary antibody volume can be recovered after the incubation step by following the recommended protocol. The antibodies collected can be used successfully in subsequent immunodetection with no reduction in blot quality, even in the extended protocol (1 h or overnight incubations).

For SNAP i.d.® 2.0 system ordering information, see page 118.

Western Blotting Reagents

Highest sensitivity with the least background

For simple, cost-effective protein detection, use our Western blotting reagents to achieve the highest sensitivity with the least background. Featured Western blotting tools include protein-free, room temperature-stable blocking reagents for chemiluminescent, fluorescent, and phosphoprotein detection and pre-mixed, room temperature-stable HRP substrates.

- Signal enhancing reagents amplify your signals so you can get your data more quickly and spend less time troubleshooting
- We also offer easy-to-use reagents for the removal of antibodies from Western blots that have been developed with chemiluminescent substrates

Features & Benefits

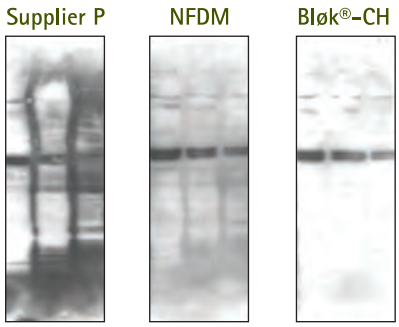
- Pre-optimized to work synergistically, providing strong, specific signals and low background

Applications

Western Blotting using Nitrocellulose or PVDF Membrane; Compatible with Radioactive, Chromogenic, Chemiluminescent, Fluorescent, and Chemifluorescent Detection

Product Performance

Bløk® reagents provide better signal-to-noise ratios compared to NFDM or blocking reagents from Supplier P. Chemiluminescence detection of p53 in EGF-stimulated A431 lysate (10-2.5 µg/lane). Blocking reagents used during the blocking and antibody incubation steps are indicated on top. NFDM = nonfat dry milk.



Ordering Information

Description	Reagents (Volumes)	Membrane Coverage (cm²)	Qty/Pk	Catalogue No.
Immobilon® Western Chemiluminescent HRP Substrate				
Immobilon® Western Chemiluminescent HRP Substrate	Luminol (25 mL); Peroxide solution (25 mL)	500	2 x 25 mL	WBKLS0050
	Luminol (50 mL); Peroxide solution (50 mL)	1000	2 x 50 mL	WBKLS0100
	Luminol (250 mL); Peroxide solution (250 mL)	5000	2 x 250 mL	WBKLS0500
Immobilon® Western AP Substrate				
Immobilon® Western AP Substrate, 25 mL		500	25 mL	WBKDS0025
Immobilon® Western AP Substrate, 100 mL		2000	100 mL	WBKDS0100
Bløk™ Noise Cancelling Reagents				
Bløk™- CH Noise Cancelling Reagents for Chemiluminescence Detection, 500 mL		1000	1	WBAVDCH01
Bløk™- FL Noise Cancelling Reagents for Fluorescent Detection, 500 mL		1000	1	WBAVDFL01
Bløk™- PO Noise Cancelling Reagents for Phosphoprotein Detection using Chemiluminescence or Fluorescence Techniques, 500 mL		1000	1	WBAVDP001

Ordering Information – Continued

Description	Membrane Coverage (cm^2)	Qty/Pk	Catalogue No.
Luminata™ Western HRP Substrates			
Luminata™ Classico Western HRP Substrate, 100 mL	1000	100 mL	WBLUC0100
Luminata™ Classico Western HRP Substrate, 500 mL	5000	500 mL	WBLUC0500
Luminata™ Crescendo Western HRP Substrate, 100 mL	1000	100 mL	WBLUR0100
Luminata™ Crescendo Western HRP Substrate, 500 mL	5000	500 mL	WBLUR0500
Luminata™ Forte Western HRP Substrate, 100 mL	1000	100 mL	WBLUF0100
Luminata™ Forte Western HRP Substrate, 500 mL	5000	500 mL	WBLUF0500
ReBlot™ Plus Reagents			
ReBlot™ Western Blot Recycling Kit		1 kit	2060
ReBlot™ Plus Kit		1 kit	2500
ReBlot™ Plus Mild Antibody Stripping Solution, 10x		50 mL	2502
ReBlot™ Plus Strong Antibody Stripping Solution, 10x		50 mL	2504

For more information visit: **www.merckmillipore.com/westernblotting**

Bring your biomarkers to life.
The best, most relevant assays for cancer immunology research.

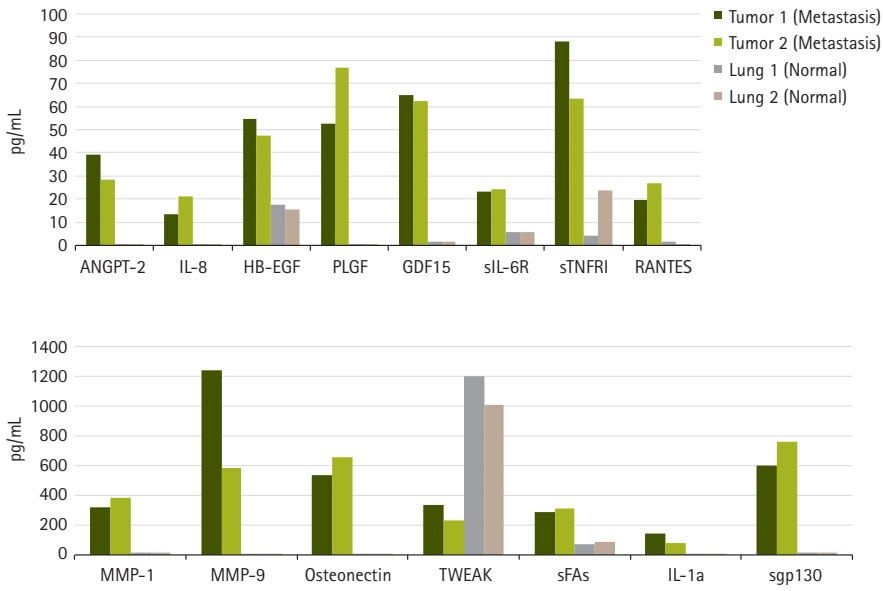
For a complete picture of the effects of inflammation on disease you need to analyze multiple proteins from multiple systems, including inflammation and stress response pathways. To help you discover the biology in your data, we've built the largest portfolio of assays for both circulating and intracellular inflammation biomarkers and a complete spectrum of trusted Luminex® instrumentation.

Our quality manufacturing of MILLIPLEX® MAP assay panels and ELISAs gives you the same accuracy and precision in every lot, backed by the same, unwavering technical support.

Why use MILLIPLEX® MAP panels to study cancer?

- Cancer research necessitates the ability to study multiple biomarkers or multiple targets in a single pathway or multiple pathways simultaneously
- Wide selection of human circulating cancer biomarker panels enables analyses that cross multiple tumor types and metastases
- Availability of both human and mouse angiogenesis/growth factor panels

Bring your research to life:
www.merckmillipore.com/milliplex



Identification of tumor-associated biomarkers (cell migration, tumor invasion, angiogenesis and metastasis) in lung tissue lysates derived from tumor-bearing and control (normal) mice. Lung tissue samples harvested 38 days after tumor inoculation and normal lung was harvested from age-matched controls. MILLIPLEX® MAP Human Cancer, Angiogenesis, Metastasis, Cytokine, Bone, MMP and TIMPs Panels were used to identify biomarker candidates.

Reput(Ab)le™ Antibodies

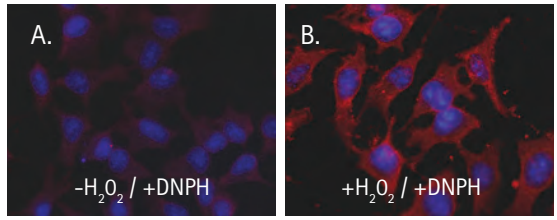
We're validated.
We're guaranteed.
We're published.
We create the antibodies most cited by the research community.

Researchers trust our antibodies because we are a thoughtful antibody producer, not a reseller. We're selective about offering the best antibodies based on the expertise of Chemicon® and Upstate®, internal R&D teams and collaborations with leading institutions. We guarantee our antibodies because of a stringent validation process that produces the highest quality antibodies on the market today.

We provide the most reliable, defensible, and publishable antibody performance, because, ultimately, it's not about our reputation. **It's about yours.**

Focused on your research.

Our extensive, focused portfolio provides validated antibodies with breadth and depth in major research areas: neuroscience, epigenetics, cell signaling, cancer and cell structure, backed by excellent service and support. Plus, many of our antibodies and assays are validated for multiple detection platforms, such as immunohistochemistry (IH), immunocytochemistry (ICC), flow cytometry and immunoprecipitation.

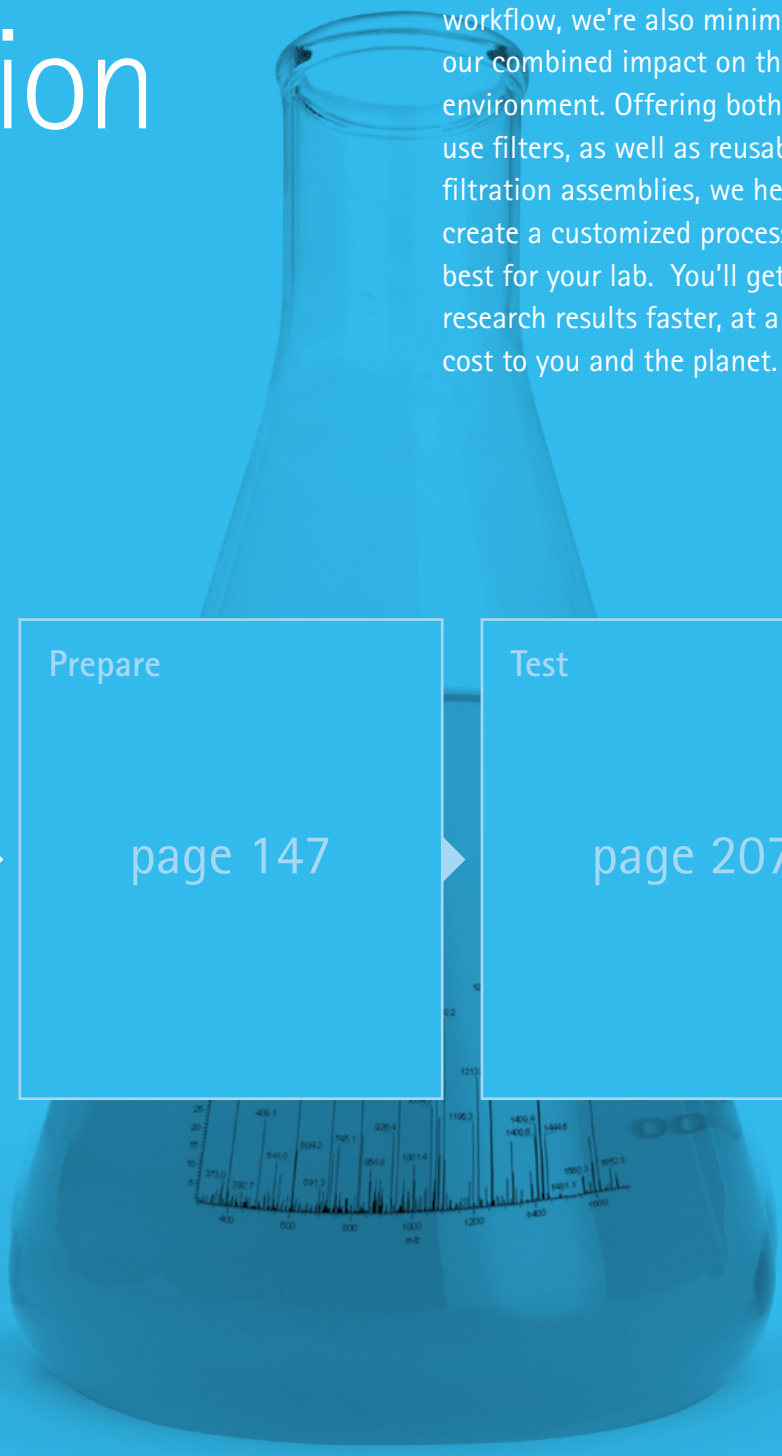


Oxidative stress detection with OxyBlot™, OxyELISA™, OxyICC™ (shown), IH, and flow cytometry assays. Under physiological and pathophysiological oxidative stress, oxygen free radicals and other reactive species result in carbonyl groups being introduced into protein side chains. Merck Millipore's oxidative stress detection kits enable simple and sensitive immunodetection of these carbonyl groups, following specific modification with dinitrophenylhydrazine (DNPH). DNPH-modified carbonyls (red) are more abundant in peroxide-treated cells (B), compared to untreated cells (A).

Put the most reputable antibodies to work for you.
www.merckmillipore.com/Ab

Analytical Sample Preparation

Trust Merck Millipore membrane filtration devices, chromatography columns and test kits for the collection, preparation and analysis of your most precious air or fluid samples. In building solutions for your entire analytical research workflow, we're also minimizing our combined impact on the environment. Offering both single-use filters, as well as reusable filtration assemblies, we help you create a customized process that's best for your lab. You'll get better research results faster, at a lower cost to you and the planet.



Collect

Collect samples from air, soil, water, fuel and industrial processes using our membrane filters, filter holders and solvent dispensers. Many of our sample collection devices feature broad chemical compatibility, low extractables and low analyte binding, making them ideal for sensitive analyses.

Prepare

page 147

Test

page 207

Filter Holder Selection Guide

	Glass	Stainless Steel (SS)		Plastic	
	Vacuum	Vacuum	Pressure	Vacuum	Pressure
13 mm		Epifluorescence Filter Holder (page131)  Analytical Filter Holder (page 130) 	Swinny Filter Holder (page 191) 		Swinnex® Holder (page 190)
25 mm	Microanalysis Filter Holder (page 129) 	Analytical Filter Holder (page 130) 	High Pressure Filter Holder (page 193)  Solvent Filtering Dispenser (page 141)  Microsyringe Filter Holder (page 191)  Filterjet™ Solvent Dispenser (page 142) 	1225 Sampling Manifold (page 140) 	Swinnex® Holder (page 190)
47 mm	All-Glass Filter Holders (page 127) 	Analytical Filter Holder (page 130) 	SS Pressure Filter Holder (page 196) 	Sterifil® System (page 131) 	Swinnex® Holder (page 190) 
	Classic Glass Filter Holder (page 128)  MilliSolve™ System (page 197) 	Hydrosol™ Filter Holder (page 133) 	High Pressure Filter Holder (page 193) 	Sterifil® 500 Filter Holder (page 131) 	In-Line Filter Holder (page 192) 
90 mm	All-Glass Filter Holder (page 127) 		Standing SS Filter Holder (page 195) 		
142 mm			Standing SS Filter Holder (page 195) 		

All-Glass Filter Holder (47 mm, 90 mm)

For filtration of corrosive liquids and solvents

The All-Glass Filter Holder was designed for the filtration of aqueous and organic or corrosive liquids for particulate contamination analysis. The holder can also be used for HPLC solvent preparation. The vacuum connection is integrated into the filter holder base and flask cap, above the filtrate exit level. With this design, you can avoid unintentionally drawing filtrate into vacuum tubing. This design also allows simple transfer of filtrate (i.e., HPLC solvents) by pouring from the receiver flask.

Features & Benefits

- All-glass construction has broad chemical compatibility
- Borosilicate glass parts contact liquid, with ground-glass sealing surfaces
- Vacuum connection to flask cap simplifies transfer of filtrate

Applications

Particle Contamination Analysis, HPLC Solvent Filtration, General Filtration and Clarification

Specifications

	47 mm Holder	90 mm Holder
Materials		
Funnel, Base, and Cap	Borosilicate glass funnel, base and tubulated cap; anodized aluminum spring clamp	
Filter Support	Fritted glass*	PTFE-coated stainless steel
Flask	Borosilicate glass	N/A
Filter Diameter, mm	47	90
Filtration Area, cm²	9.6	40
Volume Capacity, mL	Funnel: 300 mL; flask: 1 L	Funnel: 1 L
Outlet Fitting	6 mm (1/4 in.) O.D. tubulated cap sidearm to vacuum	
Dimensions		
Height, cm	43	35 (funnel and base)
Diameter, cm	Flask: 14; funnel: 7.6	Funnel: 11.5

* Optional glass base with stainless steel screen available.

Ordering Information

Description	Qty/Pk	Catalogue No.
All-Glass Filter Holder Assembly with Funnel, base, cap, clamp, and flask, 47 mm	1	XX1504700
All-Glass Filter Holder Assembly with Funnel, base, cap, clamp, 90 mm	1	XX1009020
Accessories (47 mm and 90 mm Holders)		
1 L Ground Joint Flask	1	XX1504705
2 L Ground Joint Flask	1	XX1604705
5 L Ground Joint Flask with Conical Bottom	1	XX1604706
Tubing, 3/16 in. I.D. x 140 cm, silicone	1	XX7100004
Filter Forceps, blunt end, stainless	3	XX6200006P
Accessories (47 mm Holder Only)		
Glass Base & Cap with Stainless Steel Screen, 47 mm	1	XX1504732
1L Funnel, 47 mm, ground glass seal	1	XX1004707
Replacement Parts (47 mm Holder)		
Glass Funnel, 300 mL, 47 mm	1	XX1004704
Vacuum Base and Cap, fritted glass	1	XX1504702
Vacuum Base and Cap, stainless steel support	1	XX1504732
Support Screen, stainless steel	1	XX2004708
Spring Clamp, anodized aluminum	1	XX1004703
47 mm Gasket, PTFE	25	XX2004703
Replacement Parts (90 mm Holder)		
Glass Funnel, 1 L, 90 mm	1	XX1009000
Support Screen, stainless steel	1	XX1009002
Spring Clamp, anodized aluminum	1	XX1009003
Vacuum Base and Cap, stainless steel support	1	XX1009004
90 mm Gasket, PTFE	10	XX1009010

Note: completed replacement part information available online.

For more information visit: www.merckmillipore.com/LabHardware

Classic Glass Filter Holders

For 47 mm disc filters

The Classic Glass Filter Holder is an essential tool for every research lab. The holder's multipurpose design is appropriate for a variety of applications and is available in three different support materials for compatibility with your specific application needs.

Features & Benefits

- Designed for easy loading and removal of membranes
- Three membrane support material options to suit a variety of applications
- UV sterilize or autoclave with filter in place for bacteriological analysis

Applications

General Clarification, Bacteriological Analysis, Particulate Contamination Analysis of Oils and Hydraulic Fluids, Exfoliative Cytology

Specifications

Materials of Construction	Borosilicate glass funnel and base; anodized aluminum spring clamp; silicone stopper
Glass Support (cat. no. XX1004700)	Coarse-frit glass filter support
PTFE Support (cat. no. XX1004720)	PTFE-faced funnel and base
Stainless Screen Support (cat. no. XX1004730)	Stainless steel screen filter support
Filter Diameter, mm	47
Filtration Area, cm^2	9.6
Funnel Capacity, mL	300; accessory 1 L is available
Prefilter Diameter, mm	35 (thick depth prefilter) or 47 (membrane prefilter)
Outlet Fitting	No. 8 perforated silicone stopper mounts in standard 1 L and 4 L filtering flasks
Dimensions	
Height, cm	22.9
Diameter, cm	7.6
Sterilization Method	
Glass Supported and Stainless Screen Supported Holders	UV sterilize or autoclave without filter in place
PTFE Supported Holder	Autoclave with filter in place

Ordering Information

Description	Qty/Pk	Catalogue No.
Glass Filter Holder Assembly, with funnel, fritted base, stopper, clamp, 47 mm	1	XX1004700
Glass Filter Holder Assembly, PTFE-coated, with funnel, base, stopper clamp, 47 mm	1	XX1004720
Glass Filter Holder with stainless steel screen, 47 mm	1	XX1004730
Replacement Parts: Glass Filter Holder		
Glass Funnel, 300 mL, borosilcate	1	XX1004704
Spring Clamp, 47 mm, aluminum	1	XX1004703
Base for 47 mm glass/filter holder	1	XX1004702
No. 8 Perforated Stopper, silicone	5	XX1004708
Replacement Parts: PTFE-faced Glass Filter Holder		
Funnel, PTFE-faced, 300 mL	1	XX1004724
Spring Clamp, 47 mm, aluminum	1	XX1004703
Glass Base, PTFE-faced, 47 mm	1	XX1004722
No. 8 Perforated Stopper, silicone	5	XX1004708
Replacement Parts: Stainless Screen Glass Filter Holder		
Glass Funnel, 300 mL, borosilcate	1	XX1004704
Spring Clamp, 47 mm, aluminum	1	XX1004703

Description	Qty/Pk	Catalogue No.
Glass Base with Screen, 47 mm	1	XX1004732
Glass Base without Screen, 47 mm	1	XX1004733
Support Screen, 47 mm, stainless steel	1	XX2004708
Gasket, PTFE	25	XX2004703
No. 8 Perforated Stopper, silicone	5	XX1004708
Note: complete replacement parts information available online.		
Accessories		
Vacuum Filtering Flask, 1 L	1	XX1004705
Vaccum Filtering Flask, 4 L	1	XX1004744
1 L Funnel, 47 mm, ground glass seal	1	XX1004707
Tubing, 3/16 in. I.D. x 140 cm, silicone	1	XX7100004
High Output Pump, 115 V/60 Hz	1	WP6211560
High Output Pump, 220 V/50 Hz	1	WP6222050
High Output Pump, 100 V/50–60 Hz	1	WP6210060

For more information visit: www.merckmillipore.com/LabHardware

Glass Microanalysis Filter Holders

For small-volume contamination or biological analysis

The glass microanalysis filter holder is designed for vacuum filtration of small-volume liquid samples for particulate or biological contamination analysis.

Applications

Contamination Analysis (not for use with thick prefilters or flammable liquids)

Features & Benefits

- Volume graduations clearly indicate sample volume
- Filter support available in fritted glass or stainless steel

Specifications

Materials	
Filter Holder, 25 mm, fritted glass (cat. no. XX1002500)	Borosilicate glass funnel and base; fritted glass filter support; anodized aluminum spring clamp; silicone stopper
Filter Holder, 25 mm, stainless steel (cat. no. XX1002530)	Borosilicate glass funnel and base; removable stainless steel screen filter support; anodized aluminum spring clamp; silicone stopper
Filter Diameter, mm	~25
Filtration Area, cm²	2.5
Funnel Capacity, mL	15
Outlet Fitting	No. 5 perforated silicone stopper mounts in standard 125 mL filtering flask*
Dimensions	
Height, cm	15.2
Diameter, cm	2.5

*Filter holders can be used on 1 L flasks using a No. 8 stopper (cat. no. XX2004718).

Ordering Information

Description	Qty/Pk	Catalogue No.
Microanalysis Filter Holder, 25 mm, fritted glass support	1	XX1002500
Microanalysis Filter Holder, 25 mm, stainless steel support	1	XX1002530
Replacement Parts		
Funnel,15 mL, borosilcate glass	1	XX1002514
Spring Clamp, 25 mm, aluminum	1	XX1002503
Fritted Glass Base with Stopper, 25 mm	1	XX1002502
Base Stopper and Stainless Steel Screen	1	XX1002532
No. 5 Perforated Stopper, silicone	5	XX1002508
Gaskets, PTFE coated	10	XX1002535
Support Screen, 25 mm, stainless steel	1	XX5002501

For more information visit: www.merckmillipore.com/LabHardware

Analytical Stainless Steel Filter Holders for 13, 25, and 47 mm Disc Filters

For contamination analysis

The analytical stainless steel filter holders are designed for the vacuum filtration of samples for bacteriological or particulate contamination analysis.

Features & Benefits

- Available in three diameters with four available funnel sizes to accommodate samples up to 250 mL
- Holder with 250 mL funnel is equipped with a funnel lid, which can be vented using accessory filter unit
- Can be autoclaved or flame-sterilized

Applications

Bacteriological or Particulate Contamination Analysis

Specifications

	40 mL Holder	50 mL Holder	100 mL Holder	250 mL Holder
Materials				
Assembly	Stainless steel funnel and support screen	Stainless steel funnel and support screen; borosilicate glass base; anodized aluminum spring clamp; silicone stopper	Stainless steel funnel, support screen and base; anodized aluminum spring clamp; silicone stopper	Stainless steel funnel, support screen and base; stainless steel funnel cover; anodized aluminum spring clamp; silicone stopper
Gasket	PTFE	PTFE	No gasket needed	No gasket needed
Filter Diameter, mm	13	25	47	47
Filtration Area, cm²	0.7	2.8	9	9
Dimensions				
Height, cm	8.9	12.6	15.6	19.4
Diameter, cm	3.8	5.1	6.2	7.6
Outlet	Male Luer-Slip™	No. 8 perforated silicone stopper mounts in standard 1 L filtering flask		

Ordering Information

Description	Qty/Pk	Catalogue No.
40 mL Filter Holder, 13 mm, stainless steel	1	XX3001240
50 mL Filter Holder, 25 mm, stainless steel	1	XX1002540
100 mL Filter Holder, 47 mm, stainless steel	1	XF2004710
250 mL Filter Holder, 47 mm, stainless steel	1	XF2004725
Replacement Parts for 40 mL Holder		
Replacement Parts Kit for 40 mL Holder	1	XX30012RK*
*Kit includes (4) PTFE O-rings, (4) PTFE gaskets, (4) stainless steel support screens		
Replacement Parts for 50 mL Holder		
Spring Clamp, 25 mm, aluminum	1	XX1002503
Base Assembly for 25 mm Filter Holder	1	XX1002542**
No. 8 Stopper, 9.5 mm (3/8 in.) hole, silicone	5	XX2004718
Support Screen, 25 mm, stainless steel	1	XX5002501
Gaskets, PTFE coated	10	XX1002535
**Base with Support Screen, Gasket, and Stopper		

Description	Qty/Pk	Catalogue No.
Replacement Parts for 100 and 250 mL Holders		
Stainless Steel Funnel, 100 mL	1	XF2004755
Stainless Steel Funnel, 250 mL	1	XF2004756
Spring Clamp, 47 mm, aluminum	1	XX1004703
No. 8 Perforated Stopper, silicone	5	XX1004708
Stainless Steel Support Frit	1	XF2004758
Accessories		
Millex®-FG Filter Unit, 0.20 µm, hydrophobic PTFE, 25 mm	50	SLFG02550
Vacuum Filtering Flask, 1 L	1	XX1004705
Vaccum Filtering Flask, 4 L	1	XX1004744
Tubing, 3/16 in. I.D. x 140 cm, silicone	1	XX7100004

For more information visit: www.merckmillipore.com/LabHardware

Epifluorescence Stainless Steel Filter Holder

For bacteriological analysis by epifluorescence

Designed for accurate, quantitative vacuum filtration of samples for bacteriological analysis by epifluorescence microscopy, the highly polished stainless steel funnel prevents bacterial cells from adhering to surface.

Applications

Bacteriological Analysis by Epifluorescence Microscopy

Specifications

Materials	Stainless steel funnel and base; anodized aluminum spring clamp; silicone stopper
Filter Diameter, mm	13
Filtration Area, cm²	0.7
Funnel Capacity, mL	250
Outlet Fitting	No. 8 perforated silicone stopper mounts in standard 1 L filtering flask

Ordering Information

Description	Qty/Pk	Catalogue No.
Epifluorescence Filter Holder, 13 mm, stainless steel	1	XF3001200

For more information visit: www.merckmillipore.com/LabHardware

Sterifil® Aseptic System and Holder

Reusable, autoclavable device with removable membrane

The Sterifil® aseptic system was designed as a tool for general filtration applications and filtration of samples for particulate or biological contamination analysis. Sterifil® holder and funnel are available separately (without receiver flask and cover) to use with standard 1 L filter flasks or multiple place manifolds.

Applications

General Filtration, Field-based Filtration (with optional hand pump), Sterile Filtration, Bioburden Monitoring, Counting Microorganisms, Filtration Processes Requiring Membrane to be Retained

Features & Benefits

- Closed unit protects samples and filtrate from environmental contamination
- Device is autoclavable with membrane in place for sterile applications with less waste
- Optional hand pump allows for on-site filtration

Specifications

Materials	Polysulfone funnel, funnel cover, receiver flask and cover; polypropylene holder base and filter support screen; silicone stopper	
	Sterifil® Aseptic System	**Sterifil® 500 Holder**
Dimensions		
Height, cm	20.3	14.5
Diameter, cm	10.8	8.5
Filter Diameter, mm	47	47
Filtration Area, cm^2	13.8	15.2
Funnel Capacity, mL	250	500
Prefilter Diameter, mm	42 (thick depth prefilter) or 47 (membrane prefilter)	
Outlet Fitting	Holder outlet stopper fits standard 1 L filtering flask	
Receiver Flask Fitting	Receiver flask ports accept 6 mm (1/4") I.D. tubing or male Luer-Slip™ connection for vacuum, drain, or vent.	
Cover Inlet and Vent Ports	Female Luer-Slip™ connection	

Ordering Information

Description	Qty/Pk	Catalogue No.
Sterifil® Aseptic System, 47 mm	1	XX1104700
Sterifil® Holder, 250 mL (excludes receiver flask)	1	XX1104710
Sterifil® Holder, 500 mL	1	XX11J4750
Replacement Parts		
Sterifil® Funnel Cover	1	XX1104703
Caps, gum rubber	100	XX1104711
Swinnex® Filter Holder, 13 mm	10	SX0001300
Glass Fiber Filter with Binder, AP25, 13 mm	100	AP2501300
Sterifil® Funnel, 250 mL, 47 mm, Polysulfone	1	XX1104704
Filter Holder Base and Support Screen	1	XX1104702
Support Screen, 47 mm, polypropylene	1	XX1104715
O-ring (5-329) for Swinnex® 47 mm filter holder, silicone	10	XX1104707
No. 8 Stopper, 9.5 mm (3/8 in.) hole, silicone	5	XX2004718
Cover for Sterifil® Receiver Flask	1	XX1104706
Sterifil® Receiver Flask, 250 mL	1	XX1104705
Note: complete replacement parts information available online.		
Accessories		
Tubing, 3/16 in. I.D. x 140 cm, silicone	1	XX7100004
Hand Vacuum Pump, polypropylene	1	XKEM00107
EZ-Fit® Manifold, 3-place, stainless steel	1	EZFITMIC03
High Output Pump, 115 V/60 Hz	1	WP6211560
High Output Pump, 220 V/50 Hz	1	WP6222050
High Output Pump, 100 V/50–60 Hz	1	WP6210060

For more information visit: www.merckmillipore.com/LabHardware

Hydrosol™ Stainless Steel Filter Holder

For analysis of flammable liquids

The Hydrosol™ filter holder is designed for the filtration of flammable liquids. Unlike other filter holders, the Hydrosol™ filter holder includes a grounding unit to prevent sparking from static discharge, which can be a safety hazard.

Applications

Vacuum Filtration of Flammable Liquids

Specifications

Materials	Stainless steel funnel, base and filter support screen; anodized aluminum locking ring; nylon lockwheels; silicone stopper
Filter Diameter, mm	47
Filtration Area, cm²	9.6
Funnel Capacity, mL	650
Prefilter Diameter, mm	35 (thick depth prefilter) or 47 (membrane prefilter)
Outlet Fitting	No. 8 perforated silicone stopper mounts in standard 1 L filtering flask
Dimensions	
Height, cm	22.9
Diameter, cm	11.4

Ordering Information

Description	Qty/Pk	Catalogue No.
Hydrosol™ Filter Holder, 47 mm, stainless steel	1	XX2004720
Replacement Parts		
Funnel and Locking Ring Assembly, stainless steel	1	XX2004704
Support Screen, 47 mm, stainless steel	1	XX2004708
Base with Screen, gasket and stopper	1	XX2004702
Gasket, PTFE	25	XX2004703
No. 8 Stopper, 9.5 mm (3/8 in.) hole, silicone	5	XX2004718
Replacement Parts Kit for Hydrosol™ Filter Holder	1	XX20047RK*
*Replacement parts kit includes (1) 47 mm aluminum locking ring, (1) hex key, (1) nylon locking wheel with wrench, (5) PTFE screen gaskets, (5) PTFE locking ring gaskets		
Accessories		
Vacuum Filtering Flask, 1 L	1	XX1004705
Vaccum Filtering Flask, 4 L	1	XX1004744
Tubing, 3/16 in. I.D. x 140 cm, silicone	1	XX7100004
Filter Forceps, blunt end, stainless steel	3	XX6200006P
3-place Manifold, 47 mm, PVC	1	XX2604735
3-place Manifold, 47 mm, stainless steel	1	XX2504735
6-place Manifold, 47 mm, stainless steel	1	XX2504700
High Output Pump, 115 V/60 Hz	1	WP6211560
High Output Pump, 220 V/50 Hz	1	WP6222050
High Output Pump, 100 V/50–60 Hz	1	WP6210060

For more information visit: www.merckmillipore.com/LabHardware

Aerosol Filter Holders

For environmental monitoring

These aerosol filter holders are designed for monitoring airborne particulates from the environment and/or closed systems. Choose the holder design most appropriate for your method. Aerosol filter holders are available in two formats: open-type for open atmosphere sampling and a standard design with a closed connection and inlet dispersion chamber.

Applications
Particulate Contamination Monitoring in Gases

Specifications

Materials	Stainless steel bodies, filter support screens; anodized aluminum locking rings; nylon lockwheels
Dimensions	
Filter Diameter, mm	47
Filtration Area, cm²	9.6
Length, cm of Std. Holder	17.8
Length, cm of Open Holder	10.2
Diameter, cm	6.9
Connections	
Inlet – Std. Holder	Hose connector (11 mm O.D.)
Outlet	Closed system connection, with inlet dispersion chamber and 11mm O.D. inlet/outlet connections, threaded for flow-limiting orifices

Ordering Information

Description	Qty/Pk	Catalogue No.
Aerosol Standard Filter Holder, 47 mm, stainless steel	1	XX5004700
Aerosol Open Filter Holder, 47 mm, stainless steel	1	XX5004710
Aerosol Clean Room Filter Holder, 47 mm, stainless steel	1	XX5004740

For more information visit: www.merckmillipore.com/ParticleMonitoring

PVC Membrane Filters

Pure, medical-grade PVC for sensitive air monitoring

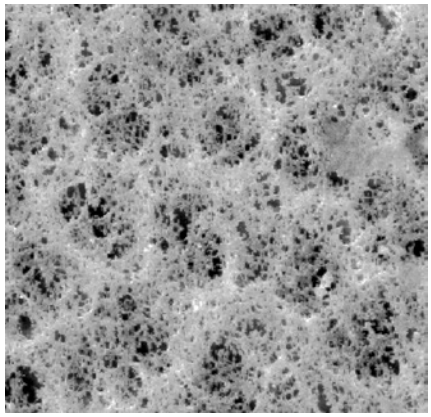
Polyvinylidene chloride (PVC) membranes are specified by ASTM, NIOSH, and OSHA in air monitoring applications to analyze silica, carbon black, metals, quartz particulates and others.

Features & Benefits

- High-quality, medical-grade PVC polymer
- PVC is non-hygroscopic, so humidity will not impact your gravimetric analysis

Applications

Air Monitoring of Particulate Contaminants Including Silica, Metals, and Quartz



Ordering Information

Description	Pore Size (µm)	Diameter (mm)	Color	Surface	Qty/Pk	Catalogue No.
PVC Membrane	5	25	White	Plain	100	PVC502500
		37	White	Plain	100	PVC503700
		47	White	Plain	100	PVC504700

For more information visit: www.merckmillipore/filterdiscs

Silver Membrane Filters

Pure silver filters for particulate monitoring

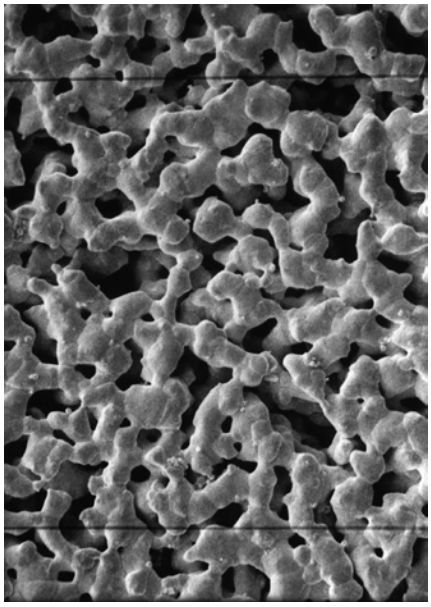
Silver membrane filters are suitable for a variety of applications and are commonly used for air monitoring and analysis of particulate contaminants. Methods from standards organizations like NIOSH specify silver membrane filters for collection and detection of particles such as silica, carbon black, coal tar products, and coke oven emissions.

Features & Benefits

- Pure silver
- Highly resistant to thermal stress and aggressive chemicals
- Low background for sensitive X-ray diffraction analysis

Applications

Air Monitoring: Asbestos, Lead Sulfide, Crystalline and Amorphous Silica



Ordering Information

Description	Pore Size (µm)	Diameter (mm)	Surface	Qty/Pk	Catalogue No.
Silver Membrane	0.45	25	Plain	50	AG4502550
Accessory					
Filter Forceps, blunt end, stainless steel				3	XX6200006P

For more information visit: www.merckmillipore/filterdiscs

Radioactive Alpha Particle Monitoring

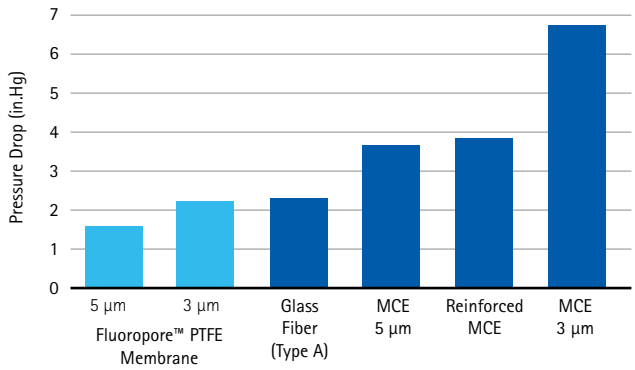
In order to reap the benefits of nuclear energy responsibly, users and regulatory organizations must monitor the degree to which radioactive byproducts of human activity enter the environment. Human activities that generate radioactive particles include scientific experiments involving radiation, medical therapies, nuclear-powered submarines, x-ray procedures, nuclear power plants and smoke detectors. Although there are many naturally occurring radioisotopes in water, air, soil, and organisms, the challenge in radiation monitoring is to detect the "nonnatural" radiation signal above the naturally occurring background radiation levels.

To support efficient, convenient radiation monitoring, Merck Millipore has developed a special Fluoropore™ PTFE membrane filter designed for alpha particle collection in single-use and continuous air monitors. Fluoropore™ membrane is approved for use by the French Institute for Radiological Protection and Nuclear Safety in Saclay, France as well as national labs in North America and Asia.

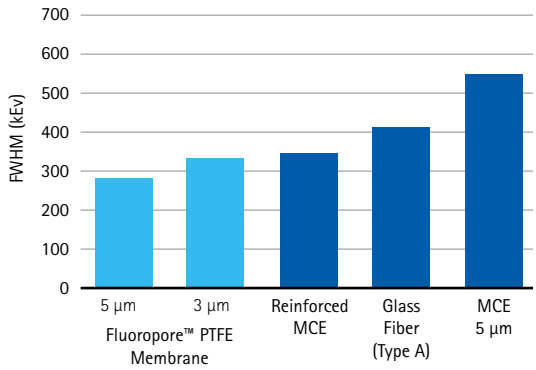
The Fluoropore™ filter for alpha particle monitoring provides:

- **Improved detection accuracy.** Unlike fibrous filter media that trap particles in their matrix, Fluoropore™ membranes collect particles on their surface. This surface collection keeps particles closer to the detector, providing better detection efficiencies and improved resolution.
- **Choice of pore sizes.** Fluoropore™ membranes are available in 3 and 5 µm pore sizes. The smaller pore size provides high resolution. The larger pore size has very low pressure drop and greater throughput capacity, which minimizes the number of filter change-outs.
- **Contrasting backing material.** The 5 µm Fluoropore™ membrane is bonded to a gridded backing made from high density polyethylene fiber. The contrast between the top and bottom of the filter prevents incorrect installation in sampling devices. The backing also reduces the electrostatic charge of the filters and makes them easier to handle.

A.



B.



Lower pressure drop, lower FWHM* measurements. Merck Millipore's Fluoropore™ PTFE membranes exhibit lower pressure drop (A) and collect particles on the surface , providing better detection efficiencies and lower FWHM measurements (B). Room air was collected at 1.7 m3/h (1 standard cubic foot/min).

*FWHM, a measure of spectral quality/resolution, is defined as the full width at half of the maximum height of the P0-218 peak obtained during air sampling of room air.

For ordering information see page 178.

Aerosol Contamination Monitors

With 25 mm and 37 mm filters

Two types of three-piece aerosol contamination monitors are offered: the PS monitor (Type A) and the PP monitor (Type B). Type A is a clear, polystyrene monitor with a 16 mm center ring. The three-piece design holds the filter in place when the top section is removed for open aerosol sampling. Monitors are available in 25 mm and 37 mm diameters, with female Luer-Slip™ vacuum connection. Type A monitors are also available without membrane.

Type B is a three-piece carbon-filled polypropylene conductive monitor with 50 mm extension cowl. Barbed hose vacuum connection eliminates the need for tubing adapter. Use monitors (Cat. No. MAWP025AC) for airborne asbestos monitoring in accordance with NIOSH specifications.

Features & Benefits

- Compliant with NIOSH standard methods
- Boxes marked with Average Background Count (ABC) values
- Pre-assembled with filters in place
- Available with white, black or gridded membranes in two pore sizes
- Available with matched-weight membranes to save time during gravimetric analysis
- A thin cellulose support seals the filter between monitor sections to distribute sample flow evenly over the filter surface

Applications

Air Monitoring, Environmental Montitoring, Aerosol Contamination Monitoring, Asbestos Monitoring

Specifications

Materials	
Filter and Support Pad	MF-Millipore™ MCE membrane / cellulose pad
Type A Monitor Case	Polystyrene
Type B Monitor Case	Carbon-filled polypropylene
Connections	
Inlet	Female Luer-Slip™ fit
Outlet	Female Luer-Slip™ fit
Sterility	Non-sterile

Ordering Information

Description	Pore Size (µm)	Diameter (mm)	Filter Color	Filter Surface	Qty/Pk	Catalogue No.
Monitors, complete with membrane filters						
Type A, Aerosol Monitor	0.8	25	White	Plain	50	MAWP025A0
	0.8	37	White	Plain	50	MAWP037A0
	0.45	37	White	Plain	50	MHWP037A0
Type A, Matched-Weight Aerosol Monitor	0.8	37	White	Plain	50	MAWP037AM
Type B, Aerosol Monitor	0.8	25	White	Plain	50	MAWP025AC
Monitor Refills						
MF-Millipore™ MCE Refills with Thin Absorbent Pad	5.0	37	White	Plain	100	SMWP03700
	0.8	37	White	Plain	100	AAWP03700
	0.8	37	White	Gridded	100	AAWG03700
	0.8	37	Black	Gridded	100	AABG03700
	0.45	37	White	Plain	100	HAWP03700
	0.45	37	White	Gridded	100	HAWG03700
	0.22	37	White	Plain	100	GSWP03700
Mitex™ PTFE Refills with Thin Absorbent Pad	5.0	37	White	Plain	100	LSWP03700
Empty Monitor Housings						
Empty Monitor Cassette, Type A		25			50	M000025A0
		37			50	M000037A0
Empty Monitor Cassette without Ring		37			50	M00003700

For more information visit: www.merckmillipore.com/ParticleMonitoring

Aerosol Analysis Accessories

For environmental monitoring

The Aerosol Adapter adapts your vacuum source to an aerosol analysis monitor, Swinnex® 47 mm filter holder or other products with female Luer inlets. Attach a flow-limiting orifice for quantitative aerosol sampling. The adapter's vacuum-hose end fits the hole of a No. 8 silicone stopper, (cat. no. XX1004708) and the opposite male Luer-Slip™ end fits Swinnex® filter holders or monitor outlet connections.

Flow-limiting orifices create quantitative airflow through an MF-Millipore™ filter for airborne contamination analysis. Thread the orifice into the outlet of an aerosol analysis holder or aerosol adapter for a constant flow rate.

Features & Benefits

- Modulate flow rate to meet specified flow rates without the need for additional flow regulators or valves
- Flow-limiting orifice ratings are accurate to within approximately 15%; for greater precision, calibrate orifice with a flowmeter at actual working vacuum level

Applications

Air Monitoring, Environmental Monitoring, Aerosol Contamination Monitoring

Specifications

Orifice Flow Rate (L/min)	mm Hg	in Hg	PSIG
1	300	12	6
3	300	12	6
4.9	400	16	8
10	500	20	10
14	550	22	11

Ordering Information

Description	Qty/Pk	Catalogue No.
Flow-limiting Orifices, set of 5	1	XX5000000
Flow-limiting Orifice, 2 L/min	1	XX5000020
Flow-limiting Orifice, 1 L/min	1	XX5000002
Aerosol Adapter, Luer-Slip™ to 1/4 in.– 3/8 in. I.D. hose, stainless steel	1	XX6200004

For more information visit: www.merckmillipore.com/ParticleMonitoring

Fluid Contamination Monitors

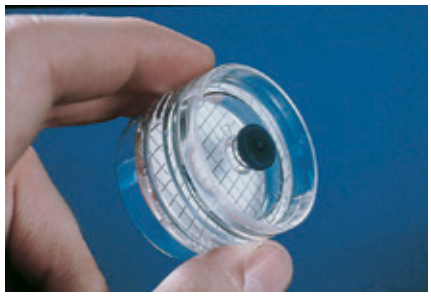
For contamination analysis

Fluid Contamination Analysis Monitors are transparent, disposable filter holders made from Tenite® plastic and pre-assembled with MF-Millipore™ filters. A thick cellulose pad, 34 mm diameter, between the monitor sections seals the filter to distribute the sample flow evenly over the filter surface. Use with the Fluid Sampling Kit (cat. no. XX6403730).

Matched-Weight Monitors eliminate the need to pre-weigh test filters in gravimetric analysis. Each monitor contains two filters matched in weight to within 0.1 mg. Sample passes through both, but upper (test) filter retains all contaminants. The difference in filter weights, after drying, equals the weight of contaminants in sample.

Features & Benefits

- Pre-assembled with filters in place
- Tenite® housings are compatible with liquid hydrocarbon fuels
- Available with matched-weight membranes to save time during gravimetric analysis
- Extend the life of your monitors with membrane refills, both standard membane and matched-weight pairs



Applications

Liquid Contamination Monitoring

Ordering Information

Description	Pore Size (µm)	Filter Color	Filter Surface	Qty/Pk	Catalogue No.
Fluid Contamination Analysis Monitor	0.8	White	Plain	50	MAWP037P0
Matched-Weight Fluid Contamination Analysis Monitor	0.8	White	Plain	50	MAWP037PM
Accessories					
Fluid Contamination Monitor, empty				50	M000037P0

For more information visit: www.merckmillipore.com/ParticleMonitoring

Filter Support Materials

Cellulose pads and Dacron® mesh spacers

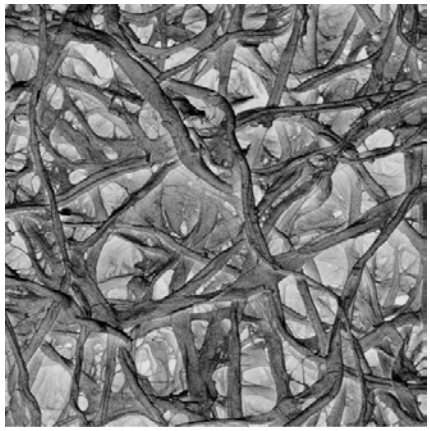
Cellulose support pads are used to reinforce filters in monitors for contamination analysis. When saturated with growth medium, they can also be used for culturing microorganisms on membranes. Woven mesh spacers are placed between filters during serial filtration to prevent the downstream screen filter from "blinding" the upstream filter pores. They increase flow rate and throughput.

Features & Benefits

- Avoid membrane damage during high pressure or fast flow conditions
- Spacers enable you to combine multiple stages of filtration into a single process step, saving time

Applications

Air Monitoring, Environmental Monitoring, Aerosol Contamination Monitoring



Ordering Information

Description	Diameter (mm)	Qty/Pk	Catalogue No.
Absorbent Pad	13	100	AP1001300
	25	100	AP1002500
	37	100	AP1003700
	47	100	AP1004700
Thick Absorbent Pad	34	100	AP30034P0
Woven Mesh Spacer	124	50	AP3212450

For more information visit: www.merckmillipore/filterdiscs

1225 Sampling Manifold

For multi-sample vacuum filtration

Simultaneously vacuum filter 12 samples for rapid analysis of retentate or filtrate. Numbered positions on the filter plate assure accurate sample tracking. Sealing stoppers maintain vacuum on unused sample cups. Accessory extension barrels increase sample volumes from 15 to 50 mL.

Applications

General Filtration of 15 to 50 mL Samples, Preparation for Scintillation Counting

Specifications

Materials	Glass-filled polypropylene plates, chamber, handwheel nut, valve; polypropylene test tube rack, support screens; HDPE drain plug; 316 stainless steel bolt; brass handwheel insert
Filter Diameter, mm	24 or 25
Filtration Area, cm^2	2.7 per filter
Cup Volume, mL	15; 50 with extension barrel
Fittings	1/4 in. NPTF for vacuum valve and drain plug
Dimensions	
Height, cm	17.7
Diameter, cm	20.5
Shipping Weight, kg (lb)	2.9 (6.4)
Sterilization Method	Can be autoclaved a minimum of 20 times (screens and O-rings not autoclavable)
Chemical Compatibility	Acid- and base-resistant (includes TCA). Solvent-resistant at temperatures <80 °C. Not for strong oxidizing acids.

Ordering Information

Description	Qty/Pk	Catalogue No.
1225 Sampling Manifold	1	XX2702550
Replacement Parts		
Hand Knob	1	YY2214257
Top Plate	1	5162
Filter O-ring, silicone	30	XX2702509
Support Plate	1	5163
Support Screen, 25 mm, polypropylene	30	XX2702510
Ball Valve, glass-filled polypropylene	1	XX11000PP
Tubing, 1/4 in. x 23 in., latex	1	XX2504755
Note: Complete replacement parts information available online.		
Accessories		
Chamber O-rings and Plug Set	1	XX2702552
Sample Cup Extension Barrel	12	XX2702555
Filter Forceps, blunt end, stainless steel	3	XX6200006P
Tubing, 3/16 in. I.D. x 140 cm, silicone	1	XX7100004

Solvent Filtering Dispenser

Point-of-use, hand-operated solvent filtration

Ultraclean and dispense small volumes of solvent by squeeze-bottle action. This hand-pressure operated dispenser features a filter holder fitted with a delivery tube. Use to direct filtered solvent against surfaces.

Features & Benefits

- Integrated hand pump eliminates the need for external pump
- Holds up to 1 L of solvent

Applications

Solvent Filtration Prior to Contamination Analysis, Solvent Rinsing of Machined Parts and Collection Containers

Specifications

Materials	Borosilicate glass flask; neoprene bulb and stopper; stainless steel filter holder; PTFE gaskets and tubing; glass elbow and dispensing nozzle
Filter Diameter, mm	25
Filtration Area, cm²	3.9
Pore Size, µm	1.2*
Flask Capacity, L	1
Dimensions	
Height, cm	31.8
Diameter, cm	13.3

*25 type RAWP filter discs are included with dispenser.

Ordering Information

Description	Qty/Pk	Catalogue No.
Solvent Filtering Dispenser, 25 mm	1	XX6602500
Replacement Parts		
Flask and Neoprene Stopper	1	XX6602501
Filter Holder Gasket, PTFE	10	XX3002502
Filter Holder Support Screen, stainless steel	1	XX3002510

For more information visit: www.merckmillipore.com/ParticleMonitoring

Filterjet™ Solvent Dispenser

Point-of-use solvent filtration

Apply a concentrated jet spray of ultracleaned solvent or rinse solution to surfaces that require washing. Just connect the Filterjet™ dispenser to a dispensing pressure vessel to ensure that the solvent or other liquid is filtered immediately before dispensing. The filter holder (cat. No. XX4002500), which is part of the dispenser, can also be used by itself for in-line pressure filtration of gases.

Applications

Solvent Filtration Prior to Contamination Analysis, Solvent Rinsing of Machined Parts and Collection Containers

Specifications	
Materials	Stainless steel filter holder and filter support screens; nylon-coated aluminum dispenser handle; PTFE valve; fluoroelastomer filter-holder gaskets; polyethylene pressure tubing; stainless steel jet nozzle
Filter Diameter, mm	25
Filtration Area, cm^2	3.9
Prefilter Diameter, mm	22 (thick depth prefilter)
Max Inlet Pressure, bar (psi)	3.5 (50)
Fittings	1/4 in. NPTF to 1/4 in.
Dimensions	Approximately 229 mm (9 in.) from nozzle tip to end of dispenser handle, with 1.8 m (6') tubing

Ordering Information

Description	Qty/Pk	Catalogue No.
Filterjet™ Solvent Dispenser, 25 mm	1	XX6702500
Replacement Parts		
Handle and Valve Assembly	1	XX6702501
Valve Seals, PTFE	4	XX6702502
Pressure Tubing with 1/4 in. NPT Adapters, PE	1	XX6702506
Tube Adapter, 1/4 in. NPTM to 1/4 in. Tube	1	XX6702507
Tubing, 6 mm O.D. x 3 m, polypropylene	1	XX6702508
Replacement Pats Kit for Filterjet™ Solvent Dispenser	1	XX67025RK*
Gas Line Filter Holder, 25 mm, stainless steel	1	XX4002500
Replacement Parts Kit for Filter Holder	1	XX40025RK**
Note: additional replacement parts available.		
Accessories		
Dispensing Pressure Vessel, 5 L	1	XX6700P05
Pressure Gauge, 0–7 bar	1	YY1301015
Ball Valve, 1/4 in. NPTF, stainless steel	1	YY2029348
Quick-release Nipple & Coupling, 1/4 in. NPTM	1	XX6700030

*Includes stainless steel jet nozzle, fan spray and cone spray

**Includes (5) PTFE locking nut washers, (5) fluoroelastomer-A (2-021) O-rings, (5) stainless steel support screens

For more information visit: www.merckmillipore.com/ParticleMonitoring

Groundwater Sampling Capsules

EPA-approved for groundwater collection

These groundwater sampling capsules are an EPA-approved method for collection of groundwater prior to dissolved metals analysis. The pleated membrane provides four times more filtration area than a 142 mm filter disc for faster flow rates and higher throughput.

Features & Benefits

- Each capsule includes a certificate indicating lowest detectable level (LDL) analysis for 67 metals and 2 anions
- Low-extractable filter and housing materials minimize background during sample analysis
- Available with three different pore sizes to suit a variety of water conditions: 5.0 µm for high particulate levels, 1.0 µm for normal particulate levels, 0.45 µm for relatively clean water

Applications

Environmental Monitoring, Dissolved Metals Analysis in Water

Specifications

Materials	
Housing	HDPE
Membrane	Polyethersulfone
Connections	
Inlet/Outlet	1/8 in. NPTM, external threaded connections; with stepped hose adapter for up to 3/8 in. I.D. tubing
Maximum Pressure, bar (psi)	4.1 (60)
Dimensions	
Filtration Area, cm^2	600
Diameter, mm	76
Height, mm	102
Performance Properties	
Maximum Inlet Pressure, bar (psi)	4.1 (60)
Maximum Differential Pressure, bar (psid)	0.7 (10)
Water Flow Rate at 10 psi, L/min (gpm)	3.8 (1)
Bubble Point at 23 °C	
0.45 µm	≥2070 mbar, air with water
1.0 µm	≥690 mbar, air with water
5.0 µm	≥345 mbar, air with water

Ordering Information

Description	Pore Size (µm)	Qty/Pk	Catalogue No.
Groundwater Sampling Capsules	0.45	1	GWSC04501
		10	GWSC04510
		50	GWSC04550
	1.0	1	GWSC10001
		10	GWSC10010
	5.0	1	GWSC50001

For more information visit: www.merckmillipore.com/ParticleMonitoring

ZHE Hazardous Waste Filtration System (90 mm)

EPA-approved for EP Toxicity Test and TCLP

Do your waste samples contain volatile substances, such as isopropanol, acetone or xylene? Then use our ZHE (Zero Head Space Extractor) Hazardous Waste Filtration system, which is approved by the US Environmental Protection Agency (EPA) as an apparatus for Toxicity Characteristic Leaching Procedure (TCLP) measurement.

Features & Benefits

- Allows for pressurization of filter without introducing air, due to movable piston design
- Prevents loss of volatiles
- Manual and automatic venting modes
- System cannot be pressurized unless completely assembled, thereby preventing "shooting the piston" out of the unit accidentally

Applications

US EPA Extraction Procedure (EP) Toxicity Test and Toxicity Characteristic Leaching Procedure

Specifications

Materials	316 stainless steel body; molded polypropylene handwheels; fluoroelastomer-A O-rings
Connections	
Top Plate	1/8 in. NPTF upstream port for two-way SST valve with 1/8 in. NPTF for Luer fitting
Bottom Plate	1/4 in. NPTF port for 1/4 in. elbow or 1/4 in. x 1/8 in. NPT T-fitting; 1/4 in. NPTF port for pressure relief valve
Maximum Pressure, bar (psi)	3.5 (50)
Dimensions	
Filter Diameter, mm	90
Filtration Area, cm²	64
Prefilter Diameter, mm	90
Diameter, cm	15.9
Height, cm	27.9
Shipping Weight, kg	6.8
Piston Break Force, bar	0.35 – 0.7

Ordering Information

Description	Qty/Pk	Catalogue No.
ZHE Hazardous Waste System	1	YT30090HW
Replacement Parts		
Fitting Luer 1/8 in. NPTF	1	YT3009002
2-way Valve, 1/8 in. NPTM, stainless steel	1	XX2702512
Hand Knob	1	YY2214257
O-ring (2-235), 90 mm, fluoroelastomer	6	YY2209068
Support Screen, 90 mm, stainless steel	1	YY2209064
Cylinder O-rings	3	XX6700010
Piston with O-rings, wiper seal	1	YT3009001
Piston O-rings, wiper seal	3	YT3009003
Street Elbow, 1/4 in. NPTF to M	1	XX6700104
Quick-disconnect Female Swagelok®	1	YT3009013
Quick-disconnect Male Swagelok®	1	YT3009014
Vent/Relief Valve, 9 bar	1	XX6700024
Gauge, 0-100 psi 1/8 in. NPT	1	P16938
Quick Connector, female, 1/8 in. NPT	1	P16940
ZHE Holder, piston pusher	1	13899

Description	Qty/Pk	Catalogue No.
Accessories		
ZHE Tedlar Bag, 1 liter	10	YT3009016
ZHE Tight Syringe, 50 mL	1	YT3009015
Dispensing Pressure Vessel, 5 L	1	XX6700P05
Connector Kit Components		
Ball Valve, 1/4 in. NPTF, stainless steel	1	YY2029348
Vent/Relief Valve, 9 bar	1	XX6700024
Pressure Gauge, 0–7 bar	1	YY1301015
Quick-release Nipple & Coupling, 1/4 in. NPTM	1	XX6700030
Quick-disconnect Female Swagelok® Fitting	1	YT3009013
Hex Nipple, 1/4 in. NPTM 51 mm, stainless steel	1	XX6700125
Tube Adapter, 1/4 in. NPTM to 1/4 in. Tube	1	XX6702507
Tubing, 6 mm O.D. x 3 m, polypropylene	1	XX6702508
Adapter, 1/8 in. NPTF to M Luer-Lok®, chrome plated	1	XX3002567

Note: For rotary agitator and accessories, see Hazardous Waste Filtration System (142 mm).

For more information visit: www.merckmillipore.com/ParticleMonitoring

Hazardous Waste Filtration System (142 mm)

EPA approved for TCLP

If your waste samples contain non-volatile or semi-volatile substances or metals, use this Hazardous Waste Filtration System for separation, extraction, and filtration. Developed in collaboration with the US Environmental Protection Agency (EPA), the system is designed specifically for for the US EPA Extraction Procedure (EP) Toxicity Test and Toxicity Characteristic Leaching Procedure (TCLP). The device separates solid and liquid phases of waste samples for analysis.

Features & Benefits

- Contains interior holder with PTFE coating to prevent heavy metal contamination
- Allows easy introduction of bulky samples through wide entry port and removable top plate
- Disassembles for easy cleaning

Applications

US EPA EP Toxicity Test and Toxicity Characteristic Leaching Procedure

Specifications

Materials	316 stainless steel; aluminum legs; molded polypropylene handwheels; PTFE seal
Fittings	1-1/2 in. sanitary flange with clamps and adapters for 14 mm (9/16 in.) I.D. hose; 1/8 in. NPTF upstream port for vent/relief
Maximum Operating Pressure, bar (psi)	5.2 (75)
Dimensions	
Height, cm	43 (17)
Diameter, cm	18.4
Filter Diameter, mm	142
Prefilter Diameter, mm	124; type AP depth filter
Filtration Area, cm²	97
Volume, L	1.5
Shipping Weight, kg (lb)	12.3 (27.1)

Ordering Information

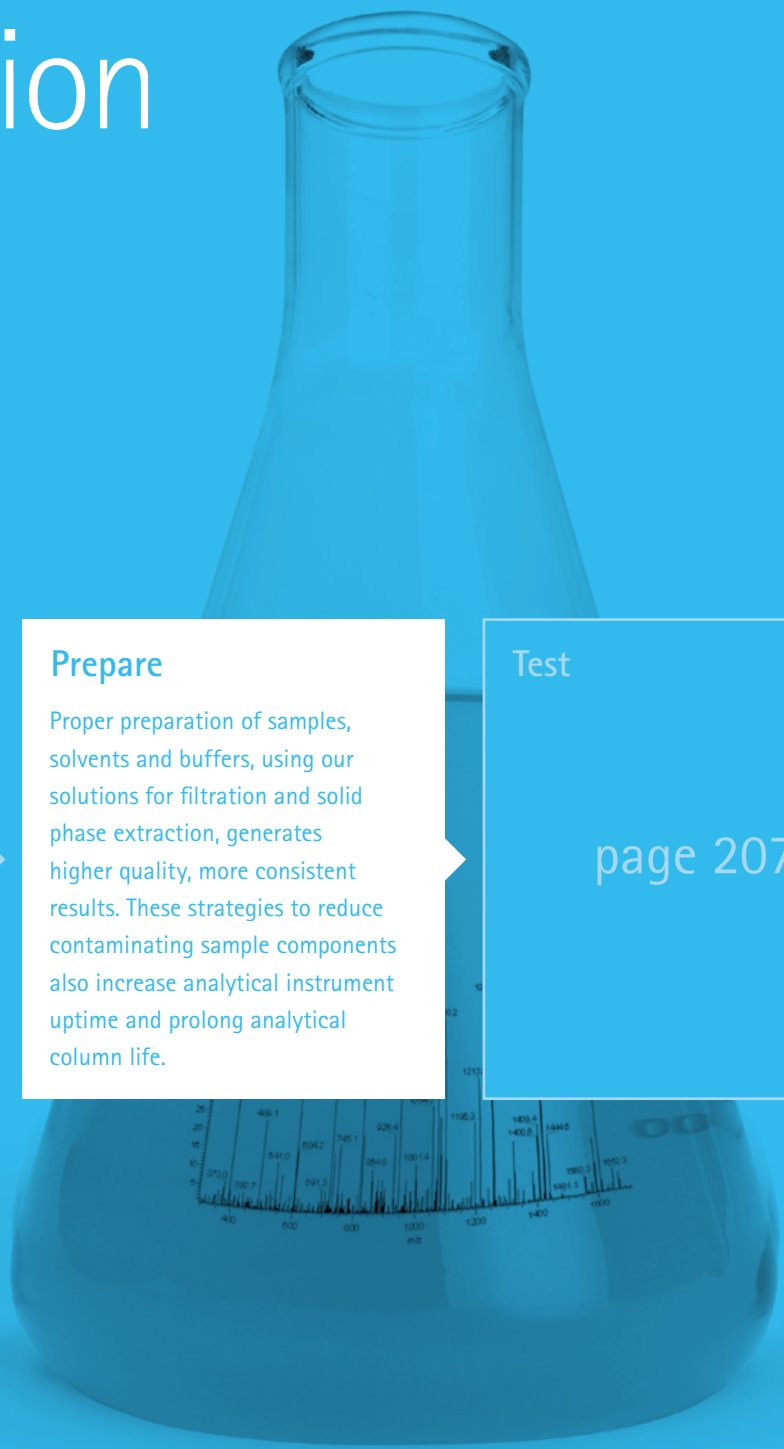
Description	Qty/Pk	Catalogue No.
Hazardous Waste Filtration System, 142 mm	1	YT30142HW
Replacement Parts		
Hand Knob	1	YY2214257
1-1/2 in. TC Silicone Gasket	10	YY2004055
Clamp 1-1/2 in. TC	1	YY2004045
O-ring (2-251), silicone	4	YY2214265
O-ring (2-251), PTFE	1	YY2214253
Underdrain Support, PTFE-coated	1	YT3014257
Legs with Caps, 3/16 in. wrench	3	YY2214251
Handwheel Wrench for 142 mm Holder	1	YY2214252

Description	Qty/Pk	Catalogue No.
Accessories		
Gasket, 1-1/2 in., PTFE-coated fluoroelastomer	10	YY2004057
Tubing for Pressure Use, 1/2 in. I.D.	1	XX6700035
Membrane Filters		
Glass Fiber Filter without Binder, AP40, 142 mm	50	AP4014250*
Glass Fiber Filter without Binder, APFF, 142 mm	50	APFF14250**
Rotary Agitator		
Rotary Agitator, 115 V/60 Hz	1	YT310RAHW

*AP40 filters are recognized in EPA Method 1311 for TCLP analysis.
**APFF filters meet specifications for EPA Method 1311.

For more information visit: www.merckmillipore.com/ParticleMonitoring

Analytical Sample Preparation



Collect

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Prepare

Proper preparation of samples, solvents and buffers, using our solutions for filtration and solid phase extraction, generates higher quality, more consistent results. These strategies to reduce contaminating sample components also increase analytical instrument uptime and prolong analytical column life.

Test

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Solutions for the Complete HPLC/UHPLC Workflow

Obtain more information about your molecules of interest and increasingly fine separation of complex solutions using the newest liquid chromatography technologies, such as high performance liquid chromatography (HPLC) and ultra-high performance liquid chromatography (UHPLC), that feature high sensitivity and throughput. To benefit from these advanced separation systems, you need cutting-edge columns, high purity reagents and state-of-the-art preparation tools for higher purity samples and cleaner mobile phases. Merck Millipore's solutions for liquid chromatography support the entire workflow, delivering higher quality, more consistent results, increased instrument uptime and prolonged column life.

Mobile Phase Preparation

Contaminating solutes may contribute to baseline variability and poor chromatographic performance when bottled water instead of freshly delivered water is used to prepare the mobile phases. Using Milli-Q® water purification systems will ensure that your mobile phases are free of organic contaminants and deliver the best, most reproducible chromatographic results.

Membrane filtration removes contaminating particles from solvents and mobile phases, increasing column life, minimizing backpressure, and preventing system failure. That's why most HPLC/UHPLC instrument manufacturers recommend filtration of mobile phases using either 0.45 or 0.20 µm filters.

Membranes that display the highest particle retention tend to be the most effective at minimizing backpressure. Polypropylene membranes exhibit poor particle retention, and therefore filtering UHPLC mobile phases through polypropylene is the least effective for reducing backpressure buildup. In contrast, filtering the mobile phase through PTFE membranes, which show excellent particle retention, enable the UHPLC system to run without significant backpressure buildup.

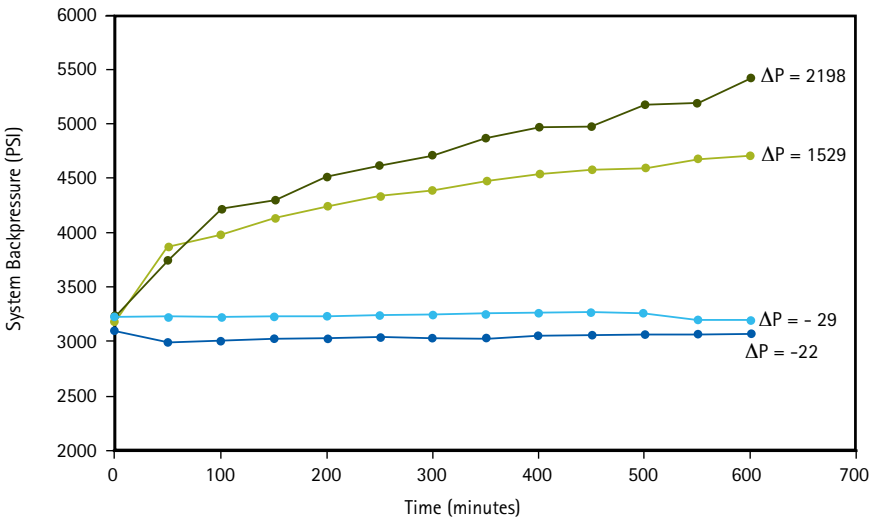
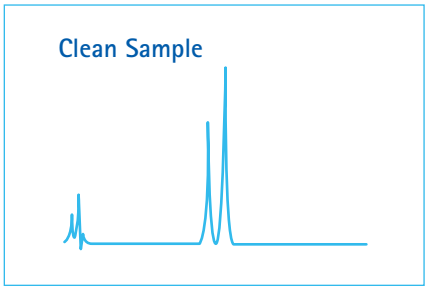
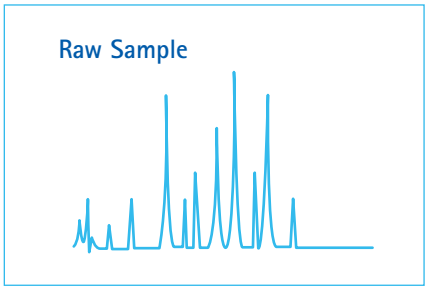


Figure 1. Filtration through 0.2 µm hydrophilic PTFE Millex® filters prevents backpressure buildup on a UHPLC system. Water and acetonitrile were passed through polypropylene or PTFE syringe filters (as indicated in legend), then used 1:1 (v/v) to prepare the mobile phase for UHPLC. The system was run at 0.25 mL/min for 600 min with backpressure recorded every 50 min. ΔP represents total change in backpressure after 600 min.

Sample Preparation

Sample preparation prior to analysis helps to bring a sample to a format that is compatible with the analytical technique, reduces sample complexity, removes interfering impurities from matrix and thereby concentrates the analyte prior to analysis. A typical sample for HPLC/UHPLC needs to be particle-free and completely soluble in the solvent compatible with the chromatography system.





Reduce signal-to-noise ratios and maintain clean baselines by filtering samples with Millex® syringe filters, Millex Samplicity® Filters, or MultiScreen® Filter Plates, depending on your throughput needs. With their broad chemical compatibility, low holdup volumes, and consistent quality, Millex® filters are ideal for preparing samples for HPLC/UHPLC analysis.

In addition to filtration, you can use solid phase extraction with Lichrolut® columns or liquid-liquid extraction with the help of EXtrelut® sorbent to reduce the complexity of your sample, facilitating analysis and improving reproducibility. These tools are not only highly efficient, but they are also easy to use and deliver high recoveries.

Analytical Separation Columns

For reliable, reproducible analytical separations, even for the most challenging analyses, choose from a comprehensive range of high-quality liquid chromatography columns. Thanks to their unique, patented, monolithic silica technology, our Chromolith® columns allow you to perform ultra-fast and robust separations using standard HPLC systems. For all polar and hydrophilic compounds, the proprietary zwitterionic SeQuant® ZIC®-HILIC technology provides straightforward HPLC separations with high flexibility in the selection of separation conditions. The optimally balanced selectivity of Purospher® columns makes them the perfect choice for reversed phase HPLC and UHPLC method development in a wide variety of labs.

Non-Sterile Millex® Syringe Filter Selection Guide

Membrane	Housing	Diameter, mm	Process Volume (hold-up)	Pore Size	Page
Non-sterile Millex® Syringe Filters with Millipore Express PLUS® (PES) Membrane Fastest flow, high throughput	Polypropylene	13	10 mL (≤ 15 µL)	0.22	159
				0.45	
		33	100 mL (≤ 80 µL)	0.22	
				0.45	
Non-sterile Millex® Syringe Filters with Durapore® (PVDF) Membrane Low protein binding	HDPE	4	1 mL (≤10 µL)	0.22	152
				0.45	
	Polypropylene	13	10 mL (≤ 15 µL)	0.22	
				0.45	
	PVC	25	100 mL (≤ 100 µL)	5.0	
	Polypropylene	33	100 mL (≤ 80 µL)	0.22	
				0.45	
Non-sterile Millex® Syringe Filters with Nylon Membrane Broad chemical compatibility	Polypropylene	13	10 mL (≤ 15 µL)	0.20	157
				0.45	
		33	100 mL (≤ 80 µL)	0.20	
				0.45	
Non-sterile Millex® Syringe Filters with LCR (Hydrophilic PTFE) Membrane Lowest extractables and excellent solvent resistance	HDPE	4	1 mL (≤10 µL)	0.20	153
				0.45	
		13	10 mL (≤ 25 µL)	0.20	
				0.45	
		25	100 mL (≤ 100 µL)	0.20	
				0.45	
Non-sterile IC Millex® Syringe Filters with LCR (Hydrophilic PTFE) Membrane Sample preparation for ion chromatography	HDPE	13	10 mL (≤ 25 µL)	0.20	156
				0.45	
		25	100 mL (≤ 100 µL)	0.20	
				0.45	
Non-sterile Millex® Syringe Filter with Fluoropore™ (Hydrophobic PTFE) Membrane Excellent solvent resistance	HDPE	4	1 mL (≤10 µL)	0.20	155
				0.45	
	Polypropylene	13	10 mL (≤ 15 µL)	0.20	
				0.45	
	HDPE	25	100 mL (≤ 100 µL)	0.20	
				0.45	
				5.0	
Non-sterile Millex® Syringe Filters with MCE Membrane General purpose filtration	PVC	25	100 mL (≤ 100 µL)	0.22	160
				0.45	
				0.80	
Automation-Compatible & High Particulate Filtration					
Glass Fiber	HDPE	25	100 mL (<250 µL)	1.0	162, 163
LCR (Hydrophilic PTFE) Membrane with graduated multi-layer glass fiber prefilter	HDPE	25	100 mL (<250 µL)	0.20	
			100 mL (<250 µL)	0.45	
Durapore® (PVDF) Membrane with graduated multi-layer glass fiber prefilter	HDPE	25	100 mL (<250 µL)	0.45	
Nylon Membrane with graduated multi-layer glass fiber prefilter	HDPE	25	100 mL (<250 µL)	0.20	
			100 mL (<250 µL)	0.45	

Non-Sterile Millex® Syringe Filter Selection Guide

Membrane	Pore Size	Dissolution Testing	IC	HPLC	UHPLC	LC-MS	Clarification of Particle-Laden Solutions	Clarification of Aqueous Solutions	Clarification of Organic Solutions	Clarification of Aqueous and Organic Solutions	Clarification of Proteinaceous Solutions	Vent Filtration
Millipore Express® PLUS (PES) Membrane Fastest flow, high throughput	0.22	●	●		●	●	●	●			●	
	0.45	●	●	●			●	●			●	
Durapore® (PVDF) Membrane Low-protein binding	0.22	●			●	●		●			●	
	0.45	●		●		●		●			●	
	5.0						●	●				
Nylon Membrane Broad chemical compatibility	0.20	●			●	●		●	●	●		
	0.45	●		●		●		●	●	●		
LCR (Hydrophilic PTFE) Membrane Lowest extractables and excellent solvent resistance	0.20	●			●	●		●	●	●	●	
	0.45	●		●		●		●	●	●	●	
IC Millex® Syringe Filters with LCR (Hydrophilic PTFE) Membrane Sample preparation for ion chromatography	0.20		●					●	●	●		
	0.45		●					●	●	●		
Fluoropore™(Hydrophobic PTFE) Membrane Excellent solvent resistance	0.20				●				●			●
	0.45			●					●			●
	5.0								●			●
MCE Membrane General purpose filtration	0.22	●						●				
	0.45	●						●				
	0.80						●	●	●			
Glass Fiber Membrane	Glass Fiber							●				
Automation-Compatible & High Particulate Filtration												
Glass Fiber	1.0	●					●	●	●	●		
LCR (Hydrophilic PTFE) Membrane with graduated multi-layer glass fiber prefilter	0.20	●			●	●	●	●	●	●	●	
	0.45	●		●		●	●	●	●	●	●	
Durapore® (PVDF) Membrane with graduated multi-layer glass fiber prefilter	0.45	●		●		●	●	●			●	
Nylon Membrane with graduated multi-layer glass fiber prefilter	0.20	●			●	●	●	●	●	●		
	0.45	●		●		●	●	●	●	●		

Non-Sterile Millex® Syringe Filters with Durapore® Membrane

Low protein binding

Non-sterile Millex® syringe filters with hydrophilic Durapore® (PVDF) membrane provide high flow rates and throughput, low levels of extractables and broad chemical compatibility. Hydrophilic PVDF membranes bind far less protein than nylon, nitrocellulose membranes, or PTFE membranes. Syringe filters are available in two pore sizes and three diameters to optimize results.

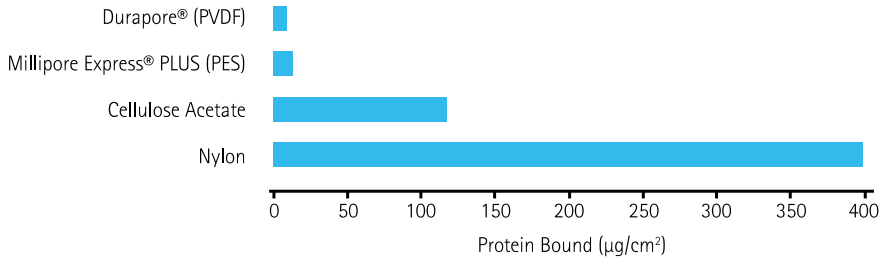
Features & Benefits

- Low protein binding to minimize interaction with your sample and maximize recovery
- Available in 0.22 µm and 0.45 µm pore sizes and three diameters to suit your application needs
- Housing materials are either polypropylene or high density polyethylene (HDPE), offering low levels of extractables and broad chemical compatibility

Applications

Sample Filtration Prior to UHPLC, HPLC and Mass Spec; Solvent Filtration; Filtration of Biological Samples and Protein Solutions

Product Performance



Lowest protein binding with Durapore® PVDF membrane. Membrane disks with a 0.22 µm pore size were exposed to a 1 mg/mL solution of ^{125}I-labeled IgG. The chart shows protein binding after incubation (normalized to membrane surface area).

Specifications

	4 mm Millex® Filters	13 mm Millex® Filters	25 mm Millex® Filters	33 mm Millex® Filters
Housing Material	HDPE	Polypropylene	PVC	Polypropylene
Housing Color	Natural	Yellow band	Clear	Yellow band
Membrane Material	Hydrophilic Durapore® (PVDF)	Hydrophilic Durapore® (PVDF)	Hydrophilic Durapore® (PVDF)	Hydrophilic Durapore® (PVDF)
Pore Sizes Available, µm	0.22, 0.45	0.22, 0.45	5.0	0.22, 0.45
Inlet Fittings	Female Luer-Lok®	Female Luer-Lok®	Female Luer-Lok®	Female Luer-Lok®
Outlet Fittings	Male LuerSlip™, stepped	Male Luer-Slip™	Male Luer-Slip™	Male Luer-Slip™
Filtration Area, cm²	0.1	0.8	3.9	4.5
Process Volume, mL	1	≤10	≤100	≤100
Hold-up Volume, µL	<10	≤15 after air purge	<100	≤80 after air purge
Maximum Pressure, bar (psi)	14 (200)	10 (150)	5.2 (75)	8.6 (125)
Maximum Temperature, °C	45	45	45	45

Ordering Information

Description	Diameter (mm)	Pore Size (µm)	Qty/Pk	Catalogue No.
Millex®-GV Syringe Filter	4	0.22	100	SLGVR04NL
			1000	SLGVR04NK
Millex®-HV Syringe Filter	4	0.45	100	SLHVR04NL
			1000	SLHVR04NK
Millex®-GV Syringe Filter	13	0.22	100	SLGVX13NL
			100	SLGVX13TL*
			1000	SLGVX13NK
Millex®-HV Syringe Filter	13	0.45	100	SLHVX13NL
			100	SLHVX13TL*
			1000	SLHVX13NK
Millex®-GV Syringe Filter	33	0.22	50	SLGV033NS
			250	SLGV033NB
			1000	SLGV033NK
Millex®-HV Syringe Filter	33	0.45	50	SLHV033NS
			250	SLHV033NB
			1000	SLHV033NK
Millex®-SV Syringe Filter	25	5.0	250	SLSV025NB

*Tube Outlet

For more information visit: www.merckmillipore.com/NSmillex

Non-Sterile Millex® Syringe Filters with Hydrophilic PTFE Membrane

Lowest level of extractables and excellent solvent resistance

Hydrophilic PTFE membranes provide the lowest level of extractables and broad chemical compatibility with both aqueous and organic solutions. Hydrophilic PTFE membranes are ideal for preparing samples and mobile phases prior to liquid chromatography (LC) or mass spectrometry (MS) analysis and can be used to filter aqueous solutions without prior wetting. Syringe filters are available in two pore sizes and three diameters to optimize results. The housing is made from a low-extractable, high density polyethylene (HDPE).

Features & Benefits

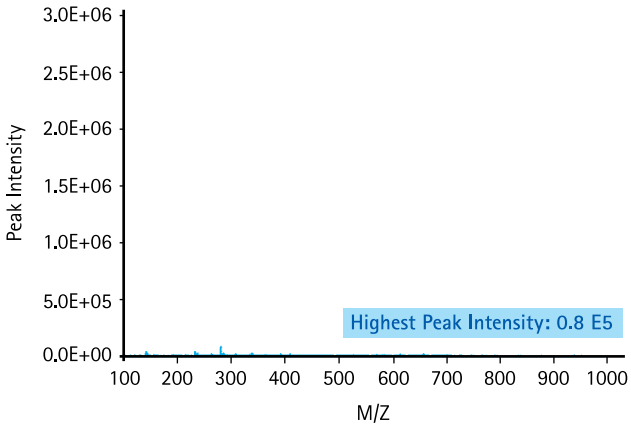
- Lowest level of extractables, optimizing background levels of sensitve analyses like UHPLC and LC-MS
- Compatible with both aqueous and organic solutions, providing broad chemical compatibility and flexibility in the lab
- Available in 0.20 µm and 0.45 µm pore sizes and three diameters to suit your application needs

Applications

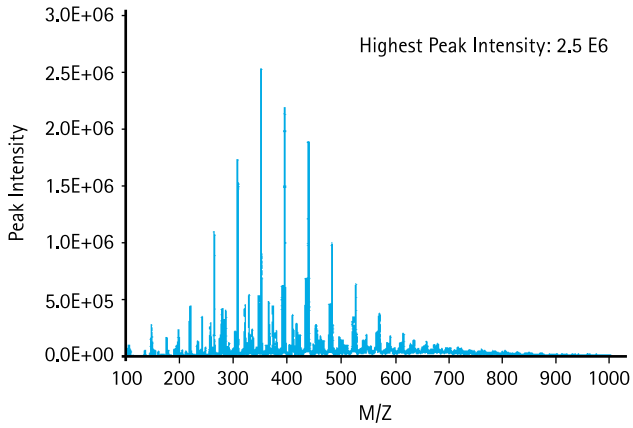
Sample Filtration Prior to UHPLC, HPLC and Mass Spec; Solvent Filtration; Clarification of Aqueous and Organic Solutions

Product Performance

A. Millex® Filter Unit, PTFE



B. Polypropylene



Millex® filters feature low extractables. Mass spectrometry detects few extractable impurities from Millex® syringe filters containing 0.45 µm pore hydrophilic PTFE membrane (A). In contrast, a syringe filter containing 0.45 µm pore polypropylene membrane from another vendor (B) shows significant leaching of impurities.

Specifications

	4 mm Millex® Filters	13 mm Millex® Filters	25 mm Millex® Filters
Housing Material	HDPE	HDPE	HDPE
Housing Color	Natural	Natural	Natural
Membrane Material	Hydrophilic PTFE	Hydrophilic PTFE	Hydrophilic PTFE
Pore Sizes Available, µm	0.20, 0.45	0.20, 0.45	0.20, 0.45
Inlet Fittings	Female Luer-Lok®	Female Luer-Lok®	Female Luer-Lok®
Outlet Fittings	Male Luer-Slip™, stepped	Male Luer-Slip™	Male Luer-Slip™
Filtration Area, cm^2	0.1	0.65	3.9
Process Volume, mL	1	≤10	≤100
Hold-up Volume, µL	<10	≤25 after air purge	<100 after air purge
Maximum Pressure, bar (psi)	14 (200)	7 (100)	7 (100)
Maximum Temperature, °C	45	45	45

Ordering Information

Description	Diameter (mm)	Pore Size (µm)	Qty/Pk	Catalogue No.
Millex®-LG Syringe Filter	4	0.20	100	SLLGR04NL
Millex®-LH Syringe Filter	4	0.45	100	SLLHR04NL
			1000	SLLHR04NK
Millex®-LG Syringe Filter	13	0.20	100	SLLGH13NL
			1000	SLLGH13NK
Millex®-LCR Syringe Filter	13	0.45	100	SLCR013NL
			100	SLCRT13NL*
			1000	SLCR013NK
Millex®-LG Syringe Filter	25	0.20	50	SLLGH25NS
			250	SLLGH25NB
			1000	SLLGH25NK
Millex®-LCR Syringe Filter	25	0.45	50	SLCR025NS
			250	SLCR025NB
			1000	SLCR025NK

*Tube Outlet

For more information visit: www.merckmillipore.com/NSmillex

Non-Sterile Millex® Syringe Filter with Fluoropore™ Membrane

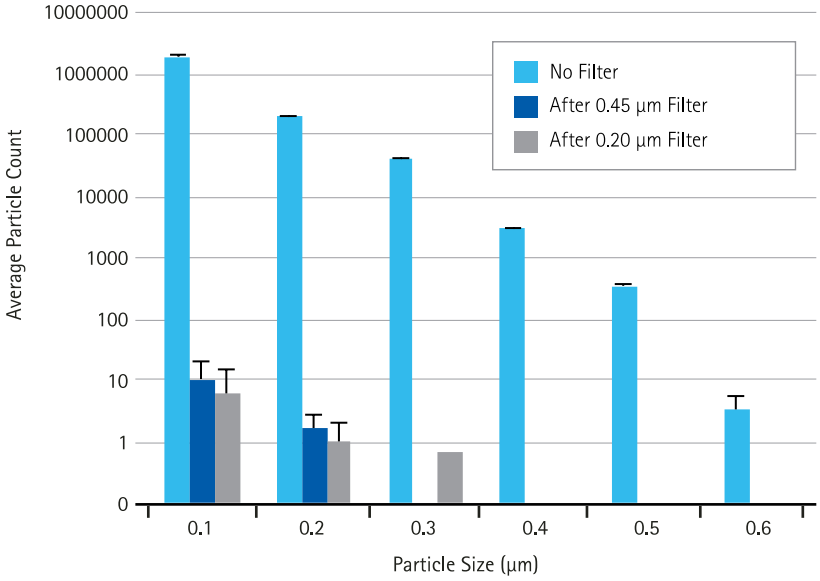
Excellent solvent resistance

Non-sterile Millex® syringe filters with hydrophobic Fluoropore™ (PTFE) membrane provide broad chemical compatibility and are ideal for filtering samples in organic solvents. Hydrophobic Fluoropore™ syringe filters can also be used to prevent back-streaming of atmospheric moisture in venting appications. Syringe filters are available in 0.20 µm and 0.45 µm pore sizes and three diameters to optimize results. The housing is made from a low-extractable, high density polyethylene (HDPE) or polypropylene.

Features & Benefits

- Broad chemical compatibility and excellent solvent resistance with organic solutions
- Available in two pore sizes and three diameters to suit your application needs

Product Performance



Excellent particle retention. Millex® syringe filters of two different pore sizes were used to remove particulates from samples of air. The resulting particulate levels per cubic foot of air, with and without syringe filtration, were measured using a particle counter (three samples per type of filter). Data show excellent particle retention by Millex®filters with Fluoropore™ membrane, as even particles smaller than the nominal pore size were efficiently removed from the samples (note that y axis is on a log scale).

Applications

Fine Particle Removal and Clarification of Organic Solutions, Vent Filtration, Sterilization of Gases

Specifications

	4 mm Millex® Filters	13 mm Millex® Filters	25 mm Millex® Filters
Housing Material	HDPE	Polypropylene	HDPE
Housing Color	Natural	Red band	Natural
Membrane Material	Hydrophobic PTFE	Hydrophobic PTFE	Hydrophobic PTFE
Pore Sizes Available, µm	0.20, 0.45	0.20, 0.45	0.20, 0.45, 5.0
Inlet Fittings	Female Luer-Lok®	Female Luer-Lok®	Female Luer-Lok®
Outlet Fittings	Male Luer-Slip™, stepped	Male Luer-Slip™	Male Luer-Slip™
Filtration Area, cm^2	0.1	0.8	3.9
Process Volume, mL	1	≤10	≤100
Hold-up Volume, µL	<10	≤15 after air purge	<100 after air purge*
Maximum Pressure, bar (psi)	14 (200)	10 (150)	7 (100)
Maximum Temperature, °C	45	45	45

* 5.0 µm device hold-up volume <300 after air purge

Ordering Information

Description	Diameter (mm)	Pore Size (µm)	Qty/Pk	Catalogue No.
Millex®-FG Syringe Filter	4	0.20	100	SLFGR04NL
Millex®-FH Syringe Filter	4	0.45	100	SLFHR04NL
Millex®-FG Syringe Filter	13	0.20	100	SLFGX13NL
			100	SLFGX13TL*
			1000	SLFGX13NK
Millex®-FH Syringe Filter	13	0.45	100	SLFHX13NL
			100	SLFHX13TL*
			1000	SLFHX13NK
Millex®-FG Syringe Filter	25	0.20	50	SLFG025NS
			250	SLFG025NB
			1000	SLFG025NK
Millex®-FH Syringe Filter	25	0.45	50	SLFH025NS
			250	SLFH025NB
			1000	SLFH025NK
Millex®-LS Syringe Filter	25	5.0	50	SLLS025NS

*Tube Outlet

For more information visit: www.merckmillipore.com/NSmillex

Non-Sterile IC Millex® Syringe Filters with Hydrophilic PTFE Membrane

Sample preparation for ion chromatography

Non-sterile ion chromatography (IC) Millex® syringe filters with hydrophilic PTFE membrane provide the lowest IC extractable levels and broad chemical compatibility with both aqueous and organic solutions. Syringe filters are available in two pore sizes and two diameters to optimize results. The housing is made from a low-extractable, high density polyethylene (HDPE). In addition, each unit is individually packaged to minimize the risk of extraneous ionic contamination. Lot release criteria include bubble point, flow rate, housing pressure, downstream particles, and IC levels. A certificate of quality with complete specifications is included in each box.

Features & Benefits

- Lowest level of IC extractables, optimizing background levels in sensitive IC analyses
- Compatible with both aqueous and organic solutions, offering broad chemical compatibility and flexibility in the lab
- Each lot is certified to contain low ion extractable levels
- Available in 0.20 µm and 0.45 µm pore sizes and two diameters to suit your application needs

Applications

Ion Chromatography

Specifications

	13 mm Millex® Filter	25 mm Millex® Filter
Housing Material	HDPE	HDPE
Inlet Fittings	Female Luer-Lok®	Female Luer-Lok®
Outlet Fittings	Male Luer-Slip™	Male Luer-Slip™
Filtration Area, cm^2	0.65	3.9
Process Volume, mL	10	100
Hold-up Volume, µL	<25 after air purge	<100 after air purge
Maximum Inlet Pressure, bar (psi)	7 (100)	7 (100)
Maximum Operating Temperature, °C	45	45

Ordering Information

Description	Diameter (mm)	Pore Size (µm)	Qty/Pk	Catalogue No.
IC Millex®-LG Syringe Filter	13	0.20	100	SLLGC13NL
	25		50	SLLGC25NS
IC Millex®-LH Syringe Filter	13	0.45	100	SLLHC13NL
	25		50	SLLHC25NS

For more information visit: www.merckmillipore.com/NSmillex

Non-Sterile Millex® Syringe Filters with Nylon Membrane

Broad chemical compatibility

Non-sterile Millex® syringe filters with hydrophilic nylon membrane are compatible with a broad range of solvents, making them ideal for sample filtration of most aqueous and organic solvents across the laboratory. Syringe filters are available in two pore sizes and three diameters to optimize results. The housing is made from polypropylene, offering a low level of extractables and broad chemical compatibility.

Features & Benefits

- Compatible with both aqueous and organic solutions, providing broad chemical compatibility and flexibility in the lab
- Available in 0.20 µm and 0.45 µm pore sizes and two diameters to suit your application needs

Applications

Sample Filtration Prior to UHPLC, HPLC and Mass Spec; Solvent Filtration; Clarification of Aqueous and Organic Solutions

Specifications

	13 mm Millex® Filters	33 mm Millex® Filters
Housing Material	Polypropylene	Polypropylene
Housing Color	Purple band	Purple band
Membrane Material	Hydrophilic Nylon	Hydrophilic Nylon
Pore Sizes Available, µm	0.20, 0.45	0.20, 0.45
Inlet Fittings	Female Luer-Lok®	Female Luer-Lok®
Outlet Fittings	Male Luer-Slip™	Male Luer-Slip™
Filtration Area, cm^2	0.8	4.5
Process Volume, mL	≤10	≤100
Hold-up Volume, µL	≤15 after air purge	≤80 after air purge
Maximum Pressure, bar (psi)	10 (150)	8.6 (125)
Maximum Temperature, °C	45	45

Ordering Information

Description	Diameter (mm)	Pore Size (µm)	Qty/Pk	Catalogue No.
Millex®-GN Syringe Filter	13	0.20	100	SLGNX13NL
			100	SLGNX13TL*
			1000	SLGNX13NK
Millex®-HN Syringe Filter	13	0.45	100	SLHNX13NL
			100	SLHNX13TL*
			1000	SLHNX13NK
Millex®-GN Syringe Filter	33	0.20	50	SLGN033NS
			250	SLGN033NB
			1000	SLGN033NK
Millex®-HN Syringe Filter	33	0.45	50	SLHN033NS
			250	SLHN033NB
			1000	SLHN033NK

*Tube Outlet

For more information visit: www.merckmillipore.com/NSmillex

Non-Sterile Millex® Syringe Filters with PES Membrane

Fastest flow, high throughput

Non-sterile Millex® syringe filters with Millipore Express® PLUS polyethersulfone (PES) membrane provide ultrafast filtration of aqueous solutions. This fast-filtering, low protein-binding membrane is preferred by many researchers. Syringe filters are available in two pore sizes and two diameters to optimize results. The housing is made from polypropylene, offering a low level of extractables and broad chemical compatibility.

Features & Benefits

- Low protein binding to minimize interaction with your sample and maximize recovery
- High-throughput PES membrane provides fast filtration for large sample volumes
- Available in 0.22 µm and 0.45 µm pore sizes and two diameters to suit your application needs

Applications

Buffer Filtration, Clarification of Aqueous Solutions

Specifications

	13 mm Millex® Filters	33 mm Millex® Filters
Housing Material	Polypropylene	Polypropylene
Housing Color	Green band	Green band
Membrane Material	Hydrophilic PES Millipore Express® PLUS	Hydrophilic PES Millipore Express® PLUS
Pore Sizes Available, µm	0.22, 0.45	0.22, 0.45
Inlet Fittings	Female Luer-Lok®	Female Luer-Lok®
Outlet Fittings	Male Luer-Slip™	Male Luer-Slip™
Filtration Area, cm^2	0.8	4.5
Process Volume, mL	≤10	≤100
Hold-up Volume, µL	≤15 after air purge	≤80 after air purge
Maximum Pressure, bar (psi)	10 (150)	8.6 (125)
Maximum Temperature, °C	45	45

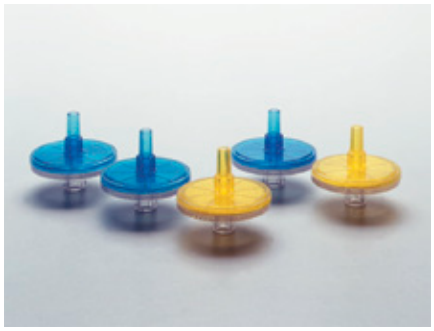
Ordering Information

Description	Diameter (mm)	Pore Size (µm)	Qty/Pk	Catalogue No.
Millex®-GP Syringe Filter	13	0.22	100	SLGPX13NL
			1000	SLGPX13NK
Millex®-HP Syringe Filter	13	0.45	100	SLHPX13NL
			1000	SLHPX13NK
Millex®-GP Syringe Filter	33	0.22	50	SLGP033NS
			250	SLGP033NB
			1000	SLGP033NK
Millex®-HP Syringe Filter	33	0.45	50	SLHP033NS
			250	SLHP033NB
			1000	SLHP033NK

For more information visit: www.merckmillipore.com/NSmillex

Non-Sterile Millex® Syringe Filters with MCE Membrane

Broad application and research use



Non-sterile Millex® syringe filters with hydrophilic mixed cellulose esters (MCE) membrane are widely used in general analytical and research applications. Syringe filters are available in three pore sizes to optimize results. The housing is made from a low-extractable polyvinylidene chloride (PVC).

Features & Benefits

- MCE is the most widely used and referenced general purpose membrane
- Available in 0.22 µm, 0.45 µm and 0.80 µm pore sizes to suit your application needs

Applications

Clarification of Aqueous Solutions, General Laboratory Filtration

Specifications

Housing Material	PVC
Housing Color	Clear top/blue base*
Membrane Material	Hydrophilic MCE
Pore Sizes Available, µm	0.22, 0.45, 0.80, prefilter
Inlet Fittings	Female Luer-Lok®
Outlet Fittings	Male Luer-Slip™
Filtration Area, cm^2	3.9
Process Volume, mL	100
Hold-up Volume, µL	≤100**
Maximum Pressure, bar (psi)	5.2 (75)
Maximum Temperature, °C	45

***0.8 µm device has clear top with green base. Glass prefilter device is natural colored.**

****Hold-up volume does not apply to glass prefilter device.**

Ordering Information

Description	Diameter (mm)	Pore Size (µm)	Qty/Pk	Catalogue No.
Millex®-GS Syringe Filter	25	0.22	250	SLGS025NB
			1000	SLGS02510
Millex®-HA Syringe Filter	25	0.45	100	SLHA025NB
			1000	SLHA02510
Millex®-AA Syringe Filter	25	0.80	250	SLAA025NB
			1000	SLAA025NK
Millex®-AP Syringe Filter	25	NA	50	SLAP02550

For more information visit: www.merckmillipore.com/NSmillex

In-Line Millex® Filter Units (25 mm and 50 mm)

Ideal for in-line sterilization of gases and venting sterile containers

Millex® syringe filter units with hydrophobic Fluoropore™ or Millipore Express® PLUS PES membrane are ideal for in-line sterilization of gases and venting sterile containers, and filters with Fluoropore™ membrane can also be used for sterilizing or clarifying organic solutions. There are also specialized filter units to protect hemodialysis transducers from blood and moisture. The 50 mm Millex® filter units are especially useful for vacuum line protection. All units are bi-directional.

Features & Benefits

- Specialized filter units protect hemodialysis transducers from blood and moisture
- 50 mm Millex® units ideal for vacuum line protection
- All Millex® Hydrophobic PTFE units are bi-directional in flow

Applications

Sterilizing Gases, Vacuum Line Protection, Venting Sterile Containers, Sterilizing and Clarifying Organic Solutions

Specifications

	25 mm Millex® Units	50 mm Millex® Units with PTFE Membrane	50 mm Millex® Units with PES Membrane
Housing Material	PVC	Polypropylene	Acrylic
Filtration Area, cm²	3.9	19.6	19.6
Maximum Inlet Pressure, bar (psi)	5.2 (75)	4.1 (60)	4.1 (60)
Maximum Operating Temperature, °C	45	121	45

Ordering Information

Description	Filter Diameter (mm)	Pore Size (µm)	Membrane	Fitting Inlet	Fitting Outlet	Sterilization	Qty/Pk	Catalogue No.
Millex®-FG Filter Unit	25	0.2	Fluoropore™ PTFE	Female Luer-Lok®	Male Luer Slip™	Ethylene oxide	50	SLFG025LS
				Female Luer-Lok®	Male Luer-Lok®	Ethylene oxide	50	SLFGL25BS
				Female Luer-Lok®	Male Luer Slip™	Autoclavable	50	SLFG02550
Millex®-FG$_{50}$ Filter Unit	50	0.2	Fluoropore™ PTFE	Stepped hose barb with female Luer-Slip™ interior	Stepped hose barb with female Luer-Slip™ interior	Autoclavable	10	SLFG05010
				Stepped hose barb with female Luer-Slip™ interior	Stepped hose barb with female Luer-Slip™ interior	Autoclavable	100	SLFG05000
Millex®-FG$_{50}$ Filter Unit	50	0.2	Fluoropore™ PTFE	Stepped hose barb with female Luer-Slip™ interior	1/8 in. NPTM	Autoclavable	10	SLFG55010
Millex®-FG$_{50}$ Filter Unit	50	0.2	Fluoropore™ PTFE	Stepped hose barb with female Luer-Slip™ interior	1/8 in. NPTM	Autoclavable	10	SLFG65010
				Stepped hose barb with female Luer-Slip™ interior	1/8 in. NPTM	Autoclavable	100	SLFG65000
Millex®-FG$_{50}$ Filter Unit	50	0.2	Fluoropore™ PTFE	1/8 in. NPTM	1/8 in. NPTM	Autoclavable	10	SLFG75010
				1/8 in. NPTM	1/8 in. NPTM	Autoclavable	100	SLFG75000
Millex®-FG$_{50}$ Filter Unit	50	0.2	Fluoropore™ PTFE	Stepped hose barb with female Luer-Slip™ interior	Stepped hose barb with female Luer-Slip™ interior	Autoclavable	10	SLFG85010
				Stepped hose barb with female Luer-Slip™ interior	Stepped hose barb with female Luer-Slip™ interior	Autoclavable	100	SLFG85000
Millex®-FH$_{50}$ Filter Unit	50	0.45	Fluoropore™ PTFE	Stepped hose barb with female Luer-Slip™ interior	Stepped hose barb with female Luer-Slip™ interior	Autoclavable	10	SLFH05010
				Stepped hose barb with female Luer-Slip™ interior	Stepped hose barb with female Luer-Slip™ interior	Autoclavable	10	SLFH05000
Millex®-FA$_{50}$ Filter Unit	50	1	Fluoropore™ PTFE	Stepped hose barb with female Luer-Slip™ interior	Stepped hose barb with female Luer-Slip™ interior	Autoclavable	100	SLFA05010
				Stepped hose barb with female Luer-Slip™ interior	Stepped hose barb with female Luer-Slip™ interior	Autoclavable	10	SLFA05000
Millex®-GP$_{50}$ Filter Unit	50	0.22	Millipore Express® PLUS PES	Stepped hose barb with female Luer-Slip™ interior	Stepped hose barb with female Luer-Slip™ interior	Gamma ir-radiated	10	SLGP05010
				Stepped hose barb with female Luer-Slip™ interior	Stepped hose barb with female Luer Slip™ interior and filling bell	Gamma ir-radiated	10	SLGPB5010
Transducer Protectors								
Dualex™ Ultra Filter Unit	25	0.22	Durapel™ PVDF	Female Luer-Lok®	Male Luer-Lok®	Ethylene oxide	50	SLGVS25US
				Female Luer-Lok®	Male Luer Slip™	Ethylene oxide	50	SLGVS25PS
				Female Luer-Slip™	Male Luer Slip™	Ethylene oxide	50	SLGVS25XS

25 mm Automation-Compatible Filter Units

High-throughput filtration

Automation-compatible, non-sterile Millex® syringe filter units provide efficient filtration for dissolution testing and other automated sample preparation applications, especially for pharmaceutical product analysis. These filters feature high-density polyethylene housing and a wide choice of membrane types, with or without prefilters, to fit any application need. The filters are designed with a pressure-resistant, domed housing and an optimized Luer-Lok® connection to ensure reliable delivery by automated systems.

Features & Benefits

- Domed housing ensures reliable delivery of filters
- Pressure-resistant housing resists bursting
- Luer-Lok® connection optimized for precise alignment and fit
- Available in either bulk or delivery tubes for use with automated filter-changing systems

Applications

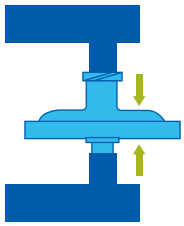
Drug Dissolution Testing, Automated Sample Preparation, Clarification of Solutions Containing High Particle Levels

Specifications

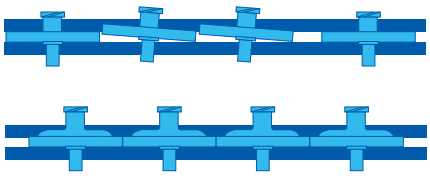
Housing Material	HDPE
Inlet Fittings	Female Luer-Lok®
Outlet Fittings	Male Luer-Slip™
Filtration Area, cm²	3.9
Process Volume, mL	100
Hold-up Volume, µL*	<100 (membrane); <200 (membrane and prefilter)
Maximum Inlet Pressure, bar (psi)	7 (100)
Maximum Operating Temperature, °C	45

*After air purge

Product Performance



A rigid domed housing design helps prevent backpressure, which can cause a workstation shut-down.



The domed housing of automation-compatible 25 mm Millex® syringe filters enables smooth, reliable delivery by eliminating shingling between filters in the transport rack.

Advantage: our automation-compatible syringe filters feature a rigid domed housing design that prevents backpressure buildup and also prevents shingling between filters, inside automated workstations.

Ordering Information

Description	Pore Size (µm)	Qty/Pk	Catalogue No.
Borosilicate glass fiber membrane (APFB) for clarifying aqueous and organic solutions containing high particle levels			
Millex®-PB Filter Unit	1.0	200 (8 x 25)	SLPBDZ5NZ
	1.0	1000	SLPBDZ5NK
Low protein-binding Durapore® (PVDF) membrane for clarifying aqueous and mild organic solutions			
Millex®-HV Filter Unit	0.45	200 (8 x 25)	SLHVDZ5NZ
		1000	SLHVDZ5NK
Low protein-binding Durapore® (PVDF) membrane and glass fiber prefilter for clarifying aqueous and mild organic solutions containing high particle levels			
Millex®-HV/PB Filter Unit	0.45	200 (8 x 25)	SLHVBZ5NZ
		1000	SLHVBZ5NK
Nylon membrane for clarifying aqueous and organic solutions			
Millex®-GN Filter Unit	0.2	200 (8 x 25)	SLGNDZ5NZ
		1000	SLGNDZ5NK
Millex®-HN Filter Unit	0.45	200 (8 x 25)	SLHNDZ5NZ
		1000	SLHNDZ5NK
Nylon membrane and glass fiber prefilter for clarifying aqueous and organic solutions containing high particle levels			
Millex®-HN/PB Filter Unit	0.45	200 (8 x 25)	SLHNBZ5NZ
		1000	SLHNBZ5NK
Low protein-binding hydrophilic LCR (PTFE) membrane for clarifying aqueous and organic solutions			
Millex®-LCR Filter Unit	0.2	200 (8 x 25)	SLLGDZ5NZ
		1000	SLLGDZ5NK
	0.45	200 (8 x 25)	SLCRDZ5NZ
		1000	SLCRDZ5NK
Low protein-binding hydrophilic LCR (PTFE) membrane and glass fiber prefilter for clarifying aqueous and organic solutions containing high particle levels			
Millex®-LCR/PB Filter Unit	0.45	200 (8 x 25)	SLCRBZ5NZ
		1000	SLCRBZ5NK

For more information visit: www.merckmillipore.com/NSmillex

Non-Sterile Millex® HPF Syringe Filters

Filter particle-laden or viscous samples

Non-sterile HPF Millex® filters include a graduated glass fiber prefilter to remove larger particles and either a 0.20 µm or 0.45 µm membrane filter for fine filtration. This combination of membranes provides significantly greater throughput than standard filters without prefiltration media, especially when filtering particle-laden solutions. HPF Millex® filters are available in bulk for individual sample filtration and in tubes for use with automated filter-changing systems. The filters feature a pressure-resistant, domed housing and an optimized Luer-Lok® connection to ensure reliable delivery by automated systems.

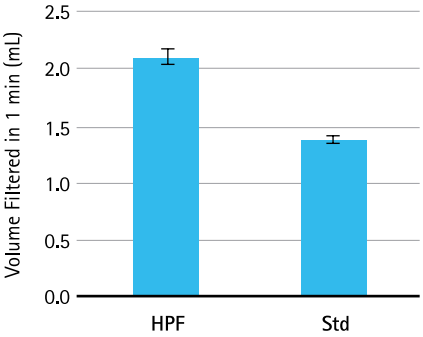
Features & Benefits

- Two to four times greater throughput than syringe filters without prefilters
- Domed housing ensures reliable delivery from automated filter-changing systems
- Pressure-resistant housing resists bursting
- Luer-Lok® connection optimized for precise alignment and fit
- Available in either bulk or delivery tubes for use with automated filter-changing systems

Applications

Drug Dissolution Testing, Automated Sample Preparation, Clarification of Solutions Containing High Particle Levels

Product Performance



Faster filtration for hard-to-filter solutions. A 25 mm Millex® HPF syringe filter and a standard 25 mm Millex® filter, both with 0.2 µm hydrophilic PTFE membrane, were used to filter a 1% solution of Pepto-Bismol® in Milli-Q® water using a pressure vessel set to 10 psi. Filtrate was collected in tared borosilicate tubes. The Millex® HPF filter enabled filtration of a higher volume of solution in one minute compared to the standard filter.

Specifications

Housing Material	HDPE
Inlet Fittings	Female Luer-Lok®
Outlet Fittings	Male Luer-Slip™
Filtration Area, cm²	3.9
Process Volume, mL	100
Hold-up Volume, µL	250
Maximum Inlet Pressure, bar (psi)	7 (100)
Maximum Operating Temperature, °C	45

Ordering Information

Description	Pore Size (µm)	Qty/Pk	Catalogue No.
Nylon membrane and graduated glass fiber prefilter for clarifying aqueous and mild organic solutions containing high particle levels			
Millex®-HPF/Nylon Filter Unit	0.20	50	SLGNM25NS
		1000	SLGNM25NK
	0.45	50	SLHNM25NS
		1000	SLHNM25NK
		200 (8 x 25)	SLHNMZ5NZ*
Low protein binding hydrophilic (PTFE) membrane and glass fiber prefilter for clarifying aqueous and organic solutions containing high particle levels.			
Millex®-HPF/LG/LCR Filter Unit	0.20	50	SLLGM25NS
		1000	SLLGM25NK
	0.45	50	SLCRM25NS
		1000	SLCRM25NK
Low protein binding Durapore® (PVDF) membrane and graduated glass fiber prefilter for clarifying proteinaceous solutions containing high particle levels			
Millex®-HPF/HV Filter Unit	0.45	50	SLHVM25NS
		1000	SLHVM25NK
		200 (8 x 25)	SLHVMZ5NZ*

*Automation-compatible

For more information visit: www.merckmillipore.com/NSmillex

Samplicity® Filtration System

Multi-sample vacuum filtration system

The Samplicity® Filtration System provides a convenient, high-throughput alternative to syringe-tip filters when preparing samples for chromatography. The easy-to-use Samplicity® system is the first vacuum-driven system with the designed-in flexibility to filter 1 to 8 samples directly into standard HPLC vials. Just attach a vacuum pump, load samples with a standard pipettor and flip the lever to recover particulate-free samples—even those with high viscosity or particulates—in seconds. In addition, the system has a low hold-up volume, which allows processing of samples as small as 300 µL.

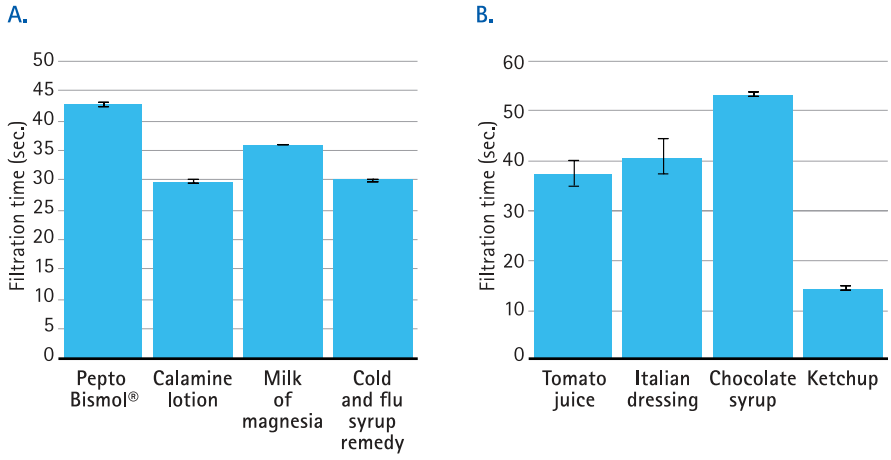
Features & Benefits

- Higher throughput with simultaneous vacuum filtration of up to eight samples
- Easy sample preparation of even highly viscous or particulate-laden mixtures
- Ergonomic alternative to syringe filters
- Millex Samplicity® membrane filters provide long-trusted quality with low extractables and low analyte binding

Applications

Sample Filtration Prior to UHPLC, HPLC and Mass Spec; Filtration of Hard-to-Filter Samples

Product Performance



Concentration	2%	2%	100%	5%	100%	25%	25%	25%
Viscosity (cP)	2.30	298.3	10088.00	2.20	18600	12.07	24.73	252.33

Efficient filtration of hard-to-filter samples. Hydrophilic PTFE Millex Samplicity® filters (0.45 µm) efficiently processed hard-to-filter pharmaceutical samples (A) and food/beverage samples (B) in seconds. Filtration times were the average of 4 replicates and error bars represent standard deviation.

Specifications

	PTFE	Durapore® PVDF
Housing Material	HDPE	HDPE
Housing Color	White	White
Membrane Material	Hydrophilic PTFE	Hydrophilic Durapore® PVDF
Pore Sizes	0.20 µm, 0.45 µm	0.45 µm
Process Volume, mL	0.3–1.6	0.3–1.6
Hold-up Volume, µL	<100	<100
Chemical Compatibility	Few limitations	Aqueous, some solvents
Inlet Fitting	Easy loading funnel	Easy loading funnel
Outlet Fitting	Tip for smooth transfer to vial	Tip for smooth transfer to vial

Ordering Information

Description	Pore Size (µm)	Qty/Pk	Catalogue No.
Samplicity® Filtration System, Glossy Green		1	SAMPSYSGR
Samplicity® Filtration System, Bold Blue		1	SAMPSYSBL
Millex Samplicity® Filters Hydrophilic PTFE	0.20	96	SAMPLG001
	0.45	96	SAMPLCR01
	0.20	384	SAMPLG004
	0.45	384	SAMPLCR04
Millex Samplicity® Filters Hydrophilic PVDF	0.45	96	SAMPHV001
		384	SAMPHV004

For more information visit: www.merckmillipore.com/samplicity

MultiScreen® Filter Plates for Enzyme Assays

Save time and sample, increase consistency

Enzyme assays are widely used in life science research and compound screening. Filter plates, by facilitating the separation of the products from the reactants in enzymatic reactions, enable reliable, highly sensitive, and automation-compatible assays. MultiScreen®$_{HTS}$ filter plates set the standard for filtration-based enzyme assays. These versatile systems are widely used for kinase, phosphatase, protease and endonuclease assays, as well as second messenger assays such as for cAMP, cGMP, phosphodiesterase (PDE), Nitric Oxide (NO), Ca^{2+} and inositols. The filtration-based protocol produces specific, reliable results that are well-referenced in literature.

Features & Benefits

- Saves time and sample, reduces solvent and radioactive wastes
- Multiple configurations to match your application
- Automation compatible
- Superior vacuum filtration and filtrate collection for better washing and consistent data

Applications

Protein Kinase Assays with Peptide Substrates, Other Enzyme Assays, Second Messenger Assays

Specifications

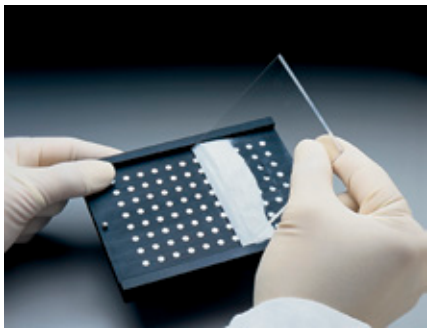
Dimensions, cm	128 x 85.5 x 14.6
Pore Size	0.65 µm
Sterility	Non-sterile

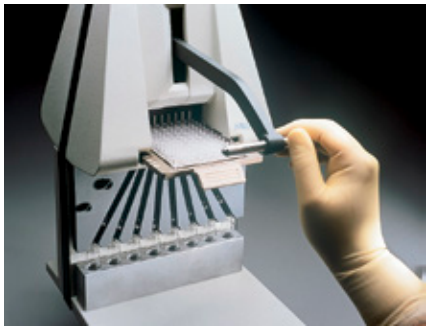
Ordering Information

Description	Membrane Type	Well Volume (mL)	Device Material	Qty/Pk	Catalogue No.
MultiScreen®$_{HTS}$ plates with negatively charged membrane for enzyme assays					
MultiScreen®$_{HTS}$-PH Plate, 96 well	Negatively Charged Phosphocellulose	0.5	Barex®/TiO_2	10	MSPHN6B10
				50	MSPHN6B50
MultiScreen®$_{HTS}$+ Hi Flow PH Plate, 96 well	Negatively Charged Phosphocellulose/ polyester mesh	0.5	Barex®/TiO_2	50	MSPHNXB50
MultiScreen®$_{HTS}$-PH Plate, 384 well	Negatively Charged Phosphocellulose/ polyester mesh	0.1	Styrene acrylonitrile (SAN)/TiO_2	10	MZPHN0W10
				50	MZPHN0W50
MultiScreen® Classic plates with negatively charged membrane for enzyme assays					
MultiScreen®-PH Plate, 96 well	Negatively Charged Phosphocellulose	0.5	Barex®/TiO_2	50	MAPHN0B50

MultiScreen® Filter Plate Accessories

For use with MultiScreen® Plates





MultiScreen® column loaders let you combine the cost savings of bulk media with the convenience of 96-well filtration plates. All 96 wells are loaded simultaneously and uniformly, eliminating the need for pipetting slurries or using prepacked columns. MultiScreen® accessories for radiometric assay detection include the MultiScreen® Punch Kit. After completing your multiwell radioactive assay, you can use the punch and disposable punch tips to simultaneously remove filters from eight wells of a MultiScreen® plate and distribute them into eight scintillation vials for detection. The patented punch tips remove each filter from its well separately, thereby eliminating the risk of cross-contamination and increasing reproducibility.

Applications

96-Well Chromatography, Radiometric Binding Assays

Ordering Information

Description	Qty/Pk	Catalogue No.
Column Loaders for 96-Well Chromatoghraphy in Classic MultiScreen® Plates		
Centrifuge Alignment Frame	4	MACF09604
MultiScreen® Column Loader, 100 µL	1	MACL09600
MultiScreen® Column Loader, 25 µL	1	MACL09625
MultiScreen® Column Loader, 45 µL	1	MACL09645
MultiScreen® Column Loader, 80 µL	1	MACL09680
MultiScreen® Column Loader Scraper	3	MACL0SC03
Radioactive Assay Detection Accessories		
Disposable Punch Tips	5 x 10	MADP19650
MultiScreen® Multiple Punch	1	MAMP09608
Carrier Rack for 4 mL Vials	1	MACR08124
Carrier Rack for 7 mL Vials	1	MACR08127
Carrier Rack for 12 mm x 75 mm Tubes	1	MACR81275
MultiScreen®$_{HTS}$ Plate Carrier Slide (required for punching HTS Plates)	1	MSCP09600
Packard TopCount Adapter for MultiScreen®$_{HTS}$ 96-well Filter Plates	50	MSTPCWH50

MultiScreen®$_{HTS}$-PCF Filter Plates for Solubility Assays

Increased screening throughput and efficiency

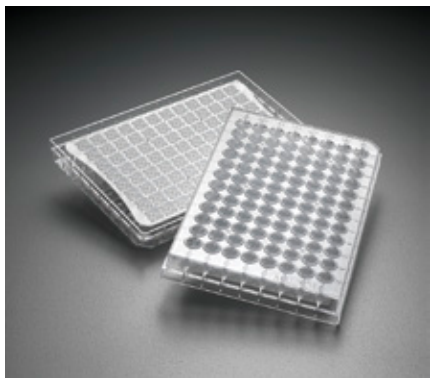
Determining water solubility is an important early step in the drug discovery and development process. Insoluble precipitates cause false positives in bioassays, potentially wasting valuable resources. Water solubility also influences drug absorption and can help predict its ADME properties. MultiScreen®$_{HTS}$-PCF filter plates have made early-stage solubility screening possible. Compared to traditional shake-flask methods, filter plate methods use low amounts of compounds, are reliable, automatable, and fast. Results are highly reproducible and correlate with published literature values. Unlike other high-throughput methods, this method measures compounds in solution.

Features & Benefits

- Increased screening throughput and efficiency saving time and sample over the shake-flask method
- Low non-specific binding
- 90-minute protocol
- Validated for high drug recovery
- Automation-compatible

Applications

Solubility Assays



Specifications

	Standard Plate	Deepwell Solvinert	Collection Plates
Dimensions, cm	128 x 85.5 x 14.6	128 x 85.5 x 40.7	128 x 85.5 x 40.7
Well Volume, mL	0.5	1.9	
Number of Wells	96	96	96
Sterility	Non-sterile	Non-sterile	Non-sterile

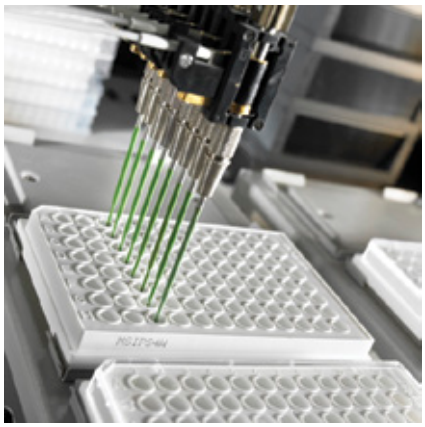
Ordering Information

Description	Membrane Type	Pore Size (µm)	Device Material	Qty/Pk	Catalogue No.
MultiScreen® Plates					
MultiScreen®$_{HTS}$-PCF Filter plate	Polycarbonate	0.4	Styrene	10	MSSLBPC10
				50	MSSLBPC50
MultiScreen® Solvinert Plate	Hydrophilic PTFE	0.45	Polyolefin copolymer	10	MSRLN0410
				50	MSRLN0450
MultiScreen® Deep Well Solvinert Plate	Hydrophilic PTFE	0.45	Polyolefin copolymer	10	MDRLN0410
Required Equipment					
96-well Polystyrene Collection Plate	--	--	Polystyrene	100	MSCPNPS00
96-well MultiScreen® UV Analysis Collection Plate	--	--	Polypropylene	40	MSCPNUV40
96-well Polypropylene V-bottom Collection Plate	--	--	Polypropylene	100	MSCPNPP00

For more information visit: www.merckmillipore.com/cellculture

MultiScreen® Filter Plates with Durapore® Membrane

High-throughput filtration with low protein binding



Durapore® PVDF membranes provide high flow rates and throughput, low levels of extractables and broad chemical compatibility. Hydrophilic Durapore® membranes bind far less protein than nylon, nitrocellulose or PTFE membranes.

Features & Benefits

- Multiple configurations and applications
- Chemical compatibility
- Automation-compatible
- Superior vacuum filtration and filtrate collection

Applications

Receptor/Ligand Binding Assays, Protein Kinase/Phosphatase Precipitation Assays, Bead-Based Assays

Ordering Information

Membrane Type/Pore Size	Number of Wells	Well Volume (mL)	Device Material	Sterility	Qty/Pk	Catalogue No.
MultiScreen® Filter Plates with Durapore® Membrane						
Durapore® PVDF, 1.2 µm	96	0.05 - 0.25	Styrene	Non-sterile	10	MSBVN1210
			Styrene	Non-sterile	50	MSBVN1250
			Barex®/TiO_2	Non-sterile	50	MSBVN1B50
			Styrene	Sterile	10	MSBVS1210
Durapore® PVDF, 0.65 µm	96	0.05 - 0.25	Styrene	Non-sterile	10	MSDVN6510
			Styrene	Non-sterile	50	MSDVN6550
			Barex®/TiO_2	Non-sterile	50	MSDVN6B50
Durapore® PVDF, 0.22 µm	96	0.05 - 0.25	Styrene	Non-sterile	10	MSGVN2210
			Styrene	Non-sterile	50	MSGVN2250
			Barex®/TiO_2	Non-sterile	50	MSGVN2B50
			Styrene	Sterile	10	MSGVS2210
Durapore® PVDF, 0.45 µm	96	0.05 - 0.25	Styrene	Non-sterile	10	MSHVN4510
			Styrene	Non-sterile	50	MSHVN4550
			Barex®/TiO_2	Non-sterile	50	MSHVN4B50
			Styrene	Non-sterile	10	MSHVS4510
	384	0.02 - 0.1	Styrene	Non-sterile	10	MZHVN0W10
			Styrene	Non-sterile	50	MZHVN0W50
	96	<2.0	Polypropylene	Non-sterile	25	MVHVN4525

MultiScreen® Filter Plates with Glass Fiber Filters

High-throughput clarification and prefiltration

Glass fiber filters with binder resin have superior wet strength and are excellent for qualitative analysis and prefiltration, especially for heavily contaminated or particulate-laden samples. They are also widely used for clarification of aqueous solutions.

Features & Benefits

- Multiple configurations and applications
- Chemical compatibility
- Automation-compatible
- Superior vacuum filtration and filtrate collection

Applications

Receptor/Ligand Binding Assays, Sample Preparation, TCA Precipitation of Protein

Ordering Information

Description	Membrane Type/Pore Size	Number of Wells	Device Material	Sterility	Qty/Pk	Catalogue No.
MultiScreen®$_{HTS}$ Filter Plates with Glass Fiber Prefilter						
MultiScreen®$_{HTS}$ FB Plate	Glass fiber FB 1.0 µm/0.65 µm Durapore® PVDF	96	Barex®/TiO_2	Non-sterile	10	MSFBN6B10
					50	MSFBN6B50
MultiScreen®$_{HTS}$+ Hi Flow FB Plate	Glass fiber FB 1.0 µm/polyester mesh	96	Barex®/TiO_2	Non-sterile	50	MSFBNXB50
MultiScreen®$_{HTS}$ FB Plate	Glass fiber FB 1.0 µm/polyester mesh	384	Barex®/TiO_2	Non-sterile	10	MZFBN0W10
					50	MZFBN0W50
MultiScreen®$_{HTS}$ FC Plate	Glass fiber FC 1.2 µm/0.65 µm Durapore® PVDF	96	Barex®/TiO_2	Non-sterile	10	MSFCN6B10
					50	MSFCN6B50
MultiScreen®$_{HTS}$+ Hi Flow FC Plate	Glass fiber FC 1.2 µm/polyester mesh	96	Barex®/TiO_2	Non-sterile	50	MSFCNXB50
MultiScreen®$_{HTS}$ FC Plate	Glass fiber FC 1.2 µm/polyester mesh	384	Barex®/TiO_2	Non-sterile	10	MZFCN0W10
					50	MZFCN0W50
Harvest Plates – MultiScreen® Plates with Glass Fiber for Traditional Cell Harvesting Assays						
MultiScreen® Harvest Plate, FB	Glass fiber FB 1.0 µm	96	Barex®/TiO_2	Non-sterile	60	MAHFB1H60
MultiScreen® Harvest Plate, FC	Glass fiber FC 1.2 µm	96	Barex®/TiO_2	Non-sterile	60	MAHFC1H60
MultiScreen® Classic 96-well Plates with Glass Fiber Prefilter						
MultiScreen® Glass Fiber B Opaque	Glass fiber FB 1.0 µm/0.65 µm Durapore® PVDF	96	Barex®/TiO_2	Non-sterile	50	MAFBN0B50
MultiScreen® Glass Fiber C Opaque	Glass fiber FC 1.2 µm/0.65 µm Durapore® PVDF	96	Barex®/TiO_2	Non-sterile	50	MAFCN0B50
MultiScreen® High Volume with Glass Fiber						
MultiScreen® High Volume with Glass Fiber C	Glass fiber FC 1.2 µm	96	Polypropylene	Non-sterile	25	MVFCN1225

Membrane Selection Guide

Microporous Membranes Organized by Application

	Durapore® PVDF	MF-Millipore™ MCE	Millipore Express® PLUS PES	Isopore™ Polycarbonate	Fluoropore™ PTFE	Omnipore™ PTFE	Mitex™ PTFE	LCR PTFE	V-Series MCE	Nylon	Silver	PVC
Lab Applications												
Clarification of cell lysates and tissue homogenates	●		●									
Cell cytology		●		●								
Sterilizing liquid filtration	●	●	●									
Air sterilization					●							
Mycoplasma reduction	●		●									
Solvent filtration	●				●	●	●	●		●		
Tissue culture media filtration	●		●									
Microdialysis of DNA and proteins									●			
Fluorescent bacteriological assays				●								
General filtration and clarification of aqueous solutions	●	●	●							●		
Clarifying acids and bases	●		●			●	●	●		●		
Chemotaxis				●								
SEM analysis				●								
Epifluorescence microscopy				●								
Venting applications					●		●					
HPLC solvent filtration	●							●		●		
Environmental Monitoring Applications												
Alpha particle monitoring					●							
Air monitoring		●		●	●		●				●	●
Industrial particle monitoring		●					●	●				●
Particle collection and analysis		●										
Gravimetric analysis		●		●								

NOTE: This chart provides general recommendations.
Contact your local Merck Millipore technical service representative to discuss the requirements of your specific application:
www.merckmillipore.com/techservice

Membrane Selection Guide

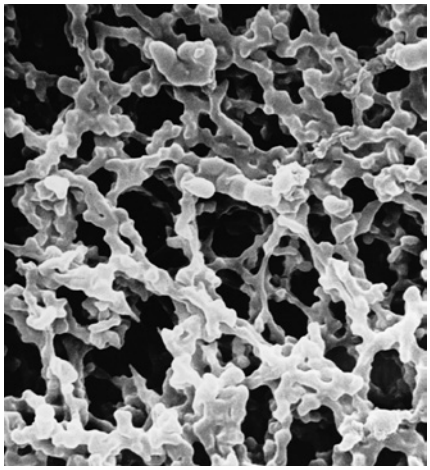
Microporous Membranes Organized by Performance

Membrane Type	Surface Chemistry	Membrane Code[4]	Pore size (µm)	Typical Flow Rate[0] Water (mL/min/cm²/psi)[1]	Air (L/min/cm²/psi)[2]	Min. Ave. Bubble Pt. (Air with H_2O, psi)[3]	Refractive Index
MF-Millipore™ MCE	Hydrophilic	VSWP	0.025	0.0	0.0	306.0	1.50
		VMWP	0.05	0.1	0.0	255.3	1.50
		VCWP	0.1	0.1	0.1	204.5	1.50
		GSWP	0.22	1.4	0.3	51.1	1.51
		PHWP	0.3	2.4	0.5	34.8	1.51
		HAWP	0.45	4.5	0.8	31.9	1.51
		DAWP	0.65	10.6	2.3	17.0	1.51
		AAWP	0.8	14.3	2.7	14.5	1.51
		RAWP	1.2	20.4	3.5	11.0	1.52
		SSWP	3	24.1	4.9	10.2	1.50
		SMWP	5	43.7	6.4	6.1	1.50
		SCWP	8	46.8	6.9	6.1	1.52
Millipore Express® PLUS PES	Hydrophilic	GPWP	0.22	1.5	0.5	20.2	NA
		HPWP	0.45	2.3	1.1	10.0	NA
Durapore® PVDF	Hydrophilic	VVLP	0.1	≥ 0.33	0.1	72.5	1.42
		GVHP	0.22	≥ 1	0.2	50.0	1.42
		HVLP	0.45	≥ 2.6	0.9	22.5	1.42
		DVPP	0.65	≥ 6	1.1	16.0	1.42
		SVLP	5	≥ 15.4	1.6	2.9	1.42
Isopore™ polycarbonate	Hydrophilic	VCTP	0.1	0.2	0.1	101.0	1.60
		GTTP	0.2	1.0	0.3	58.0	1.60
		GTBP	0.2	0.7	0.3	75.4	1.60
		HTBP	0.4	1.2	0.4	42.1	1.60
		DTTP	0.6	2.3	0.8	17.0	1.60
		ATTP	0.8	4.1	1.4	13.0	1.60
		RTTP	1.2	6.2	2.3	10.0	1.60
		TTTP	2	8.5	2.0	5.0	1.60
		TSTP	3	29.0	4.9	3.0	1.60
		TMTP	5	39.4	5.4	1.9	1.60
		TETP	8	44.0	5.5	1.3	1.60
		TCTP	10	114.7	7.2	1.0	1.60
Nylon	Hydrophilic	GNWP	0.2	0.6	0.2	42.1	NA
		HNWP	0.45	1.1	0.3	30.0	NA
		ANWP	0.8	1.4	0.3	8.0	NA
		RNWP	1.2	1.6	0.5	5.9	NA
LCR PTFE	Hydrophilic	FHLC	0.45	1.6	0.6	11.0	NA
Omnipore™ PTFE	Hydrophilic	JVWP	0.1	0.1	0.4	342.3	NA
		JGWP	0.2	0.3	0.7	197.3	NA
		JHWP	0.45	1.1	1.2	114.6	NA
		JAWP	1	3.4	3.4	52.2	NA
		JMWP	5	11.4	5.3	30.5	NA
		JCWP	10	22.7	6.8	10.2	NA
Fluoropore™ PTFE	Hydrophobic	FGLP	0.22	0.9	0.4	14.5	NA
		FHLP	0.45	1.3	1.6	9.1	NA
		FHUP	0.45	2.0	1.1	9.1	NA
		FALP	1	4.8	2.7	7.3	NA
		FSLW	3	13.8	6.4	1.5	NA
Mitex™ PTFE	Hydrophobic	LSWP	5	14.1	2.0	0.7	NA
		LCWP	10	32.3	5.0	0.4	NA
Durapore® PVDF	Hydrophobic	VVHP	0.1	≥ 0.33	0.1	26.1	1.42
		GVHP	0.22	≥ 1	0.2	18.0	1.42
		HVHP	0.45	≥ 2.6	0.5	8.7	1.42

[0] NOTE: Flow rates listed are based on measurements with clean water and air, and represent typical values. Values presented here do not establish specifications.
[1] Water flow rates were measured through 9.6 cm² of membrane, using 500 mL of water at 25 °C and 27.5 in. Hg of vacuum. Hydrophobic membranes were wet with solvents and then exchanged in water for testing.
[2] Air flow rates were measured on a 25 mm disc at 10 psi using a mass flow meter.
[3] Membranes were tested with water, except for Mitex™, Fluoropore™ and hydrophobic Durapore® membranes, which were tested with methanol.
[4] Corresponds to the first four letters of the catalogue number.

MF-Millipore™ Membrane Filters

Mixed cellulose esters



Biologically inert mixtures of cellulose acetate and cellulose nitrate have made MF-Millipore™ membrane filters one of the most widely used membranes in analytical and research applications.

MF-Millipore™ filters without Triton® surfactant contain minimum amounts of wetting agent and have a lower water extractable content than standard MF-Millipore™ filters.

Features & Benefits

- Versatile filter for biological and environmental monitoring applications
- Available in a range of pore sizes, colored black or white, with or without a gridded surface
- Compatible with ethylene oxide, gamma irradiation, and autoclave sterilization methods

Specifications

Color	White or black
Surface	Plain or gridded
Wettability	Hydrophilic
Sterilization	Ethylene oxide, autoclavable (121 °C at 1 bar)
Operating Temperature	55 °C maximum
Protein Binding	150 µg/cm²
Bacterial Endotoxins	8.0 EU/mL
Gravimetric Extractables	<1.0%

Detailed Specifications

Applications	Filter Code[1]	Color	Pore Size (µm)	Bubble Point[2] (psi)	Thickness (µm)	Water Flow Rate[3] (mL/min/cm²)	Typical Air Flow[4] (L/min/cm²)	Porosity (%)
Standard MF-Millipore™ Membranes								
Microdialysis of DNA and proteins	VSWP	White	0.025	306	105	-	>0.12	70
	VMWP	White	0.05	255	105	-	>0.26	72
	VCWP	White	0.1	205	105	-	>0.37	74
Sterilizing filtration, bioassays	GSWP	White	0.22	51.1	150	>20.1	2.7	75
Sterilizing filtration, air monitoring, particle monitoring, particle removal, bioassays	PHWP	White	0.3	35.7	150	>34.0	5.1	77
Clarification of aqueous solutions, particle removal and analysis, microbiology analysis	HAW*	White	0.45	30.6	150	>48.1	8.3	79
Fluorescent bacteriological assays, particle monitoring, bioassays	HAB**	Black	0.45	33.6	150	>69.4	-	79
Particle monitoring, particle removal, dairy microbiology, retention of yeasts, molds and algae	DAWP	White	0.65	17.0	150	>140	23.4	81
Air monitoring, particle monitoring, particle removal, bioassays	AAW**	White	0.8	14.0	150	>184	26.7	82
Fluorescent assays, particle monitoring, air monitoring	AAB**	Black	0.8	16.2	150	>195	-	82
Clarification of aqueous solutions	RAWP	White	1.2	11.2	150	>284	35.2	82
QC of fluid holding tanks, fluid monitoring, air monitoring, particle collection and analysis	SSWP	White	3	10.2	150	>347	49.3	83
QC of fluid holding tanks, fluid monitoring, particle collection and analysis	SMWP	White	5	8.0	135	>520	64.5	84
QC of fluid holding tanks, fluid monitoring, air monitoring, particle collection and analysis	SCWP	White	8	6.1	135	>625	68.9	84

*Available with plain (P) or gridded (G) surface.

[1]Corresponds to first 4 digits of catalogue number.

[2]Bubble point tested with water.

[3]Water Flow Rate measured with 47 mm disc and 500 mL of water at 25 °C and 27.5 inHg vacuum.

[4]Air flow values measured at 10 psi with a digital flow meter. Values represent typical performance and are not established specifications.

Ordering Information

Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Standard MF-Millipore™ Membranes, white, plain			
0.025	13	100	VSWP01300
	25	100	VSWP02500
	47	100	VSWP04700
	90	25	VSWP09025
	142	50	VSWP14250
0.05	13	100	VMWP01300
	25	100	VMWP02500
	47	100	VMWP04700
	90	25	VMWP09025
0.1	13	100	VCWP01300
	25	100	VCWP02500
	47	100	VCWP04700
	90	25	VCWP09025
	142	50	VCWP14250
0.22	13	100	GSWP01300
	25	100	GSWP02500
	37	100	GSWP03700[1]
	47	100	GSWP04700
	90	100	GSWP09000
	142	50	GSWP14250
0.3	25	100	PHWP02500
	47	100	PHWP04700
	90	25	PHWP09025
	142	50	PHWP14250
0.45	13	100	HAWP01300
	24	100	HAWP02400
	25	100	HAWP02500
	37	100	HAWP03700[1]
	47	100	HAWP04700
	47	50 pr	HAWP0470M[2]
	50	100	HAWP05000
	90	100	HAWP09000
	142	50	HAWP14250
0.65	13	100	DAWP01300
	25	100	DAWP02500
	47	100	DAWP04700
	90	25	DAWP09025
	142	50	DAWP14250
0.8	13	100	AAWP01300
	25	100	AAWP02500
	37	100	AAWP03700[1]
	37	100	AAWP037P0[3]
	37	50 pr	AAWP037PM[4]
	47	100	AAWP04700
	47	50 pr	AAWP0470M[2]
	90	100	AAWP09000
	142	50	AAWP14250
1.2	13	100	RAWP01300
	25	100	RAWP02500
	37	100	RAWP03700
	47	100	RAWP04700
	90	25	RAWP09025
	142	50	RAWP14250
3.0	13	100	SSWP01300
	25	100	SSWP02500
	47	100	SSWP04700
	90	25	SSWP09025
	142	50	SSWP14250
5.0	13	100	SMWP01300
	25	100	SMWP02500
	37	100	SMWP03700[1]
	47	100	SMWP04700
	90	25	SMWP09025
	142	50	SMWP14250
8.0	13	100	SCWP01300
	19 x 42	100	SCWP0190R
	25	100	SCWP02500
	47	100	SCWP04700
	90	25	SCWP09025
	142	50	SCWP14250
Standard MF-Millipore™ Membranes, white, gridded			
0.45	13	100	HAWG01300
	25	100	HAWG02500
	37	100	HAWG03700[1]
	47	100	HAWG04700

[1]Monitor refills with thin absorbent pads for aerosol monitoring.
[2]Matched weight filter pairs.
[3]Monitor refills with thick absorbent pads for liquid monitoring.
[4]Monitor refills (matched weight pairs) with thick absorbent pads for liquid monitoring.
[5]Cut from specifically selected and controlled roll stock to avoid contamination by fibers. For asbestos monitoring applications.

Ordering Information – Continued

Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
0.8	13	100	AAWG01300
	25	100	AAWG0250C[5]
	37	100	AAWG03700[1]
	47	100	AAWG04700
1.2	25	100	RAWG02500
	25	100	RAWG0250C[5]
	47	100	RAWG04700
Standard MF-Millipore™ Membranes, black, plain			
0.45	25	100	HABP02500
	47	100	HABP04700
0.8	25	100	AABP02500
	47	100	AABP04700
Standard MF-Millipore™ Membranes, black, gridded			
0.45	13	100	HABG01300
	25	100	HABG02500
	47	100	HABG04700
0.8	13	100	AABG01300
	25	100	AABG02500
	37	100	AABG03700[1]
	47	100	AABG04700

[1]Monitor refills with thin absorbent pads for aerosol monitoring.
[2]Matched weight filter pairs.
[3]Monitor refills with thick absorbent pads for liquid monitoring.
[4]Monitor refills (matched weight pairs) with thick absorbent pads for liquid monitoring.
[5]Cut from specifically selected and controlled roll stock to avoid contamination by fibers. For asbestos monitoring applications.

Detailed Specifications

Applications	Filter Code[1]	Color	Pore Size (µm)	Bubble Point[2] (psi)	Thickness (µm)	Water Flow Rate[3] (mL/min/cm²)	Typical Air Flow[4] (L/min/cm²)	Porosity (%)
MF-Millipore™ Membranes without Triton® surfactant								
For biological solutions, cell contact, or very small volumes, requiring surfactant-free surfaces	GSTF	White	0.22	51.1	150	>20	2.7	77
	HATF	White	0.45	30.6	150	>48	8.3	79
	RATF	White	1.2	11.2	150	>284	35.2	82

[1]Corresponds to first 4 digits of catalogue number.
[2]Bubble point tested with water.
[3]Water Flow Rate measured with 47 mm disc and 500 mL of water at 25 °C and 27.5 inHg vacuum.
[4]Air flow measured at 10 psi. Values represent typical performance and are not established specifications.

Ordering Information

Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
MF-Millipore™ Membranes without Triton® surfactant, white, plain			
0.22	13	100	GSTF01300
	25	100	GSTF02500
	47	100	GSTF04700
	90	100	GSTF09000
	142	50	GSTF14250
0.45	13	100	HATF01300
	25	100	HATF02500
	47	100	HATF04700
	90	25	HATF09025
	142	50	HATF14250
1.2	47	100	RATF04700
	142	50	RATF14250

Accessory

Description	Qty/Pk	Catalogue No.
Filter Forceps, blunt end, stainless steel	3	XX6200006P

For more information visit: www.merckmillipore/filterdiscs

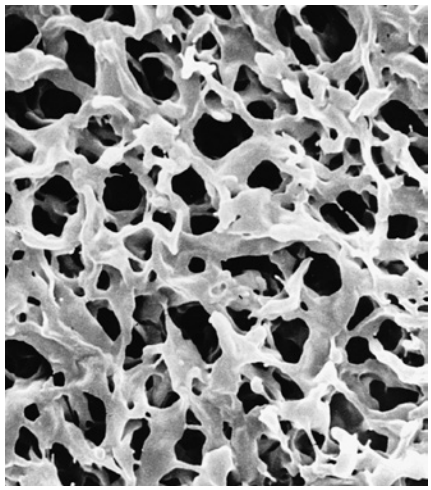
Durapore® Membrane Filters

Polyvinylidene fluoride (PVDF)

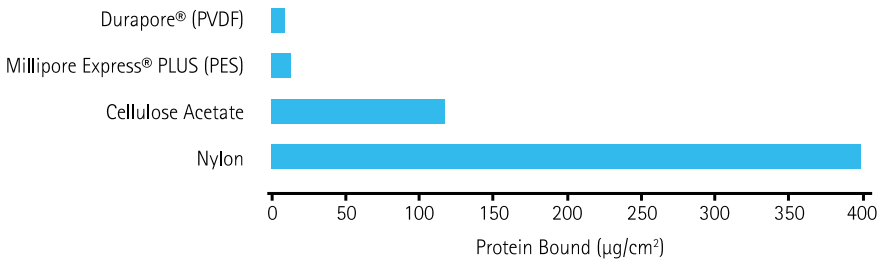
Durapore® membranes provide high flow rates and throughput, low extractables and broad chemical compatibility. Hydrophlic Durapore® membrane binds far less protein than nylon, nitrocellulose, or PTFE membranes.

Features & Benefits

- Available in several pore sizes (both hydrophilic and hydrophobic varieties) to suit your application needs
- Durapore® membrane filters have very low protein binding to minimize interaction with your sample and maximize recovery



Product Performance



Lowest protein binding with Durapore® PVDF membrane. Membrane disks with a 0.22 µm pore size were exposed to a 1 mg/mL solution of ^{125}I-labeled IgG. The chart shows protein binding after incubation (normalized to membrane surface area).

Specifications

Color	White
Surface	Plain
Wettability	Hydrophilic or hydrophobic
Sterilization	Ethylene oxide, gamma irradiation, autoclavable (121 °C at 1 bar)
Operating Temperature	85 °C maximum
Thickness	125 µm
Bacterial Endotoxins	0.5 EU/mL
Gravimetric Extractables	<0.5%

Detailed Specifications

Applications	Filter Code[1]	Pore Size (µm)	Wettability	Bubble Point (psi)	Water Flow Rate[2] (mL/min/cm²)	Typical Air Flow[3] (L/min/cm²)	Protein Binding (µg/cm²)
Mycoplasma reduction in biological solutions	VVLP	0.1	Hydrophilic	≥75 psi, air with water	>4	-	4
Sterilizing filtration of biological solutions	GVWP	0.22	Hydrophilic	≥50 psi, air with water	>12	-	4
Clarifying filtration of biological solutions	HVLP	0.45	Hydrophilic	≥22 psi, air with water	>34	-	4
Clarifying filtration of biological solutions	DVPP	0.65	Hydrophilic	≥15 psi, air with water	>78	-	4
Clarifying filtration of biological solutions, particle monitoring	SVLP	5.0	Hydrophilic	≥3 psi, air with water	>208	-	4
Air sterilization, gas sterilization	VVHP	0.1	Hydrophobic	≥26 psi, air with methanol	-	0.9	150
Air sterilization, gas sterilization, solvent filtration	GVHP	0.22	Hydrophobic	≥18 psi, air with methanol	-	1.7	150
Air clarification, gas filtration, solvent filtration	HVHP	0.45	Hydrophobic	≥9 psi, air with methanol	-	4.9	150

[1]Corresponds to first 4 digits of catalogue number.

[2]Water Flow Rate measured with 500 mL of water at 25 °C and 27.5 inHg vacuum through 47 mm disc.

[3]Air flow rate measured at 10 psi. Values represent typical performance and are not established specifications.

Ordering Information

Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Hydrophilic Durapore® Membrane Filters			
0.1	13	100	VVLP01300
0.1	25	100	VVLP02500
0.1	47	100	VVLP04700
0.1	90	50	VVLP09050
0.1	142	50	VVLP14250
0.22	13	100	GVWP01300
0.22	25	100	GVWP02500
0.22	47	100	GVWP04700
0.22	90	50	GVWP09050
0.22	100	50	GVWP10050
0.22	142	50	GVWP14250
0.45	13	100	HVLP01300
0.45	25	100	HVLP02500
0.45	47	100	HVLP04700
0.45	90	50	HVLP09050
0.45	304 mm x 3 m	1	HVLP00010
0.65	13	100	DVPP01300
0.65	25	100	DVPP02500
0.65	47	100	DVPP04700
0.65	82	50	DVPP08250
0.65	90	50	DVPP09050
0.65	142	50	DVPP14250
0.65	293	25	DVPP29325
5.0	13	100	SVLP01300
5.0	13	100	SVLP01300
5.0	25	100	SVLP02500
5.0	47	100	SVLP04700
5.0	75	50	SVLP07550
5.0	47	100	SVWG04700
5.0	90	50	SVLP09050
Hydrophobic Durapore® Membrane Filters			
0.1	47	100	VVHP04700
0.22	13	100	GVHP01300
0.22	25	100	GVHP02500
0.22	47	100	GVHP04700
0.22	90	50	GVHP09050
0.22	142	50	GVHP14250
0.22	304 mm x 3 m	1	GVHP00010
0.45	13	100	HVHP01300
0.45	25	100	HVHP02500
0.45	47	100	HVHP04700
0.45	90	50	HVHP09050
0.45	142	50	HVHP14250
Accessory			
Filter Forceps, blunt end, stainless steel		3	XX6200006P

*The membrane disc (cat. no. SVWG04700) has a gridded surface.

For more information visit: www.merckmillipore/filterdiscs

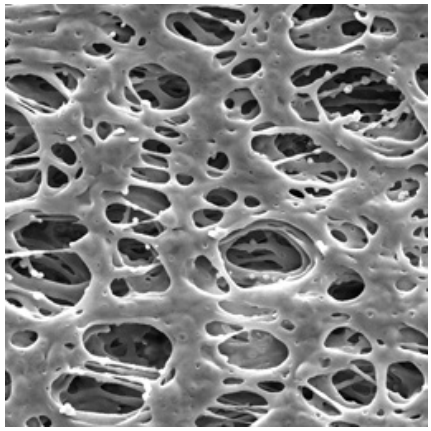
Millipore Express® PLUS Membrane Filters

Polyethersulfone (PES)

The Millipore Express® PLUS membrane provides ultrafast filtration of tissue culture media, additives, buffers and other aqueous solutions. This high throughput, low protein-binding membrane is also used in many of our ready-to-use sterile filtration devices.

Features & Benefits

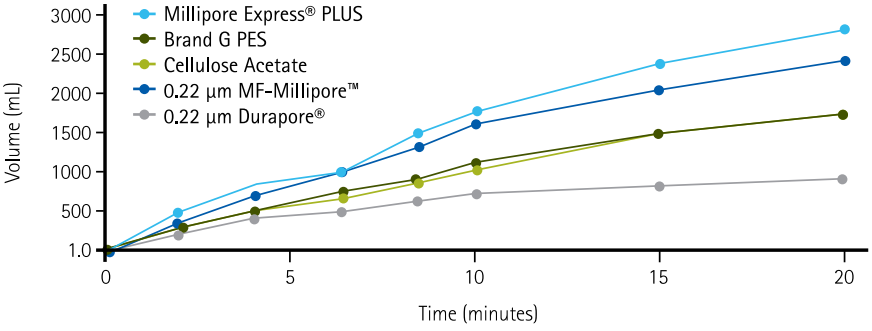
- Ultra fast filtration and high throughput shorten process time
- Can be sterilized by autoclave, ethylene oxide, or gamma irradiation for sterile filtration applications



Applications

Sterile Filtration, Buffer Filtration, Tissue Culture Media Filtration

Product Performance



Proven fast flow rate. 47 mm membrane disks with a 0.22 µm pore size were challenged with DMEM with 10% FBS, and the time required to measure each volume was recorded.

Specifications

Color	white
Surface	plain
Bacterial Endotoxins	0.5 EU/mL
Gravimetric Extractables	<0.5%
Sterilization	Ethylene oxide, gamma irradiation, autoclave (121 °C at 1 bar)

Detailed Specifications

Filter Code[1]	Pore Size (µm)	Bubble Point[2] (psi)	Thickness (µm)	Water Flow Rate[3] (mL/min/cm²)
GPWP	0.22	20	170	>27
HPWP	0.45	10	140	>44

[1]Corresponds to first 4 digits of catalogue number.
[2]Bubble point measured with isopropyl alcohol.
[3]Water flow rate measured with 500 mL of water at 25 °C and 27.5 in. Hg vacuum through 47 mm disc.

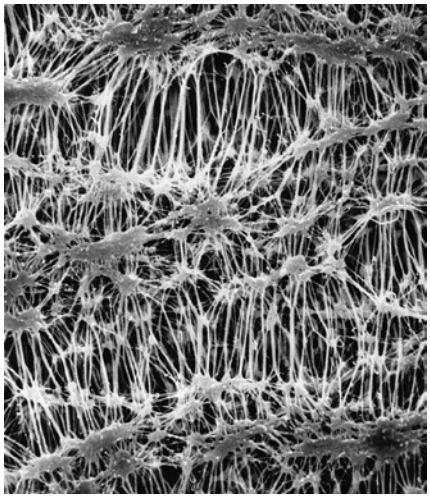
Ordering Information

Description	Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Millipore Express® PLUS Membrane	0.22	13	100	GPWP01300
		25	100	GPWP02500
		47	100	GPWP04700
		90	50	GPWP09050
		142	50	GPWP14250
	0.45	13	100	HPWP01300
		25	100	HPWP02500
		47	100	HPWP04700
		90	50	HPWP09050
		142	50	HPWP14250
Accessory				
Filter Forceps, blunt end, stainless steel			3	XX6200006P

For more information visit: www.merckmillipore/filterdiscs

Fluoropore™ and Omnipore™ PTFE Membrane Filters

PTFE with and without backing material



Features & Benefits

- Biologically and chemically inert
- High porosity yields high flow rates
- Hydrophobic and hydrophilic PTFE varieties available for filtration of aqueous and organic-based samples

Applications

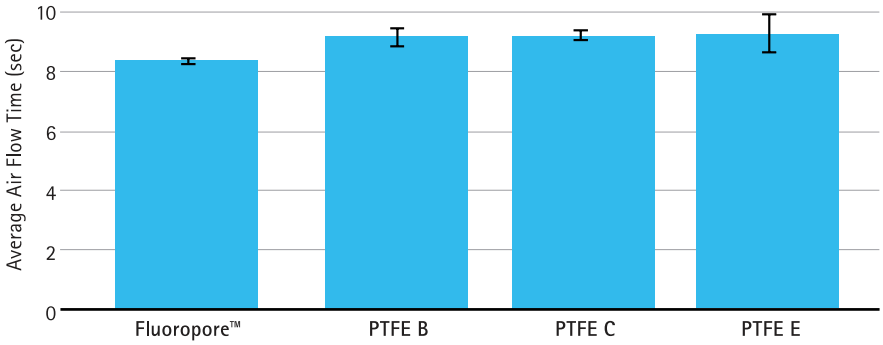
Fluoropore™ Membrane: Clarifying Acids, Bases and Solvents; Air Monitoring; Filtering and Venting Gases; UV Spectroscopy

Omnipore™ Membrane: Filtration of Aqueous Solutions, Clarifying Acids and Alkaline Solution

Fluoropore™ Membrane is a hydrophobic, polytetrafluoroethylene (PTFE) polymer membrane bonded to a high density polyethylene support. (Catalogue numbers containing ""FHUP"" have no backing.) Fluoropore™ Membranes provide broad chemical compatibility, high flow rates and consistency.

Omnipore™ Membrane is hydrophilic PTFE compatible with virually all solvents, acids, and alkaline solutions.

Product Performance



Faster flow and less variability than competitors for consistently strong performance. Air flow through PTFE membranes from various suppliers was measured using a Gurley 4110 Densometer with 0.1 in^2 aperture size and 100 cc air setting and a 20 oz cylinder.

Specifications

Sterilization	Ethylene oxide or autoclave (121 °C at 1 bar)
Bacterial Endotoxins	0.5 EU/mL
Gravimetric Extractables	<0.5%

Detailed Specifications

Applications	Filter Code[1]	Pore Size (µm)	Bubble Point[2] (psi)	Thickness (µm)	Liquid Flow Rate[3] (mL/min/cm^2)	Air Flow Rate[4] (L/min/cm^2)	Oper. Temp. (°C)	Porosity (%)
Fluoropore™ Membranes (hydrophobic)								
Clarifying acids, bases, and solvents, air monitoring, filtering or venting gases, UV spectroscopy	FGLP	0.2	14.8	150	24	5	130	85
	FHLP	0.45	9.2	150	60	9	130	85
	FALP	1.0	7.0	150	110	16	130	85
	FSLW	3.0	1.0	150	286	20	130	85
	FHUP	0.45	6.2	50	75	9	130	NA
Omnipore™ Membranes (hydrophilic)								
Clarifying acids, alkaline solutions, and virtually all solvents	JVWP	0.1	23.6	30	>10			
	JGWP	0.2	13.6	65	>28			
	JHWP	0.45	7.9	65	>74			
	JAWP	1.0	3.6	85	>156			
	JMWP	5	2.1	85	>391			
	JCWP	10	0.7	85	>446			

[1]Corresponds to first 4 digits of catalogue number.
[2]Bubble point determined with methanol, except FHUP which was tested with isopropyl alcohol (IPA). Omnipore™ membrane tested with IPA.
[3]Fluoropore™ membrane tested with methanol at 27.5 in. Hg. (average values). For Omnipore™ membrane, 100 mL water, 20 °C, 47 mm disc, 8.97" in. Hg. vacuum
[4]Air flow rates for Fluoropore™ membrane are tested at 10 psi.

Ordering Information

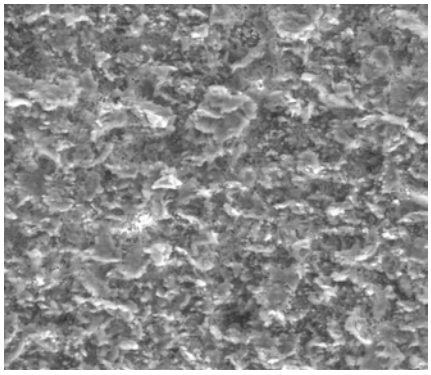
Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Fluoropore™ (PTFE) Membrane Filters			
0.22	13	100	FGLP01300
	25	100	FGLP02500
	47	100	FGLP04700
	90	50	FGLP09050
	142	50	FGLP14250
0.45	13	100	FHLP01300
	25	100	FHLP02500
	37	100	FHLP03700
	47	100	FHLP04700
	90	50	FHLP09050
	142	50	FHLP14250
1.0	13	100	FALP01300
	25	100	FALP02500
	37	100	FALP03700
	47	100	FALP04700
	90	50	FALP09050
	142	50	FALP14250
3.0	25	100	FSLW02500
	37	100	FSLW03700
	47	100	FSLW04700
	90	25	FSLW09025
	142	10	FSLW14200
Unlaminated Fluoropore™ (PTFE) Membrane Filter			
0.45	47	100	FHUP04700

Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Omnipore™ (hydrophilic PTFE) Membrane Filters			
0.1	13	100	JVWP01300
	25	100	JVWP02500
	47	100	JVWP04700
	90	25	JVWP09025
	142	25	JVWP14225
0.2	13	100	JGWP01300
	25	100	JGWP02500
	47	100	JGWP04700
	90	25	JGWP09025
	142	25	JGWP14225
0.45	13	100	JHWP01300
	25	100	JHWP02500
	47	100	JHWP04700
	90	25	JHWP09025
	142	25	JHWP14225
1.0	13	100	JAWP01300
	25	100	JAWP02500
	47	100	JAWP04700
	90	25	JAWP09025
	142	25	JAWP14225
5.0	13	100	JMWP01300
	25	100	JMWP02500
	47	100	JMWP04700
	90	25	JMWP09025
	142	25	JMWP14225
10.0	13	100	JCWP01300
	25	100	JCWP02500
	47	100	JCWP04700
	90	25	JCWP09025
	142	25	JCWP14225

For more information visit: www.merckmillipore/filterdiscs

Mitex™ PTFE Membrane Filters

Pure PTFE



Mitex™ PTFE Membrane is unaffected by almost all liquids, including organic solvents, concentrated acids and bases, propellants, and cryogenic fluids. Mitex™ membrane is unbacked, yet is easy to handle, combining the convenience of a backed membrane with the versatility of a pure PTFE membrane. Mitex™ membrane is hydrophobic.

Features & Benefits

- Broad chemical compatibility
- Biologically and chemically inert
- Stable at temperatures in excess of 260 °C (500 °F) and below -100 °C (-148 °F)

Applications

Clarifying Acids, Bases, and Cryogenic Fluids; Clarifying Propellants; Analyzing Hydraulic Fluids; Isolating RNA

Specifications

Sterilization	Ethylene oxide or autoclave (121 °C at 1 bar)
Bacterial Endotoxins	0.5 EU/mL
Gravimetric Extractables	<0.5%

Detailed Specifications

Filter Code[1]	Pore Size (µm)	Bubble Point[2] (psi)	Thickness (µm)	Water Flow Rate[3] (mL/min/cm²)	Air Flow Rate[4] (mL/min/cm²)	Oper. Temp. (°C)
LSWP	5	0.9	170	>47	>117	260
LCWP	10	0.7	130	>125	>167	260

[1]Corresponds to first 4 digits of catalogue number.
[2]Bubble point measured with ethanol at 23 °C.
[3]Water Flow Rate measured with 500 mL of water at 25 °C and 27.5 in. Hg vacuum through 47 mm disc.
[4]Air flow rates measured on 47 mm disc at 10 mbar with digital flow meter.

Ordering Information

Description	Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Mitex™ PTFE Membrane Filters, plain	5.0	13	100	LSWP01300
		25	100	LSWP02500
		37	100	LSWP03700
		47	100	LSWP04700
		90	25	LSWP09025
		142	50	LSWP14250
	10.0	13	100	LCWP01300
		25	100	LCWP02500
		47	100	LCWP04700
		90	25	LCWP09025
		142	50	LCWP14250
Mitex™ PTFE Membrane Filters, gridded	5.0	25	100	LSWG02500
		47	100	LSWG04700
	10.0	25	100	LCWG02500
		47	100	LCWG04700

For more information visit: www.merckmillipore/filterdiscs

LCR PTFE Membrane Filters

Low extractables PTFE for clearer results

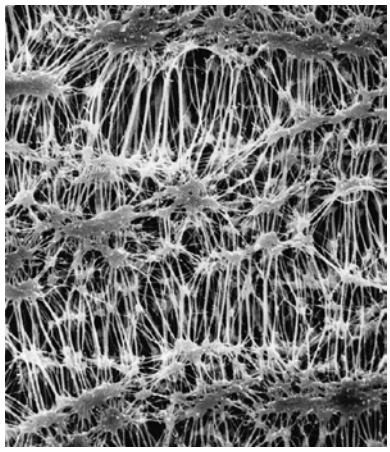
LCR membrane is an unsupported, hydrophilic PTFE membrane compatible with all commonly used HPLC solvents. The membrane undergoes a special treatment process to remove any residual extractabes, ensuring that it will not add anything to your HPLC solvents, providing clearer analysis results.

Features & Benefits

- Hydrophilic membrane can be used to filter aqueous fluids without prior wetting
- Ultraclean membrane will not add extractables to your samples or solvents

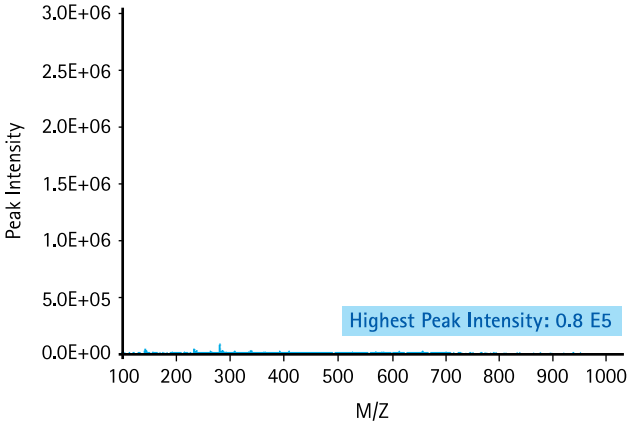
Applications

HPLC Mobile Phase Filtration; Clarifying Acids, Bases and Dilute Protein Solutions; Isolating RNA

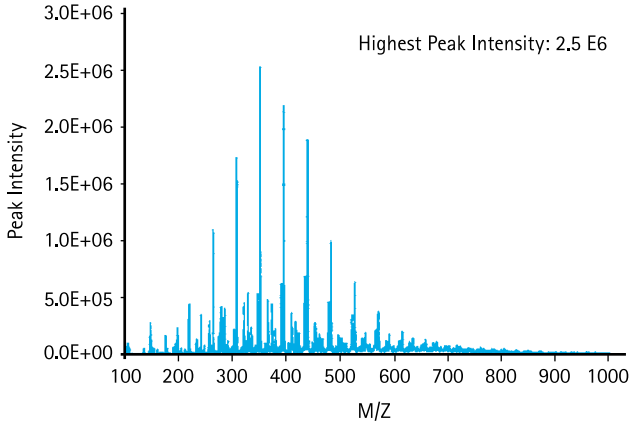


Product Performance

A. Millex® Filter Unit, PTFE



B. Polypropylene



Millex® filters feature low extractables. Mass spectrometry detects few extractable impurities from Millex® syringe filters containing 0.45 µm pore hydrophilic PTFE membrane (A). In contrast, a syringe filter containing 0.45 µm pore polypropylene membrane from another vendor (B) shows significant leaching of impurities.

Specifications

Filter Code[1]	Pore Size (µm)	Bubble Point[2] (psi)	Thickness (µm)	Water Flow Rate[3] (mL/min/cm²)	Typical Air Flow Rate[4] (L/min/cm²)	Oper. Temp. (°C)	Porosity (%)
FHLC	0.45	9.2	140	28.4	1.1	130	80

[1]Corresponds to first 4 digits of catalog number.
[2]Tested in methanol.
[3]Water Flow Rate measured with 500 mL of water at 25 °C and 27.5 in. Hg vacuum through 47 mm disc.
[4]Measured at 10 psi.

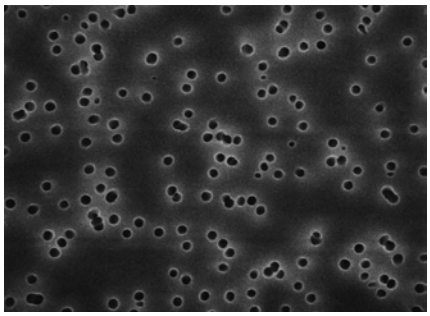
Ordering Information

Description	Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
LCR PTFE Membrane Filters	0.45	13	100	FHLC01300
		25	100	FHLC02500
		47	100	FHLC04700

For more information visit: www.merckmillipore/filterdiscs

Isopore™ Membrane Filters

Polycarbonate membrane for microscopy and visual analysis



The Isopore™ membrane is a polycarbonate, track-etched screen filter recommended for all analyses in which the sample is viewed on the surface of the membrane. Isopore™ membrane offers distinct advantages for the analysis of airborne contaminants and other particles using optical or electron microscopy. The Isopore™ membrane is composed of polycarbonate film, which has a smooth, glass-like surface for clearer sample observation. The unique manufacturing process of the membrane ensures a precise pore diameter and a consistent pore size for accurate separation of samples by size. Matched-weight filters are not usually required because of low, constant tar and ash weights.

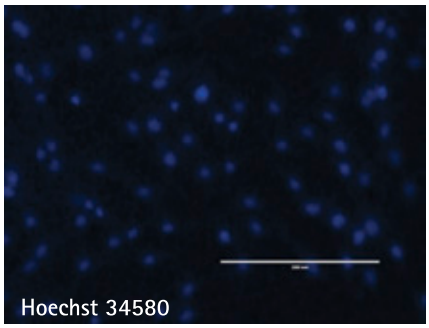
Features & Benefits

- Membrane structure retains particles on the surface, simplifying counting and analysis
- Isopore™ membranes do not stain, resulting in low background interference
- Non-hygroscopic, allowing for rapid drying and reduced sample analysis time
- Translucent material does not require clearing for transmitted light microscopy; also available in brown variety

Applications

Air Monitoring, Epifluorescent Microscopy, Chemotaxis Assays

Product Performance



Low background enables simple, accurate cell counting. NIH 3T3 cells were seeded at 25,000 cells per well of a Millicell® 24-well culture plate with 0.4 µm Isopore™ polycarbonate membrane (Cat. No. PSHT010R5). After two days, cells were fixed with 4% paraformaldehyde, nuclei were stained with Hoechst 34580 and cells counted via fluorescence microscopy. Magnification = 10X.

Specifications

Color	White or brown
Surface	Plain
Wettability	Hydrophilic
Thickness	7-27 µm
Operating Temperature	140 °C maximum
Gravimetric Extractables	<1.0%
Sterilization	Ethylene oxide, gamma irradiation, or autoclave (121 °C at 1 bar)

Detailed Specifications

Applications	Filter Code[1]	Color	Pore Size (µm)	Bubble Point[2] (psi)	Water Flow Rate[3] (mL/min/cm²)	Air Flow Rate[4] (L/min/cm²)
Chemotaxis, bioassays, cytology, air monitoring	VCTP	White	0.1	102	0.5	1.3
Chemotaxis, bioassays, cytology, air monitoring, SEM analysis, sterility testing	GTTP	White	0.2	51	6	3.5
Epifluorescent microscopy, particle monitoring, air monitoring	GTBP	Brown	0.2	51	6	-
Adsorbable organic halides (AOX), air monitoring, particle monitoring	HTTP	White	0.4	22	50	7
Epifluorescent microscopy, particle monitoring, air monitoring	HTBP	Brown	0.4	29	50	-
Reflective light microscopy, SEM analysis, gravimetric analysis, air monitoring	DTTP	White	0.6	8.7	25	8
Reflective light microscopy, SEM analysis, gravimetric analysis, air monitoring, asbestos monitoring	ATTP	White	0.8	8.7	40	14
Chemotaxis, bioassays, cytology, air monitoring	RTTP	White	1.2	8.7	110	19
	TTTP	White	2	4.4	90	23
	TSTP	White	3	0.7	180	49
Parasitology, chemotaxis, bioassays, cytology, air monitoring	TMTP	White	5	-	250	54
Chemotaxis, bioassays, cytology, air monitoring	TETP	White	8	-	250	55
	TCTP	White	10	-	250	72

[1]Corresponds to first 4 digits of catalogue number.

[2]Bubble point tested in water at 20 °C.

[3]Water flow rate tested at 10 psi.

[4]Air flow measured at 10 psi. Values represent typical performance and are not established specifications.

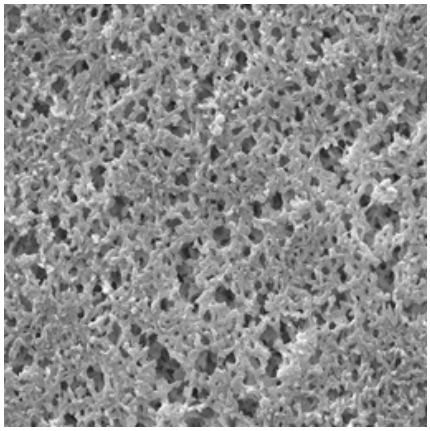
Ordering Information

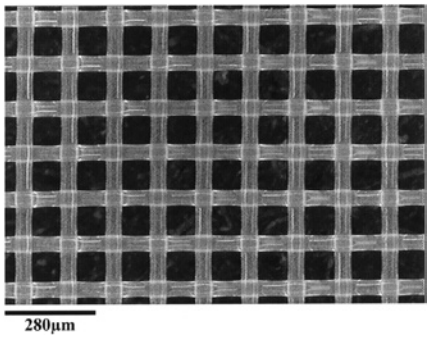
Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
White Membrane Filters			
0.1	13	100	VCTP01300
	25	100	VCTP02500
	47	100	VCTP04700
	142	50	VCTP14250
0.2	13	100	GTTP01300
	25	100	GTTP02500
	37	100	GTTP03700
	47	100	GTTP04700
	90	30	GTTP09030
	142	50	GTTP14250
0.4	13	100	HTTP01300
	25	100	HTTP02500
	37	100	HTTP03700
	47	100	HTTP04700
	90	30	HTTP09030
0.6	13	100	DTTP01300
	25	100	DTTP02500
	47	100	DTTP04700
0.8	13	100	ATTP01300
	25	100	ATTP02500
	37	100	ATTP03700
	47	100	ATTP04700
	142	50	ATTP14250
1.2	13	100	RTTP01300
	25	100	RTTP02500
	47	100	RTTP04700
	142	50	RTTP14250
2.0	25	100	TTTP02500
	47	100	TTTP04700
3.0	13	100	TSTP01300
	25	100	TSTP02500
	47	100	TSTP04700
	142	50	TSTP14250
5.0	13	100	TMTP01300
	25	100	TMTP02500
	47	100	TMTP04700
	90	30	TMTP09030
	142	50	TMTP14250
8.0	13	100	TETP01300
	25	100	TETP02500
	47	100	TETP04700
	142	50	TETP14250
10.0	13	100	TCTP01300
	25	100	TCTP02500
	47	100	TCTP04700
	142	50	TCTP14250
Brown Membrane Filters			
0.2	13	100	GTBP01300
	25	100	GTBP02500
	47	100	GTBP04700
0.4	13	100	HTBP01300
	25	100	HTBP02500
	47	100	HTBP04700

For more information visit: www.merckmillipore/filterdiscs

Nylon Membrane and Net Filters

Broad chemical compatibility





Nylon filters are compatible with a broad range of solvents. Two types are available: membrane filters with pore sizes ranging from 0.20 to 1.2 µm and woven net filters with mesh openings ranging from 10 to 180 µm.

Features & Benefits

- Wide range of pore sizes available
- Resistant to aggressive solvents

Applications

Particle Removal and Clarification; Solvent Filtration; Particle Analysis; Paint Monitoring

Specifications

Applications	Filter Code*	Pore Size (µm)	Bubble Point (psi)	Thickness (µm)	Water Flow Rate** (mL/min/cm²)	Open Area (%)
Nylon Membrane Filters						
Sterilizing filtration, bioassays, solvent filtration	GNWP	0.20	42	170	8.0	–
Clarification of solutions, particle removal and analysis	HNWP	0.45	30	170	14.6	–
Air monitoring, particle removal and analysis	ANWP	0.8	8	170	18.6	–
Clarification of aqueous and organic solutions	RNWP	1.2	6	170	21.2	–
Nylon Net Filters						
Collection of algae and cells, particle analysis, large particulate filtration, toxicology and drug screening on *C. Elegans* and zebrafish, background filter for automated particle imaging systems, prefiltration of solvents, paint monitoring	NY10	10	NA	45	–	4
	NY11	11	NA	65	–	6
	NY20	20	NA	55	–	14
	NY30	30	NA	65	–	17
	NY41	40	NA	50	–	31
	NY60	60	NA	50	–	41
	NY80	80	NA	75	–	41
	NY1H	100	NA	80	–	44
	NY2H	120	NA	80	–	49
	NY4H	140	NA	120	–	43
	NY6H	160	NA	100	–	53
	NY8H	180	NA	135	–	47

*Corresponds to first 4 digits of catalogue number

**Represent typical values

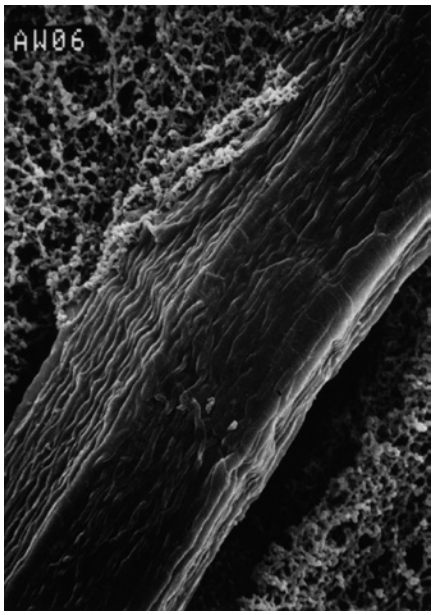
Ordering Information

Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Nylon Membrane Filters			
0.2	25	100	GNWP02500
	47	100	GNWP04700
0.45	25	100	HNWP02500
	47	100	HNWP04700
0.8	25	100	ANWP02500
	47	100	ANWP04700
1.2	25	100	RNWP02500
	47	100	RNWP04700
Nylon Net Filters			
10.0	25	100	NY1002500
	47	100	NY1004700
	90	50	NY1009000
11.0	25	100	NY1102500
	47	100	NY1104700
	90	50	NY1109000
	30 cm x 3 m	1	NY1100010
20.0	25	100	NY2002500
	47	100	NY2004700
	90	50	NY2009000
	30 cm x 3 m	1	NY2000010
30.0	25	100	NY3002500
	47	100	NY3004700
	90	50	NY3009000
41.0	25	100	NY4102500
	47	100	NY4104700
	90	50	NY4109000
	30 cm x 3 m	1	NY4100010
60.0	25	100	NY6002500
	47	100	NY6004700
	90	50	NY6009000
	30 cm x 3 m	1	NY6000010
80.0	25	100	NY8002500
	47	100	NY8004700
	90	50	NY8009000
100.0	25	100	NY1H02500
	47	100	NY1H04700
	90	50	NY1H09000
	30 cm x 3 m	1	NY1H00010
120.0	25	100	NY2H02500
	47	100	NY2H04700
	90	50	NY2H09000
140.0	25	100	NY4H02500
	47	100	NY4H04700
	90	50	NY4H09000
160.0	25	100	NY6H02500
	47	100	NY6H04700
	90	50	NY6H09000
	30 cm x 3 m	1	NY6H00010
180.0	25	100	NY8H02500
	47	100	NY8H04700
	90	50	NY8H09000
Accessory			
Filter Forceps, blunt end, stainless steel		3	XX6200006P

For more information visit: www.merckmillipore/filterdiscs

Reinforced Prefilter Membrane

Mixed cellulose ester with polyester support



Reinforced prefilter membranes can be used to remove contaminants from a variety of liquids and gases. The filters have a high dirt-holding capacity and a low pressure drop, which makes them ideally suited for reducing contaminant levels in advance of sterilizing-grade filters. Reinforced prefilter membranes are made from non-shedding materials. The filters retain contaminants on the surface of the cellulose membrane.

Features & Benefits

- Prefilter with high dirt-loading capacity for greater throughput
- Non-shedding substrate will not unload fibers downstream

Applications

Prefiltration Ahead of Sterilizing-Grade Filters

Specifications

Thickness	200 µm
Porosity	70%
Wettability	Hydrophilic
Operating Temperature	70 °C maximum
Sterilization	Ethylene oxide or autoclave (121 °C at 1 bar)
Bacterial Endotoxins	<20 EU/mL
Gravimetric Extractables	<0.5%

Detailed Specifications

Applications	Filter Code*	Retention Rating (µm)	Water Flow Rate (mL/min/cm²)	Protein Binding (µg/cm²)
Prefiltration before 0.22 µm membrane filtration	RW03	0.2	50	120
Prefiltration before 0.45 µm membrane filtration	RW06	0.5	150	80
Prefiltration before 1.2 µm membrane filtration	RW19	1.2	260	20

*Corresponds to first 4 digits of catalogue number

Ordering Information

Description	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Reinforced Membrane Type RW03	47	100	RW0304700
	90	100	RW0309000
Reinforced Membrane Type RW06	47	100	RW0604700
	90	100	RW0609000
	142	50	RW0614250
Reinforced Membrane Type RW19	47	100	RW1904700
	142	50	RW1914250
Accessory			
Filter Forceps, blunt end, stainless steel		3	XX6200006P

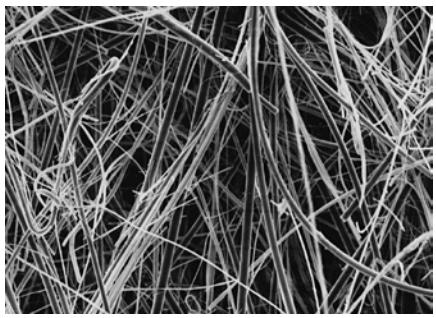
For more information visit: www.merckmillipore/filterdiscs

Glass & Quartz Fiber Filters

For contamination analysis

Glass fiber disc filters are available in a wide range of flow rates and throughput capacities. Glass fiber filters are available with or without binder resins and can be sterilized by ethylene oxide, gamma irradiation or autoclaving.

Our pure quartz fiber filters have a composition that prevents the filters from reacting with acidic gases. This makes quartz filters well-suited for measuring heavy metal concentrations and small amounts of particles (such as the US EPA PM 10 ambient air monitoring method).



Specifications

Filter Code[1]	Retention Rating (µm)	Thickness (µm)	Water Flow Rate (mL/min/cm²)	Air Resistance[2] (mm of H_2O)	Air Flow[3] (L/min/cm²)	DOP Penetration[4]	Protein Binding (µg/cm²)	Weight (g/m²)	Max. Temp. (°C)
Glass Fiber Filters with Binder Resin									
AP15	0.2 - 0.6	790	1.6	210	10.6	0.10	100	50	–
AP20	0.8 - 8.0	380	1.3	48	46.4	0.08	60	59	–
AP25	0.8 - 8.0	1200	5.8	35	63.6	0.03	110	140	–
Glass Fiber Filters without Binder Resin									
APFA	1.6	230	5.0	33	67.5	0.002	–	55	500
APFB	1.0	700	2.2	95	23.4	0.002	–	140	500
APFC	1.2	240	1.2	54	41.2	0.002	–	52	500
APFD	2.7	470	2.7	16	139	0.1	–	120	500
APFF	0.7	380	1.4	120	18.6	0.002	–	75	500
AP40	–	475	6.0	50	44.5	0.002	–	65	550
Quartz Fiber Filters									
AQFA	–	430	1.6	50	44.5	0.002	–	85	950

[1]Corresponds to first 4 digits of catalogue number
[2]Measured at 10.5 fpm or 5.3 cm/s
[3]Meaured at 10 psi
[4]Dioctyl phthalate percentage at 10.5 fpm

Ordering Information

Filter Type	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Glass Fiber Filters with Binder Resin			
AP15	25	100	AP1502500
	37	100	AP1503700
	42	100	AP1504200
	47	100	AP1504700
	75	100	AP1507500
	90	100	AP1509000
	124	50	AP1512450
	142	50	AP1514250
AP20	13	100	AP2001300
	25	100	AP2002500
	42	100	AP2004200
	47	100	AP2004700
	55	100	AP2005500
	75	100	AP2007500
	90	100	AP2009000
	124	50	AP2012450
	142	50	AP2014250

Filter Type	Filter Diameter (mm)	Qty/Pk	Catalogue No.
AP25	10	100	AP2501000
	13	100	AP2501300
	22	100	AP2502200
	25	100	AP2502500
	42	100	AP2504200
	47	100	AP2504700
	90	100	AP2509000
	124	50	AP2512450
	142	50	AP2514250
Glass Fiber Filters without Binder Resin			
APFA	47	100	APFA04700
APFB	25	100	APFB02500
	37	100	APFB03700
	47	100	APFB04700
APFC	25	100	APFC02500
	47	100	APFC04700
	90	50	APFC09050

Ordering Information – Continued

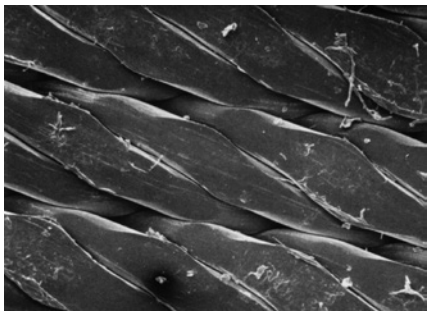
Filter Type	Filter Diameter (mm)	Qty/Pk	Catalogue No.
APFD	25	100	APFD02500
	47	100	APFD04700
	90	50	APFD09050
APFF	25	100	APFF02500
	47	100	APFF04700
	90	50	APFF09050
	142	50	APFF14250
AP40	10	100	AP4001000
	24	500	AP4002405
	25	100	AP4002500
	37	500	AP4003705
	70	100	AP4007000
	90	100	AP4009000
	142	50	AP4014250

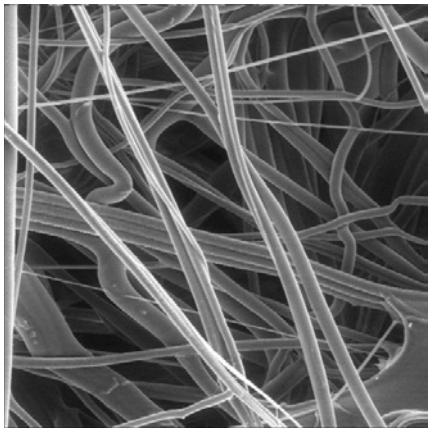
Filter Type	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Quartz Fiber Filters			
AQFA	37	100	AQFA03700
	47	100	AQFA04700
	90	50	AQFA09050
	8 in. x 10 in.	50	AQFA8X105
Accessory			
Filter Forceps, blunt end, stainless steel		3	XX6200006P

For more information visit: www.merckmillipore/filterdiscs

Polypropylene Prefilters and Membranes

Broad thermal compatibility





Polypropylene filters are constructed of 100% virgin polypropylene media. They are designed for general clarification and prefiltration of solvents, deionized water and bioburden reduction. They also provide broad thermal compatibility. The prefilters provide high particle retention, high dirt-holding capacity and low pressure drop. They are designed for filtration of organic solvents, but they can also be used, once properly wetted with alcohol, for the filtration of aqueous solutions.

Features & Benefits

- Compatible with aggressive solvents
- Prefilters have high dirt-holding capacity

Applications

General Prefiltration and Clarification, Suitable for Organic Solvents

Specifications

Applications	Filter Code*	Pore Size (µm)	Thickness (µm)	Max. Temp. (°C)
Polypropylene Prefilters				
Clarification of aqueous solutions, prefiltration upstream of membrane filters with pore sizes of 0.2 – 0.6 µm	AN06	0.6	140	90
Clarification of aqueous solutions, prefiltration upstream of membrane filters with pore sizes of 0.5 – 2.0 µm	AN12	1.2	140	90
Clarification of aqueous solutions, prefiltration upstream of membrane filters with pore sizes of 0.8 – 8.0 µm	AN25	2.5	140	90
Collection of cells and precipitates	AN50	5	110	90
	AN1H	10	150	90
Clarification of aqueous and nonaqueous solutions	AN3H	30	200	90
Polypropylene Net Filters				
Collection of cells and protein precipitates	PP25	25	360	100
Large particle removal, contamination analysis	PP45	45	430	100
	PP80	80	450	N/A

*Corresponds to first 4 digits of catalogue number

Ordering Information

Description	Pore Size (µm)	Filter Diameter (mm)	Qty/Pk	Catalogue No.
Polypropylene Prefilter	0.6	47	100	AN0604700
	1.2	47	100	AN1204700
	2.5	47	100	AN2504700
	5	47	100	AN5004700
	10	47	100	AN1H04700
	30	47	100	AN3H04700
Polypropylene Net Filter	25	25	100	PP2502500
		47	100	PP2504700
	45	25	100	PP4502500
		47	100	PP4504700
		90	100	PP4509030
Accessory				
Filter Forceps, blunt end, stainless steel			3	XX6200006P

For more information visit: www.merckmillipore/filterdiscs

Swinnex® Filter Holders

Reusable, syringe-driven filter unit

Make your own syringe filter! Swinnex® filter holders give you the flexibility to select the membrane type and diameter that are most appropriate for your application. For sterile filtration, autoclave your Swinnex® filter holders with the membrane in place. Ultraclean or sterilize small volumes of liquids dispensed by a syringe or install in-line to filter larger volumes.

Features & Benefits

- Available in three sizes for a range of process volumes
- Autoclavable with filter in place for sterile filtration

Applications

Ultracleaning or Sterilization of Liquids

Specifications

	Swinnex® 13 Filter Holder	Swinnex® 25 Filter Holder	Swinnex® 47 Filter Holder
Materials			
Housing	Polypropylene	Polypropylene	Polypropylene
Seal Material	Silicone	Silicone	Silicone
Maximum Differential Pressure, bar (psi)	3.5 (50)	3.5 (50)	5.2 (75)
Dimensions			
Length, cm	3.5	3.7	5.4
Diameter, cm	1.7	3.2	5.8
Filter Diameter, mm	13	25	47
Prefilter Diameter, mm	10 (thick depth prefilter)	22 (thick depth prefilter)	42 (thick depth prefilter) or 47 (membrane prefilter)
Filtration Area, cm²	0.7	3.4	13.8
Fitting Inlet	Female Luer-Lok®	Female Luer-Lok®	1/4 in. NPTM
Fitting Outlet	Male Luer-Slip™	Male Luer-Slip™	Female Luer-Slip™
Sterilization Method	Autoclavable with filter in place		

*Use locking inlet connection to avoid leakage at high pressures with < 10 mL syringes

**Accessory stopper, XX2004718, fits outlet connector for seating in 1 L flask, XX1004705.

Ordering Information

Description	Qty/Pk	Catalogue No.
Swinnex® Filter Holder, 13 mm	10	SX0001300
Swinnex® Filter Holder, 25 mm	12	SX0002500
Swinnex® Filter Holder, 47 mm	8	SX0004700
Replacement Parts		
Silicone Gaskets for 13 mm Swinnex® Filter Holder	100	SX0001301
Silicone Gaskets for 25 mm Swinnex® Filter Holder	100	SX0002501
Support Screen, 25 mm, polypropylene	30	XX2702510
Support Screen, 47 mm, polypropylene	1	XX1104715
O-ring (5-329) for Swinnex® 47 mm Filter Holder, silicone	10	XX1104707
Base O-ring for Swinnex® 47 mm Filter Holder, silicone	5	SX0004701
Replacement Parts Kit for Swinnex® 47 mm Filter Holder	1	SX00047RK*

*Replacement Parts Kit for Swinnex® 47 mm Filter Holder includes: (10) base O-rings, (10) silicone filter O-rings, (10) fluoroelastomer O-rings, (10) EP filter O-rings, (10) polypropylene filter support screens, (2) tightening wrenches

For more information visit: www.merckmillipore.com/LabHardware

Stainless Steel Syringe Filter Holders

Reusable, syringe-driven filter unit

Make your own syringe filter! Microsyringe and Swinny filter holders give you the flexibility to select the membrane type and diameter that are most appropriate for your application. For sterile filtration, autoclave your filter holders with the membrane in place. Ultraclean or sterilize small volumes of liquids dispensed by a syringe or install in-line to filter larger volumes.

Features & Benefits

- Available in two sizes for a range of process volumes
- Durable stainless steel construction ensures years of use, decreasing waste from disposable syringe filters
- Autoclavable with filter in place for sterile filtration

Applications

Ultracleaning or Sterilization of Liquids

Specifications

	Swinny	Microsyringe
Materials		
Housing	Stainless steel	Stainless steel
Seals	PTFE	PTFE
Filter Diameter, mm	13	25
Filtration Area, cm²	0.8	3.9
Prefilter Diameter, mm	10	22
Maximum Inlet Pressure, bar (psi)	6.9 (100)	6.9 (100)
Dimensions		
Length, cm	3.3	3.2
Diameter, cm	1.6	3.2
Fittings		
Fitting Inlet	Female Luer-Lok®	Female Luer-Lok®
Fitting Outlet	Male Luer-Slip™	Male Luer-Slip™
Sterilization	Autoclavable with filter in place	

Ordering Information

Description	Qty/Pk	Catalogue No.
Swinny Filter Holder 13 mm, stainless steel	1	XX3001200
Microsyringe Filter Holder 25 mm, Luer-Lok®, stainless steel	1	XX3002500
Microsyringe Filter Holder 25 mm, NPTF, stainless steel	1	XX3002514
Replacement Parts		
Swinny 13 mm Replacement Parts Kit*	1	XX30012RK
Microsyringe 25 mm Replacement Parts Kit**	1	XX30025RK

*Parts Kit includes (4) PTFE O-rings, (4) PTFE support screen gaskets, and (4) stainless steel support screens.

**Parts Kit includes (2) PTFE O-rings, (2) PTFE support screen gaskets, (2) stainless steel support screens, and (2) wrenches.

For more information visit: www.merckmillipore.com/LabHardware

In-Line Filter Holder

Reusable pressure-driven filter housing

Ultraclean liquids or gases in line by pressure filtration. Simply open the housing to change the filter without disturbing the attached plumbing.

Applications
General Filtration (in-line)

Features & Benefits

- Stepped hose barb connections at both ends for easy installation
- Large, easy to grip hand knobs

Specifications

Materials	Filled polypropylene; nylon hand knobs
Filter Diameter, mm	47
Filtration Area, cm²	13.8
Prefilter Diameter, mm	42 (thick depth prefilter) or 47 (membrane prefilter)
Maximum Inlet Pressure, bar (psi)	5.5 (80)
Maximum Operating Temperature, °C	70 at 5.5 bar
Fittings, Inlet/Outlet	1/4 in. NPTF; connector for 6 mm to 9.5 mm I.D. flexible tubing
Dimensions	
Length, cm	12
Diameter, cm	7.6

Ordering Information

Description	Qty/Pk	Catalogue No.
In-Line Filter Holder, 47 mm	1	XX4304700
Replacement Parts		
Hose Adapter, 1/4 in. NPTF to 5/16 in. I.D., polypropylene	2	XX4304704
O-ring (2-131), silicone	6	XX4304701
Hand Knobs	3	XX4304705
Accessories		
Stainless Steel Support Screen, 47 mm	1	XX4304707
PVC Tubing, 3 m, 9.5 mm I.D.	1	XX6700034
O-ring (2-131), fluoroelastomer	6	XX4304702
Filter Forceps, blunt end, stainless steel	3	XX6200006P

For more information visit: www.merckmillipore.com/LabHardware

In-Line Stainless Steel Filter Holders (25 and 47 mm)

For in-line filtration, up to 700 bar

The In-Line Stainless Steel Filter Holders are designed for filtration of gases or liquids at inlet pressures of 20 to 700 bar. Differential pressure depends on the filter type used. All filter holders may be autoclaved. The 47 mm In-Line filter holder (cat. no. XX4404700) is equipped with a back-pressure support screen. It may be autoclaved with filter in place, as long as the optional PTFE-coated support screens (cat. no. XX4404702 and XX4404704) are used. The 47 mm High-Pressure filter holder (cat. no. XX4504700) may be equipped with the upstream filter support screen (cat. no. XX4504704) for back-pressure protection of filter.

Features & Benefits

- Safe for use with inlet pressures up to 700 bar
- Devices are autoclavable; autoclaving with filter in place requires optional PTFE-coated support screens

Applications

In-Line Filtration of Fluid Process Streams

Specifications

	25 mm HP Holder	47 mm Holder	47 mm HP Holder
Materials			
Housing	Stainless steel	Stainless steel	Stainless steel
Gaskets	Buna-N	Silicone	Fluoroelastomer
Filter Diameter, mm	25	47	47
Filtration Area, cm²	2.2	13.8	9.6
Prefilter Diameter, mm	10 (thick depth prefilter)	22 (thick depth prefilter)	42 (thick depth prefilter) or 47 (membrane prefilter)
Maximum Pressure Differential, bar gauge (psig)			
With 3.0, 5.0 and 8.0 µm MCE filters	10.3 (150)	–	10.3 (150)
With all membrane filters except 3.0, 5.0 and 8.0 µm MCE filters	69 (1000)	–	103 (1500)
Maximum Inlet Pressure, bar (psi)	345 (5000)	19 (275)	689 (10,000)
Dimensions			
Height, cm	3.2	2.7	4.4
Diameter, cm	5.1	7.6	8.6
Fittings			
Inlet	1/8 in. NPTF	1/4 in. NPTF	7/16 in.-20 (UNF-3B) female
Outlet	1/8 in. NPTF	1/4 in. NPTF*	7/16 in.-20 (UNF-3B) female**

*1/8" NPTF upstream port with pipe plug

**Adapters to 1/4" NPTF are included

Ordering Information

Description	Qty/Pk	Catalogue No.
HP Filter Holder, 25 mm, stainless steel	1	XX4502500
Filter Holder, 47 mm, stainless steel	1	XX4404700
HP Filter Holder, 47 mm, stainless steel	1	XX4504700
Replacement Parts		
For 25 mm HP Filter Holder		
Replacement Parts Kit, 25 mm filter holder	1	XX45025RK*
For 47 mm Filter Holder		
Back-pressure Screen, 47 mm, stainless steel	1	XX4404703
O-ring (2-131), silicone	6	XX4304701
Support Screen, 47 mm	1	XX4204709
Underdrain Screen, 47 mm	1	5614
Pipe Plug, 1/8 in.	1	009507P
For 47 mm HP Filter Holder		
Replacement Parts Kit, 47 mm filter holder	1	XX45047RK**
Filter Support Screen, 47 mm, stainless steel	1	XX4504704
Inner O-ring, 47 mm, PTFE-treated fluoroelastomer	5	XX4504705
Inner O-ring, 47 mm, PTFE	5	XX4504710
Outer O-ring, 47 mm, fluoroelastomer	10	XX4504713
Note: complete replacement parts information available online.		
Accessories for 47 mm Filter Holder		
PTFE-coated HP Support Screen, 47 mm, stainless steel	1	XX4404702
Vent/Relief Valve	1	XX4204708
Hose Adapter, 1/4 in. NPTM to 3/8 in. I.D.	1	XX2504705

* Includes (3) stainless steel hex-cap screws, (3) LCR-treated Buna-N O-rings (2-018), (1) stainless steel support screen, (1) Allen™ wrench

** Includes (6) each of inlet/outlet adapter, adapter O-ring (2-111), hex-cap screw, inner O-ring, outer O-ring

For more information visit: www.merckmillipore.com/LabHardware

Standing Stainless Steel Filter Holders (90 and 142 mm)

Filter holders supported by legs

The stainless steel filter holders are designed to ultraclean or sterilize liquids or gases by pressure filtration. PTFE-faced support screens permit autoclaving with membranes in place.

Specifications

	90 mm Holder	142 mm Holder
Materials		
Holder	316 stainless steel with anodized aluminum legs	316 stainless steel with anodized aluminum legs
O-rings	PTFE	PTFE
Filter Diameter, mm	90	142
Filtration Area, cm²	45.5	97
Prefilter Diameter, mm		
Type AP	75	124
Type RW	90	142
Maximum Inlet Pressure, bar (psi)	19 (275)	14 (200)
Maximum Differential Pressure, bar (psid)	5 (75)	7 (100)
Dimensions		
Height, cm (in)	17.1 (plus inlet connector)	27 (plus inlet connector)
Diameter, cm (in)	12.1	18.4
Connections		
Fittings, Inlet/Outlet	1/4 in. NPTF with connections supplied for 9.5 mm I.D. hose	1-1/2 in. Sanitary Flange with clamps and adapters supplied for 14 mm I.D. hose
Vent/Relief Valve	1/8 in. NPTM vent/relief valve attachment	1/8 in. NPTM vent/relief valve attachment
Shipping Weight, kg (lb)	2.8 (6.2)	6.4 (14.1)

Ordering Informaiton

Description	Qty/Pk	Catalogue No.
Filter Holder, 90 mm, stainless steel	1	YY3009000
Filter Holder, 142 mm, stainless steel	1	YY3014236
90 mm Holder Replacement Parts		
Hose Adapter, 1/4 in. NPTM to 3/8 in. I.D.	1	XX2504705
Vent/Relief Valve	1	XX4204708
O-rings, 90 mm filter housing, PTFE	4	YY3009053
Support Screen, PTFE-coated	1	YY3009054
Underdrain Support, 90 mm	1	YY2209058
Support Legs	3	YY2209059
142 mm Holder Replacement Parts		
Hand Knob	1	YY2214257
Adapter 1-1/2 in. TC to 14 mm	1	YY2004076
1-1/2 in. TC silicone gasket	10	YY2004055
Clamp 1 1/2 in. TC	1	YY2004045
Vent/Relief Valve, 9 bar (125 psig)	1	YY3029366
O-ring (2-251), PTFE	1	YY2214253
O-ring (2-251), silicone	4	YY2214265
Inlet Flow Deflector, 316 holder	1	YY3029307
Support Screen for 142 mm filter holder, PTFE-coated	1	YY3014234
Underdrain Support, 142 mm	1	YY2214258
Legs with Caps, 3/16 in. wrench	3	YY2214251
Handwheel Wrench for 142 mm holder	1	YY2214252

Note: complete replacement part information is available online.

For more information visit: www.merckmillipore.com/LabHardware

Stainless Steel Pressure Filter Holders

Pressure-driven filtration of up to 340 mL of liquid

These filter holders are ideal for ultracleaning or sterilizing batch volumes of liquids. The cylindrical barrel holds 100 mL (or 340 mL) of liquid, which is filtered by externally applied gas pressure through a suitable filter supported on the holder base.

Features & Benefits

- Filter holder has reservoir to hold 100 mL (or 340 mL) of liquid for batch filtration
- Autoclavable with membrane in place for sterile filtration

Applications

Batch Filtration

Specifications

Materials	Stainless steel barrel, base, filter support screen, top cap, and tubing adapter; anodized aluminum locking ring; silicone stopper
Filter Diameter, mm	47
Filtration Area, cm²	11.3
Prefilter Diameter, mm	42 (thick depth prefilter) or 47 (membrane prefilter)
Maximum Inlet Pressure, bar (psi)	6.9 (100)
Connections	
Inlet	9.5 mm (3/8 in.) hose connector
Outlet	No. 8 perforated silicone stopper mounts in standard 1 L filtering flask
Dimensions	
Height, cm (100 mL holder)	29.2
Height, cm (340 mL holder)	53.3
Diameter, cm	7

Ordering Information

Description	Qty/Pk	Catalogue No.
Stainless Steel Pressure Filter Holder, 47 mm, 100 mL	1	XX4004700
Stainless Steel Pressure Filter Holder, 47 mm, 340 mL	1	XX4004740
Replacement Parts		
Top Cap with Hose Adapter	1	000205
Locking Ring Gasket, PTFE	5	XX4004714
O-rings, PTFE	5	XX4004716
Filter Support Screen, stainless steel, 47 mm	1	XX4004704
Gasket, PTFE	25	XX2004703
No. 8 Stopper, 9.5 mm (3/8 in.) hole, silicone	5	XX2004718
Replacement Parts Kit, 47 mm holder	1	XX40047RK*
*Replacement Parts Kit includes: (5) top cap O-rings, (5) locking ring gaskets, (5) filter sealing O-rings, (5) screen gaskets		
Note: complete replacement part information is available online.		
Accessories		
Vacuum Filtering Flask, 1 L	1	XX1004705
Vaccum Filtering Flask, 4 L	1	XX1004744
Tubing, 3/16 in. I.D. x 140 cm, silicone	1	XX7100004
3 m PVC tubing with 9.5 mm I.D.	1	XX6700034

For more information visit: www.merckmillipore.com/LabHardware

MilliSolve™ Filtration System

Bottle-to-bottle filtration of solvents and buffers

The MilliSolve™ Filtration System has been designed for the filtration of liquid chromatography buffers and solvents under vacuum. The system uses a 0.45 µm membrane filter to eliminate particles which can shorten column life. Vacuum filtration with the MilliSolve™ system also removes a large portion of dissolved gases from buffers, reducing the risk of air bubbles interfering with LC instruments. With automatic and continuous filtration, there is no need to add liquid into a funnel as filtration progresses. Filtration occurs in a closed system, which is important when filtering hazardous fluids. If open funnel filtration is required, the 300 mL funnel replaces the vacuum cover.

Features & Benefits

- Automatic, continuous solvent and buffer filtration eliminates the need to pour during filtration
- 2 L receiving flask includes plug and tubing for storage, eliminating filtered buffer transfer, reducing labor and lessening contamination risk
- Conical 2 L flask bottom allows access to all filtered solvent or buffer

Applications

Mobile Phase Preparation, Buffer Filtration

Ordering Information

Description	Qty/Pk	Catalogue No.
MilliSolve™ Filtration System, complete with 2 L flask	1	XX1604700
Replacement Parts		
Vacuum Flask, 2 L	1	XX1604705
Glass Base and Cap, 47 mm*	1	XX1504702
Vacuum Cover, ground glass	1	XX1604701
Spring Clamp, 47 mm, aluminum	1	XX1004703
Tubing for Solvent/Buffer, PTFE, 70 cm	1	XT1200000
Glass Funnel, 300 mL, borosilcate	1	XX1004704
Accessories		
Vacuum Flask, 5 L, with conical bottom, glass	1	XX1604706
Glass Base and Cap with Stainless Steel Screen, 47 mm	1	XX1504732
Ground Joint Flask, 1 L	1	XX1504705
Fluoropore™ Membrane, PTFE, hydrophobic, unlaminated, 0.5 µm, 47 mm, white, plain	100	FHUP04700
Durapore® Membrane, PVDF, hydrophilic, 0.45 µm, 47 mm, white, plain	100	HVLP04700
Tubing, 3/16 in. I.D. x 140 cm, silicone	1	XX7100004

*Higher porosity stainless steel support screen (XX1504732 instead of glass support, XX1504702) is easier to clean and improves filtration under vacuum.

For more information visit: www.merckmillipore.com/LabHardware

Millicup™ Filter Unit

Vacuum-driven, disposable bottle-top filtration

The Millicup™ Filter Unit provides fast and effective filtration of solvents and buffers (up to 3 L) used in HPLC and other analytical techniques.

Applications

Mobile Phase Preparation, Buffer Filtration

Features & Benefits

- No preparation or clean-up saves time
- Available with low-protein binding hydrophilic Durapore® PVDF, hydrophobic Fluoropore™ PTFE, and hydrophilic LCR PTFE membranes
- Ultraclean design and safe operation

Specifications

Funnel Material	HDPE
Outlet Fitting	Universal bottle top
Filtration Area, cm²	11.5
Process Volume, mL	3000
Vacuum Limit	685 mm Hg differential at 25 °C
Maximum Operating Temperature, °C	50
Dimensions	
Height, mm	120
Diameter, mm	84

Ordering Information

Description	Filter Pore Size (µm)	Filter Material	Qty/Pk	Catalogue No.
Millicup™ Filter Unit, 300 mL	0.45	Hydrophobic PTFE	10	SJFHM4710
		Hydrophilic PVDF	10	SJHVM4710
		Hydrophilic PTFE	10	SJLHM4710

For more information visit: www.merckmillipore.com/LabHardware

LiChrolut® Columns

Reliable and rapid solid-phase extraction

The primary goal of solid-phase extraction with LiChrolut® columns is the selective extraction of the components of interest from a complex sample or much larger sample volume prior to actual analysis (e.g., HPLC, GC, TLC). As solid-phase extraction works on the principle of liquid chromatography, this is achieved by using strong but reversible interactions between the analyte and surface of the stationary phase. Typical interactions are hydrophobic (i.e., Van der Waals forces), polar (i.e., hydrogen bonding, dipole-dipole forces) and ion exchange interactions. Interaction between stationary phase and matrix should not occur.

Features & Benefits

- Higher recoveries without the formation of emulsion
- High precision of analytical results through use of disposable cartridges
- Optimized, validated and certified manufacturing

Applications

Solid Phase Extraction

Ordering Information

Description	Qty/Pk	Catalogue No.
LiChrolut® EN (40-120 µm), 200 mg, 3 mL, PP	30 pc	1.19870.0001
LiChrolut® EN (40-120 µm), 200 mg, 6 mL, PP	30 pc	1.19941.0001
LiChrolut® RP-18 (40-63 µm), 200 mg, 3 mL PP	50 pc	1.02014.0001
LiChrolut® RP-18 endcapped (40-63 µm), 200 mg, 3 mL PP	50 pc	1.19847.0001
LiChrolut® Si (40-63 µm), 200 mg, 3 mL PP	50 pc	1.02021.0001
LiChrolut® CN (40-63 µm), 200 mg, 3 mL PP	50 pc	1.19698.0001
Florisil® (150-250 µm), 1.000 mg, 6 mL PP	30 pc	1.19127.0001
LiChrolut® SCX (40-63 µm), 200 mg, 3 mL PP	50 pc	1.02016.0001
LiChrolut® TSC (40-63 µm), 300 mg, 3 mL PP	50 pc	1.19767.0001

For more information visit: www.merckmillipore.com/lichrolut

EXtrelut® Columns

Liquid-liquid extraction in its most effective form

EXtrelut® NT sorbent columns simplify liquid-liquid extraction by replacing separation funnels. Using a single step is more efficient and saves solvent, material and time in contrast to classical funnel separation. With its intuitive working principle, higher recovery and cleaner extraction can be achieved. The aqueous sample is simply applied to the EXtrelut® NT sorbent, which distributes itself as a thin film over the chemically inert matrix and thus acts as a stationary phase.

Features & Benefits

- Save solvents
- Easy to use
- Highly efficient

Applications

Liquid-Liquid Extraction

Ordering Information

Description	Qty/Pk	Catalogue No.
EXtrelut® NT1	100 columns	1.15094.0001
EXtrelut® NT3	50 columns	1.15095.0001
EXtrelut® NT20	25 columns	1.15096.0001
EXtrelut® NT refill packs	50 bags	1.15093.0001

For more information visit: www.merckmillipore.com/extrelut

Filter Forceps

For safe handling of filter membranes

Ensure your filtration membranes are not damaged during handling by using these blunt-ended forceps.

Features & Benefits

- Beveled, unserrated tips to protect delicate membrane surfaces
- May be sterilized by autoclaving or flame-sterilization

Applications

Gentle Handling of Membranes

Ordering Information

Description	Qty/Pk.	Catalogue No.
Filter Forceps, blunt end, stainless steel	3	XX6200006P

For more information visit: www.merckmillipore.com/LabHardware

Filtering Flasks

For vacuum filtration with filter holders

These side-arm flasks are designed for use in vacuum filtration procedures with various filter holders.

- 1 L and 4 L flasks accept No. 8 perforated stopper
- 125 mL flask accepts No. 5 stopper

Features & Benefits

- Side arm connects to vacuum source with 3/8 in. I.D. hose

Applications

Vacuum Filtration Using Filter Holders

Ordering Information

Description	Qty/Pk	Catalogue No.
Vacuum Filtering Flask, 125 mL	1	XX1002505
Vacuum Filtering Flask, 1 L	1	XX1004705
Vaccum Filtering Flask, 4 L	1	XX1004744
Accessories		
Tubing, 3/16 in. I.D. x 140 cm, silicone	1	XX7100004
No. 5 Perforated Stopper, silicone	5	XX1002508
No. 8 Perforated Stopper, silicone	5	XX1004708
Chemical Duty Pump, 115 V/60 Hz	1	WP6111560
Chemical Duty Pump, 220 V/50 Hz	1	WP6122050
Chemical Duty Pump, 100 V/50-60 Hz	1	WP6110060

For more information visit: www.merckmillipore.com/LabHardware

Hand Vacuum Pump and Syringes

For hand-held filtration of small volumes

Use polypropylene syringes to dispense liquids into small containers and pressure-filter small volumes through filter holders or filter units with female Luer-Slip™ inlets. Syringes have male Luer-Slip™ outlets. An optional two-way vacuum valve, nylon male-to-male Luer adapter and rubber tubing with male Luer inlet converts this standard syringe into a hand vacuum pump. For sterile applications, an autoclavable stainless steel vacuum syringe with stainless steel, two-way valve is available.

Applications

Small-Volume Liquid Filtration, Hand Pump for In-Field Filtration with Sterifil® Units and Other Filter Holders

Ordering Information

Description	Qty/Pk	Catalogue No.
Plastic Syringes, 20 mL Luer-Slip™, polypropylene	12	XX1102012
Plastic Syringes, 50 mL Luer-Slip™, polypropylene	5	XX1105005
Hand Vacuum Pump, polypropylene	1	XKEM00107
Hand Vacuum Pump, stainless steel	1	XX6200035
Replacement Parts: Polypropylene Pump		
2-way Vacuum Valve, plastic	1	XKEM00104
Adapter, male Luer-Lok®, nylon	4	XX1102503
Replacement Parts: Stainless Steel Pump		
Replacement Parts Kit*	1	XX6200036

*Replacement Parts Kit includes: (1) plunger O-ring, (2) valve O-rings, (2) stainless steel ball valve balls, (2) barrel compression valve springs, (2) PTFE valve seals, and (2) compression valve springs.

For more information visit: www.merckmillipore.com/LabHardware

High Output / Chemical Duty Pumps

For flow rates up to 37 L/min

The High Output and Chemical Duty pumps can support high flow rates to decrease process filtration time. The High Output Pump features a piston-driven design for greater power. The Chemical Duty Pump has a chemically-resistant head and diaphragm for use with corrosive chemicals and solvents. Both pumps come with 70 cm of 1/4 in. tubing and a Millex®-FA$_{50}$ filter for in-line moisture protection. Both are UL-listed and CE-marked.

Features & Benefits

- High flow rates decrease filtration process time
- Optional chemical-resistant internal components for compatibility with corrosive vapors
- Portable design allows for easy sharing between workstations

Applications

Vacuum Source for Filter Holders, Manifolds, and Devices, including Samplicity® Filtration System, SNAP i.d.® 2.0 System, Multiscreen®$_{HTS}$ Filtration Manifold, and Stericup® Filters

Specifications

	High Output Pump	Chemical Duty Pump
Maximum Vacuum, mbar (in. Hg)	921 (27.2)	813 (24)
Maximum Pressure, bar (psig)	5.4 (80)	2.45 (35)
Maximum Flow Rate, L/min (CFM)	34 (1.2)	37 (1.3)
Materials (pump head, housing, regulator)	Cast aluminum	Cast aluminum
Weight, kg (lbs)	5.3 (11.7)	4.1 (9.0)
Dimensions, cm (in.) H x W x L	20.3 x 22.9 x 25.4 (8 x 9 x 10)	17.8 x 17.8 x 20.3 (7 x 7 x 8)
Connections	1/4 in. Stepped hose barb	1/4 in. Stepped hose barb

Ordering Information

Description	Qty/Pk	Catalogue No.
Chemical Duty Pump, 115 V/60 Hz	1	WP6111560
Chemical Duty Pump, 220 V/50 Hz	1	WP6122050
Chemical Duty Pump, 100 V/50-60 Hz	1	WP6110060
High Output Pump, 115 V/60 Hz	1	WP6211560
High Output Pump, 220 V/50 Hz	1	WP6222050
High Output Pump, 100 V/50-60 Hz	1	WP6210060
Replacement Parts		
Chemical Duty Pump Maintenance Kit*	1	WP61MNT00
Chemical Duty Pump Rebuild Kit**	1	WP61RBD00
High Output Pump Maintenance Kit*	1	WP62MNT00
High Output Pump Rebuild Kit**	1	WP62RBDNA

*Maintenance Kit includes: (1) diaphragm, (1) diaphragm liner, (1) O-ring gasket, (4) head screws, (2) handle screws

**Rebuild Kit includes: (1) diaphragm hold-down plate assembly, (1) valve plate assembly, (1) pump head, (1) vacuum gauge, (1) pressure gauge, (4) head screws, (2) handle screws

For more information visit: www.merckmillipore.com/LabHardware

Millivac™ Vacuum Pumps

Maintenance-free, mini-diaphragm pumps

Millivac™ Mini and Maxi vacuum pumps are compact, maintenance-free pumps that provide a consistent source of vacuum for filtration and other laborabory applications. A patented diaphragm design has reduced the footprint of the pumps compared to conventional models.

Features & Benefits

- Lubrication not required
- Quiet, compact design conserves previous lab bench space
- Millivac™ Maxi pump is gas-tight, has a PTFE-coated diaphragm, and is compatible with slightly aggressive or corrosive gases and vapors

Applications

Millivac™ Mini Pump for Water and Aqueous Solutions; Millivac™ Maxi Pump for Larger Volumes or Viscous Solutions

Specifications

	Millivac™ Mini	Millivac™ Maxi
Materials	Ryton head; EPDM membrane with fluoroelastomer valves	PTFE-coated diaphragm with FFPM valves
Max. Vacuum, L/min	6	16
Fittings	Hose connector for 4 mm I.D. tubing	Hose connector for 6 mm I.D. tubing
Dimensions		
Length, cm	22.6	36.1
Width, cm	9	9
Height, cm	14.1	14.1
Weight, kg	1.9	3.95

Ordering Information

Description	Qty/Pk	Catalogue No.
Millivac™ Mini Vacuum Pump, 115 V	1	XX5411560
Millivac™ Maxi Vacuum Pump, 230 V	1	SD1P014M04
Millivac™ Mini Vacuum Pump, 230 V	1	XF5423050
Note: All Millivac™ pumps come with 70 cm of vacuum tubing and a Millex®-FG$_{50}$ filter to protect against water intrusion.		
Replacement Parts		
Millivac™ Mini EPDM Maintenance Kit*	1	XF5423055
Millivac™ Mini PTFE Maintenance Kit*	1	XF5423056
*Maintenance Kit includes 1 diaphragm, 2 valves, 2 gaskets. Materials depends on kit type.		
Accessories		
Millex®-FG Filter Unit, 0.20 µm, hydrophobic PTFE, 50 mm	10	SLFG05010
Tubing, 3/16 in. ID x 140 cm, silicone	1	XX7100004
Vacuum Filtering Flask, 1 L	1	XX1004705
No. 8 Stopper, 9.5 mm (3/8 in.) hole, silicone	5	XX2004718

For more information visit: www.merckmillipore.com/LabHardware

Dispensing Pressure Vessels

For dispensing liquid volumes up to 20 L

Dispensing pressure vessels hold liquid for filtration through pressure-driven filter holders.

Features & Benefits

- Vessels meet ASME®-UM Code requirements
- Closures are secured by cam-lock handle
- Accessories include pressure gauges, hose connectors, and code-complying pressure relief valves

Applications

Large-Volume Filtration, Reservoir for Buffer or Solvent Dispensing

Specifications

Materials	316 stainless steel body; stainless steel fittings; fluoroelastomer gaskets and O-rings; molded Neoprene rubber base
Fittings	1/4 in. NPTF elbow fittings for inlet and outlet (labeled); 1/4 in. NPTF for pressure gauge and vent/relief valve attachment
Maximum Inlet Pressure, bar (psi)*	6.9 (100)
Maximum Temperature, °C	121

*Locally applicable pressure vessel codes should be consulted for maximum allowable pressure. Do not use vessels under vacuum without accessory vacuum closure.

Ordering Information

Description	Qty/Pk	Catalogue No.
Dispensing Pressure Vessel, 1 gal	1	XX6700P01
Dispensing Pressure Vessel, 5 L	1	XX6700P05
Dispensing Pressure Vessel, 10 L	1	XX6700P10
Dispensing Pressure Vessel, 20 L	1	XX6700P20
Replacement Parts		
Outlet Dip Tube, 5 L vessel	1	6977
Outlet Dip Tube, 10 L vessel	1	6978
Outlet Dip Tube, 20 L vessel	1	6979
Plug, 1/4 in. NPT, stainless steel	2	YY1301009
Street Elbow, 1/4 in. NPTF to M	1	XX6700104
Vessel Cover, cam-lock	1	6976
O-ring, fluoroelastomer	1	XX6700059

For more information visit: www.merckmillipore.com/LabHardware

Pressure Vessel, 600 mL

For dispensing volumes up to 600 mL

This vertical-style pressure vessel was designed for particle-free filling of vials with extemporaneous drug, allergenic extracts, and ophthalmic solutions. A Swinnex® filter holder can be attached to the outlet ball valve for point-of-use filtration.

Features & Benefits

- Vertical design minimizes hold-up volume and product loss
- Attach a Swinnex® filter holder to outlet to filter effluent prior to use

Applications

Dispensing Small Volumes of Liquid, Vial Filling

Specifications

Materials	Clear polycarbonate cylinder; white polypropylene end caps; silicone O-rings; polyethylene pressure tubing; Delrin® ball valve
Fittings	1/4 in. NPTF tubing connector, relief, outlet ball valves
Maximum Inlet Pressure, bar	6.9
Diameter, cm	9
Height, cm	41.9; not including filter holder
Weight, kg	1.1

Ordering Information

Description	Qty/Pk	Catalogue No.
Pressure Vessel, 600 mL	1	XX1100000
Accessories		
Swinnex® Filter Holder	1	SX0004700

For more information visit: www.merckmillipore.com/LabHardware

EZ-Fit® Filter Holder Manifolds

Simultaneous filtration of three or six test samples

The EZ-Fit® Manifold is designed to increase laboratory workflow efficiency and make laboratory filtration easier. It features quick-fit connections for assembly and disassembly without tools and a low profile to increase operator comfort. Plus, all internal areas are accessible for easy cleaning, facilitating biofilm prevention. Different filtration heads, all with quick-fit connections, make the manifold compatible with disposable filtration devices, as well as stainless steel and glass funnels.

Features & Benefits

- Different filtration heads for both reusable and disposable filtration devices
- Each component can be removed by hand and autoclaved
- Easy access to all inner parts for efficient cleaning
- Quick-fit connections for the vacuum tubing, the filtration heads and the on/off valves
- Low height for ease of use in laminar flow hoods

Applications

Universal Laboratory Analysis, Water Testing Analysis, Microbiological Analysis, Particle Contamination Analysis

Specifications

Materials	
Handles, valve (trigger and knob)	Aluminum
Connectors, pipe and valve body	316L stainless steel
Connectors, seals and valve seals	EPDM
Filtration O-ring	Silicone
Dimensions, mm*	168 W x 433 L x 117 H
Weight, kg*	2.9
Tubing Connection	Hose barb for 10 mm tubing (NPS 3/8 or DN10)
Autoclaving Conditions	121 °C for 30 min

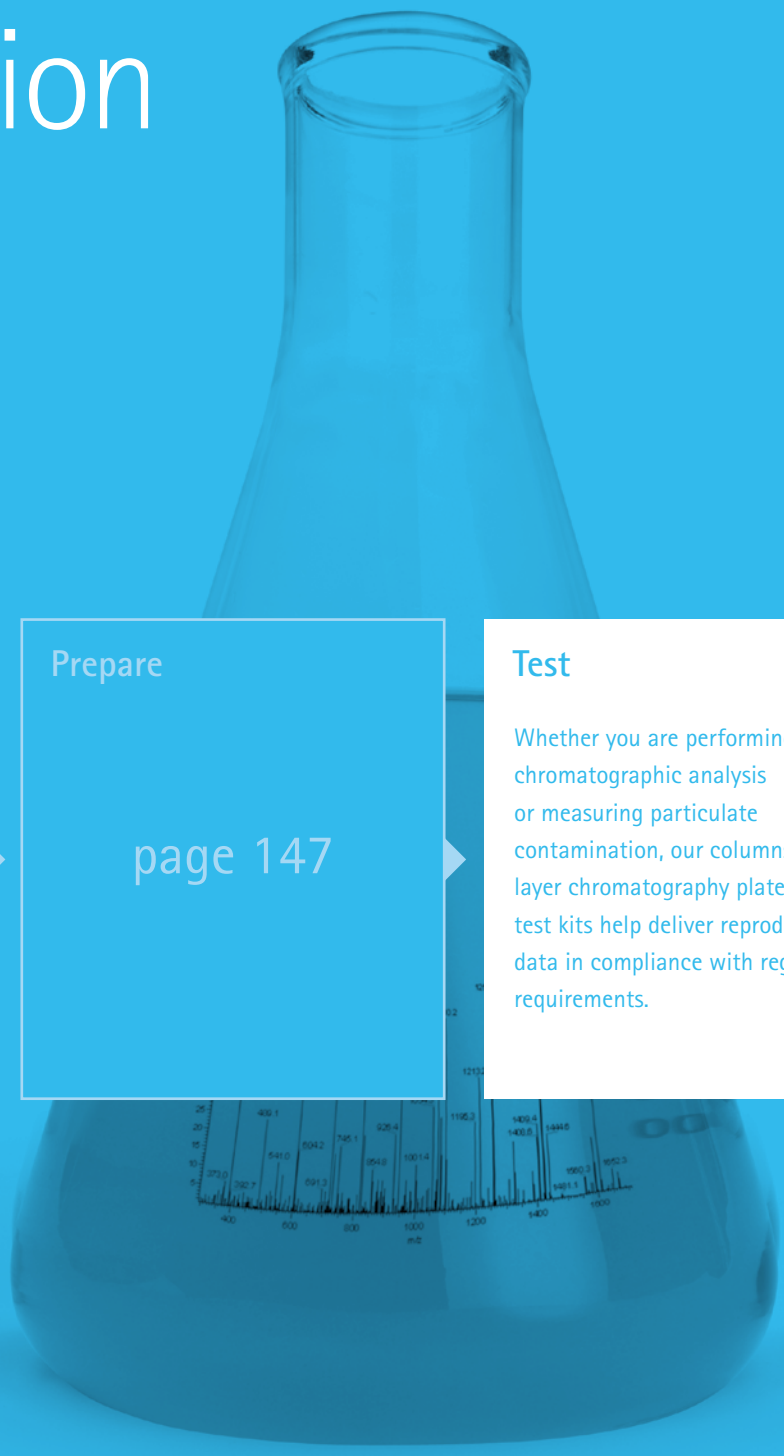
*For a 3-place manifold (cat. no. EZFITMIC03)

Ordering Information

Description	Qty/Pk	Catalogue No.
EZ-Fit® Manifold, 1-place, stainless steel	1	EZFITL0W01
EZ-Fit® Manifold, 3-place, stainless steel	1	EZFITL0W03
EZ-Fit® Manifold, 6-place, stainless steel	1	EZFITL0W06
Replacement Parts		
EZ-Fit® Manifold Quick Connection, 1 plug and 1 connector	1	EZFITQUICKC
EZ-Fit® Manifold Check Valve	3	EZFITBACKF
EZ-Fit® Manifold O-ring Kit	3	EZFITGASK3
EZ-Fit® Manifold Complete Valve	1	EZFITVALV1
EZ-Fit® Manifold Removable Porous Filter Support, stainless steel	3	EZFITFRIT3
EZ-Fit® Manifold Maintenance Kit including lubricant and brush	1	EZFITMAKIT
No.8 Blue Stopper (9.5 mm - 3/8 in.), silicone	5	XX2004718
Accessories		
Vacuum Filtering Flask, 1 L	1	XX1004705
Filter Forceps, blunt end, stainless steel	3	XX6200006P
Hose Adapter, 1/4 in. NPTF to 5/16 in. ID, polypropylene	2	XX4304704
Millex®-FG Filter Unit, 0.2 µm, hydrophobic PTFE, 25 mm, PVC, ethylene oxide-sterilized	50	SLFG025LS
High Output Pump, 115 V/60 Hz	1	WP6211560
High Output Pump, 220 V/50 Hz	1	WP6222050
High Output Pump, 100 V/50–60 Hz	1	WP6210060
EZ-Stream® Vacuum Pump	1	EZSTREAM1

For more information visit: www.merckmillipore.com/LabHardware

Analytical Sample Preparation



Collect

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Prepare

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Test

Whether you are performing chromatographic analysis or measuring particulate contamination, our columns, thin layer chromatography plates and test kits help deliver reproducible data in compliance with regulatory requirements.

Chromolith® HPLC Columns

Speed and performance in monolithic form

Chromolith® HPLC columns provide excellent separations in a fraction of the time required by a standard particulate column, because Chromolith® columns are made from highly porous, monolithic rods of silica with a revolutionary, bimodal pore structure. Instead of being packed with small particles, each of these monolithic columns consists of a single piece of high-purity, polymeric silica gel.

Features & Benefits

- Increased analysis speed
- Improved HPLC system security
- Column length no longer limited by pressure
- Cost savings from increased sample throughput can justify the expense of a method revalidation within one month

Applications

Liquid Chromatography

Ordering Information

Description	Qty/Pk	Catalogue No.
Chromolith® HighResolution RP-18 endcapped 100-4.6 mm	1 pc	1.52022.0001
Chromolith® Performance RP-18 endcapped 100-4.6 mm	1 pc	1.02129.0001
Chromolith® Performance RP-18 endcapped 100-3 mm	1 pc	1.52001.0001
Chromolith® Performance RP-18 endcapped 100-2 mm	1 pc	1.52006.0001
Chromolith® Performance NH_2 100-4.6 mm	1 pc	1.52028.0001
Chromolith® Performance Si 100-4.6 mm	1 pc	1.51465.0001
Chromolith® Performance CN 100-4.6 mm	1 pc	1.52048.0001
Chromolith® Performance Phenyl 100-4.6 mm	1 pc	1.52058.0001
Chromolith® Performance Diol 100-4.6 mm	1 pc	1.53172.0001

For more information visit: www.merckmillipore.com/chromolith

Purospher® Columns

The all-around, high-performance solution

The Purospher® RP-18 column is polar endcapped and suitable for separations of strong basic or chelating compounds (no acidic compounds) and separations of hydrophilic compounds with a high percentage of water in the mobile phase.

The Purospher® RP-18 endcapped column is suitable for separations of compley samples with simple eluents.

The Purospher® RP-18 HC column is not endcapped and is suitable for separations of polar, non-basic compounds.

The Purospher® STAR RP-18 endcapped column allows the tailing-free separation of neutral, acidic, basic or chelating compounds and is available as a special UHPLC column.

THe Purospher® STAR RP-8 endcapped column is suitable for separations of polar compounds or separation of positionally isomeric compounds.

Features & Benefits

- Enhanced performance and excellent peak symmetry
- Outstanding batch-to-batch reproducibility
- Balanced chromatographic properties
- Excellent separation efficiency
- Extended column lifetime

Applications

Liquid Chromatography

Ordering Information

Description	Qty/Pk	Catalogue No.
Purospher® STAR RP-18 endcapped 150-4.6 mm	1 pc	1.50470.0001
Purospher® STAR RP-18 endcapped 100-3 mm	1 pc	1.50398.0001
Purospher® STAR RP-18 endcapped UHPLC 100-4.6 mm	1 pc	1.50648.0001
Purospher® RP-18 endcapped 250-4 mm	1 pc	1.50169.0001
Purospher® RP-18 250-4 mm	1 pc	1.50144.0001
Purospher® STAR RP-8 endcapped 150-4.6 mm	1 pc	1.51453.0001
Purospher® STAR NH_2 150-4.6 mm	1 pc	1.50247.0001
Purospher® STAR Si 150-4.6 mm	1 pc	1.50356.0001

For more information visit: www.merckmillipore.com/purospher

LiChrospher® Columns

Silica carrier for consistently top-rate results

Reliable, versatile, traditionally produced spherical silica carriers, LiChrospher® columns are available with a number of different modifications. The polar-modified phases, LiChrospher® CN, LiChrospher® NH_2 and LiChrospher® DIOL columns , as well as unmodified LiChrospher® Si columns are best for normal-phase HPLC. Furthermore, LiChrospher® PAH columns are highly efficient and selective for the separation of polycyclic aromatic hydrocarbons (PAH), and LiChrospher® WP 300 RP-18 columns are suitable for the separation of peptides and low molecular weight proteins.

Features & Benefits

- Well-balanced pressure / separation performance ratio
- Widely used for a broad range of applications

Applications

Liquid Chromatography

Ordering Information

Description	Qty/Pk	Catalogue No.
LiChrospher® 100 RP-18 endcapped 150-4.6 mm	1 pc	1.50604.0001
LiChrospher® 100 RP-18 150-4.6 mm	1 pc	1.50601.0001
LiChrospher® 100 RP-8 endcapped 150-4.6 mm	1 pc	1.50638.0001
LiChrospher® 100 RP-8 150-4.6 mm	1 pc	1.50635.0001
LiChrospher® 60 RP-select B 150-4.6 mm	1 pc	1.50641.0001
LiChrospher® 100 CN 250-4 mm	1 pc	1.50892.0001
LiChrospher® 100 Diol 250-4 mm	1 pc	1.50836.0001
LiChrospher® 100 NH_2 250-4 mm	1 pc	1.50834.0001
LiChrospher® 60 Si 250-4 mm	1 pc	1.50830.0001

For more information visit: www.merckmillipore.com/lichrospher

SeQuant® ZIC®-HILIC Columns

Ideal for polar and hydrophilic compounds

The ideal choice for separation of all types of polar and hydrophilic compounds is SeQuant® ZIC®-HILIC and ZIC®-pHILIC HPLC columns. Reproducible retention of compounds that are difficult to separate on reversed-phase HPLC columns is ensured by the high-performance, zwitterionic stationary phase in these columns. Straightforward separation of compounds such as acids and bases, anions and cations, carbohydrates, metabolites, metal complexes, amino acids, peptides, protein digests and oligonucleotides can therefore be achieved with a selectivity complementary to reversed-phase columns. Enhanced LC-MS sensitivity is an additional benefit of using these columns.

Features & Benefits

- Improved separation of hydrophilic and polar compounds
- Orthogonal selectivity to reversed-phase columns
- Optimal combination with LC-MS
- Excellent stability

Applications

Liquid Chromatography

Ordering Information

Description	Qty/Pk	Catalogue No.
SeQuant® ZIC®-HILIC PEEK HPLC Column 100-4.6 mm	1 pc	1.50453.0001
SeQuant® ZIC®-HILIC PEEK HPLC Column 100-2.1 mm	1 pc	1.50447.0001
SeQuant® ZIC®-pHILIC PEEK HPLC Column 100-4.6 mm	1 pc	1.50464.0001
SeQuant® ZIC®-pHILIC PEEK HPLC Column 100-2.1 mm	1 pc	1.50462.0001
SeQuant® ZIC®-cHILIC PEEK HPLC Column 100-4.6 mm	1 pc	1.50660.0001
SeQuant® ZIC®-cHILIC PEEK HPLC Column 100-2.1 mm	1 pc	1.50657.0001

For more information visit: www.merckmillipore.com/hilic

TLC/HPTLC Plates

Unique quality from the pioneer in TLC

Thin layer chromatography (TLC) is a simple, fast and highly versatile separation tool for both qualitative and quantitative analyses. The technique can be used to resolve virtually all classes of substances, including pesticides, steroids, alkaloids, lipids, nucleotides, glycosides, carbohydrates, fatty acids and many others. Apart from the manual method of classical TLC, the technique can also be automated as in instrumental high performance thin layer chromatography (HPTLC). Furthermore, it can be easily extended to preparative scale for PLC.

Features & Benefits

- Disposable plates ensure simplified sample preparation
- Direct visualization of results by UV or derivatization
- Simultaneous analysis of many samples under identical conditions using easy, two-dimensional separation

Applications

Thin Layer Chromatography

Ordering Information

Description	Qty/Pk	Catalogue No.
TLC Silica Gel 60 F_{254} 25x25 cm	25 plates	1.05715.0001
HPTLC Silica Gel 60 F_{254} 20x10 cm	50 plates	1.05642.0001
TLC Silica Gel 60 RP-18 F_{254}s 20x20 cm	25 plates	1.15389.0001
HPTLC Silica Gel 60 RP-18 F_{254} 10x20 cm	50 plates	1.16225.0001
HPTLC LiChrospher® Silica Gel 60 F_{254}s 20x20 cm	25 plates	1.05586.0001

For more information visit: www.merckmillipore.com/tlc

Fluid Sampling Kit

Field-based, liquid analysis with 37 mm monitors

The Fluid Sampling Kit is a complete solution for field-based fluid collection and contamination analysis. The stainless steel sampler assembly plugs into a quick-release valve installed in the system line, which allows a measured quantity of liquid to pass through the monitor. A valved syringe serves as a pump to remove residual liquid from the monitor. Kit is compatible with our 37 mm contamination monitors and matched-weight monitors.

Features & Benefits

- Sturdy carrying case and stainless steel sampling assembly provide years of in-field service
- Fluid Sampling Kit includes 12 Tenite® contamination monitors

Applications

In-Field Collection and Analysis of Jet Fuel, Turbine Lubricants, Water and Other Liquids

Specifications

Materials	Stainless steel with stainless-clad PTFE hose; Tenite® monitors
Fittings	Quick-release valve and plug with 1/8" NPTF thread and fluoroelastomer seals; matching nipple on sampling hose
Maximum Pressure, bar (psi)	6.9 (100)
Dimensions	
Length, cm	36.8
Height, cm	12.5
Width, cm	23.5
Shipping Weight, kg (lb)	4.5 (9.9)

Warning: For filtering flammables with the Fluid Sampling Kit, properly ground the unit and secure all grounding connections.

Ordering Information

Description	Qty/Pk	Catalogue No.
Fluid Sampling Kit	1	XX6403730*
Common Components		
Fluid Contamination Analysis Monitor	50	MAWP037P0
Fluid Contamination Analysis Monitor, matched-weight membrane	50	MAWP037PM
PTFE Tape 12.5 mm x 6.6 m roll	1	TP0001326
Filter Forceps, blunt end, stainless steel	3	XX6200006P
Hand Vacuum Pump, stainless steel	1	XX6200035
Tubing, 3/16 in. I.D., Tygon	1	XX6403780
Hose Connector, 1/8 in. NPTF quick-release valve	1	XX6403735
Sampler Valve Hose Assembly	1	XX6403708
Remote Sampling Assembly	1	XX6403705
Accessory		
ASTM® Color Standards	1	ASTM03701

*The Fluid Sampling Kit (cat. no. XX6403730) contains 12 monitors. The reorder part number (cat. no. MAWP037P0) includes 50 monitors.

For more information visit: www.merckmillipore.com/ParticleMonitoring

Fluids Contamination Kit

Start-up kit for fluid contamination analysis

The Fluid Contamination Kit is a complete collection of hardware and consumables to properly equip your lab for contamination analysis. The kit conforms to standard contamination test procedures such as ARP-598 (hydraulic fluids) and federal standard 791a (lubricants, liquid fuels, and related products).

Features & Benefits

- Contains enough expendable materials for approximately 600 tests
- Includes a vacuum pump for either 115 V or 220 V electric current

Applications

Fluid Contamination Monitoring of Water, Hydraulic Fluid, Fuel Liquids and Related Fluids

Ordering Information

Description	Qty/Pk	Catalogue No.
Fluids Contamination Kit, 115 V/60 Hz	1	XX7104711K
Fluids Contamination Kit, 230 V/50 Hz	1	XX7104712
Components		
Glass Filter Holder with Stainless Steel Screen, 47 mm	1	XX1004730
Vacuum Filtering Flask, 1 L	1	XX1004705
Filter Forceps, blunt end, stainless steel	3	XX6200006P
Tubing, 1/4 in. x 23 in., latex	1	XX2504755
Solvent Filtering Dispenser, 25 mm	1	XX6602500
PetriSlides for Contamination Analysis	100*	PD1504700
Chemical Duty Pump, 115 V/60 Hz	1	WP6111560
Chemical Duty Pump, 220 V/50 Hz	1	WP6122050
Membrane Filters		
MF-Millipore™ Membrane, mixed cellulose esters, Hydrophilic, 0.45 µm, 47 mm, white, plain	100*	HAWP04700
MF-Millipore™ Membrane, mixed cellulose esters, Hydrophilic, 0.45 µm, 47 mm, white, gridded	100*	HAWG04700
MF-Millipore™ Membrane, mixed cellulose esters, Hydrophilic, 0.45 µm, 47 mm, black, gridded	100*	HABG04700
*The kit contains 400 PetriSlides and 200 of each membrane filter type. The reorder quantity is 100 per pack.		
Recommended Accessories		
Other filters available for gravimetric tests:		
MF Matched-Weight Pairs, 0.45 µm, mixed cellulose esters, 47 mm, white	50 pairs	HAWP0470M
MF Matched-Weight Pairs, 0.8 µm, mixed cellulose esters, 47 mm, white	50 pairs	AAWP0470M

For more information visit: www.merckmillipore.com/ParticleMonitoring

Patch Test Kit

In-field contamination analysis

The Patch Test Kit is a complete solution for field-based collection and analysis of hydrocarbon-based hydraulic fluids, bulk chemicals, boiler water, and lubricating oils. It allows the detection of significant changes in cleanliness through dependable, sensitive, colorimetric-based analysis.

Features & Benefits

- Contains enough expendable materials for 100 tests
- Contained within a lightweight, easy-to-carry case
- Filter color rating and particle assessment scales correspond to recognized standard contamination levels

Applications

In-Field Contamination Analysis of Hydrocarbon-Based Hydraulic Fluids, Water, Lubricating Oils and Related Products

Specifications

Materials	Stainless steel/aluminum filter holder assembly; PVC/ polyethylene sample collection, solvent dispensing bottles
Shipping Weight, kg (lb)	4.5 (9.9)

Ordering Information

Description	Qty/Pk	Catalogue No.
Patch Test Kit	1	XX6504730
Components		
Patch Test Filter Holder Assembly	1	XX6300120
Hand Vacuum Pump, stainless steel	1	XX6200035
Tubing for Vacuum, 1/8 in., fluoroelastomer	1	XX6504710
Solvent Dispensing Bottle	1	XX6504704
Swinnex® 25 mm with back-pressure screen	1	XX6504707
PVC Bottle, 120 mL	1	XX6504709
Filter Forceps, blunt end, stainless steel	3	XX6200006P
MF-Millipore™ Membrane, 5.0 µm, 47 mm, for test	100*	SMWP04700
MF-Millipore™ Membrane, 5.0 µm, 25 mm, for solvent (25 included)	100*	SMWP02500
PetriSlides for Contamination Analysis	100*	PD1504700
Naval Fluid Color Guide	1	XX6504713
*Reorder quantity Note: Kit also includes operating instructions.		
Replacement Parts		
Stainless Steel Holder Support with base	1	XX6504708
Funnel Locking Ring	1	XX2004701
Gasket, PTFE	25	XX2004703
Locking Ring Gasket, PTFE	5	XX4004714
O-ring (2-233), Buna-N	10	XX6300123

For more information visit: www.merckmillipore.com/ParticleMonitoring

High Quality Water Can Improve UHPLC Performance

Contaminating solutes may contribute to baseline variability and poor chromatographic performance when bottled water instead of freshly-delivered water is used to prepare the mobile phase (Figure 1). Use Milli-Q® water purification systems to ensure that your mobile phases are free of organic contaminants, for the best, most reproducible chromatographic results. Especially when fitted with a 0.2 µm final filter, Milli-Q® systems are the ideal water source for UHPLC, LC-MS, and other ultrasensitive analytical applications.

The effects of two different sources of water on chromatographic performance

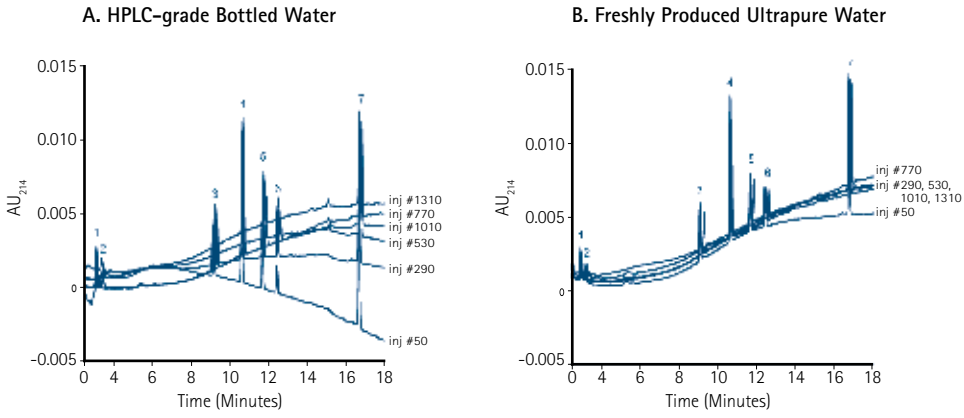


Figure 1. Two different sources of water used as solvent in the gradient elution of repeated injections of a drug mixture affect chromatographic performance over time. The solvents being compared are (A) commercially available HPLC-grade bottled water without total oxidizable carbon (TOC) specifications and (B) freshly delivered ultrapure water with a TOC level of ≤ 5 ppb. HPLC-grade acetonitrile was used as the organic solvent. Elution order: 1–acetaminophen, 2–acetazolamide, 3–phenobarbital, 4–carbamazepine, 5–phenytoin, 6–secobarbital, 7–nabumetone.

Laboratory water systems for UHPLC

Milli-Q® Integral system

The unique range of compact Milli-Q® Integral water systems uses advanced technology to provide both pure and ultrapure water from tap water, all in a single unit. Dual points of delivery (PODs) save space and increase convenience. Equipped with online TOC and resistivity monitors, the Milli-Q® Integral system gives the user total control over water quality and quantity at the point of delivery.

Description	Cat. No.
Milli-Q® Integral 15 Pure (15 L/hour) and Ultrapure (2 L/min) Water Production Unit with built-in resistivity and TOC meter designed for USP suitability test	ZRXQ015T0*

Milli-Q® Advantage A10 system

Using an optimized purification sequence, the Milli-Q® Advantage A10 water purification system converts pure water to ultrapure water, then delivers it to a POD, which provides final polishing adapted to your specific needs.

Description	Cat. No.
Milli-Q® Advantage A10 Ultrapure Water Purification System	Z00Q0V0WW*

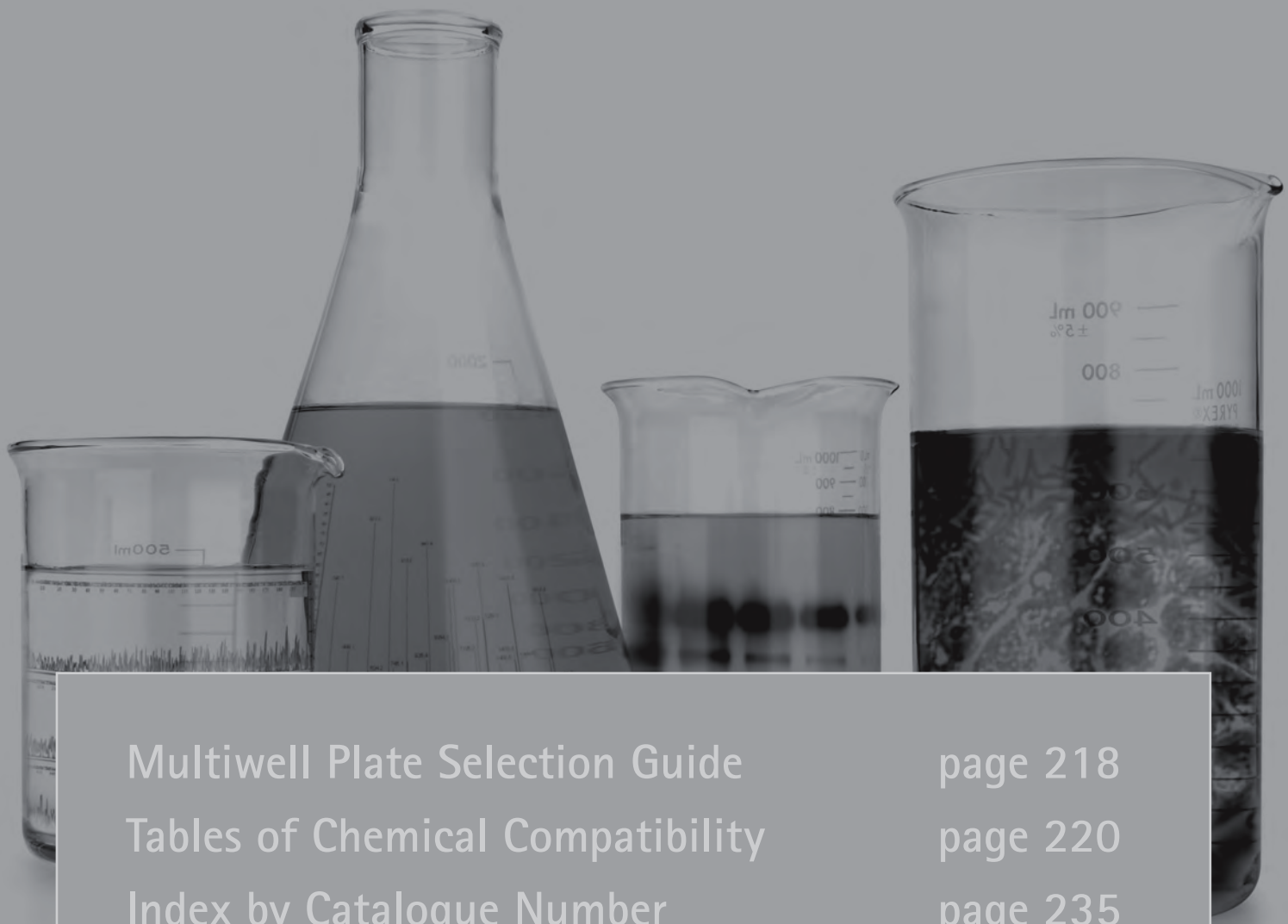
Bio-Pak® polisher: designed for advanced life science techniques

The BioPak® unit is a disposable ultrafiltration cartridge designed for installation at the outlet of Type 1 water purification systems and is typically used in cell culture, biochemistry or molecular biology applications

Description	Cat. No.
Bio-Pak® Ultrafiltration Cartridge	CDUFBI001

*Contact your local sales representative for a country-specific part number.

Appendix



MultiScreen® Selection Guide

Application	Membrane Type(s)	Pore Size (µm)	Number of Samples	Sample Volume (mL)	Plate Type(s)	Page
Drug solubility studies	Polycarbonate	0.4	96	0.25	MultiScreen®$_{HTS}$-PCF Filter Plates for Solubility Assays	167
	PVDF	0.45, 0.22	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
	PTFE	0.4	96	0.25	MultiScreen Solvinert™ and Deepwell Solvinert™ Plates	167
	PVDF	0.45		2.0	MultiScreen® High Volume plate with Durapore® Membrane	168
Permeability studies/ PAMPA assay	Polycarbonate	0.4	96	0.25	MultiScreen® Permeability Plate	167
	PVDF	0.45	96	0.25	MultiScreen®-IP Plate for PAMPA	35, 36
Cell-based drug permeability studies	Polycarbonate	0.4	96	0.25	MultiScreen® Caco-2 Assay System	24, 167
	PET	1	96	0.25	MultiScreen® Caco-2 Assay System	24
Total drug analysis	PTFE	0.4	96	0.25	MultiScreen Solvinert™ and Deepwell Solvinert™ Plates	167
Clarification of cellular debris or particulates	Glass Fiber	1.0, 1.2	96	0.25	MultiScreen®-FB or -FC Plate	169
	Glass Fiber	1.2	96	2.0	MultiScreen® High Volume Plate with FC	169
Dye terminator removal (with Sephadex® and column loader)	PVDF	0.45	96	0.25	MultiScreen® Plate with Durapore® Membrane	168
PCR cleanup	Specialty	NA	96	0.25, 0.1	MultiScreen®-PCR and -µPCR Plates	52, 53
Lysate clearing	Specialty	NA	96	0.25	MultiScreen®-NA Plate	55
DNA-binding proteins	PVDF	0.45	96	0.25	MultiScreen® Plate with Immobilon®-P membrane	35, 36
Protein binding	PVDF	0.45	96	0.25	MultiScreen® Plate with Immobilon®-P membrane	35, 36
	Mixed Cellulose Esters	0.45	96	0.25	MultiScreen®-HA Plate	35, 36
Cloned receptor-binding studies	PVDF	0.45	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
	PVDF	0.45	96	2.0	MultiScreen® High Volume Plate with Durapore® Membrane	168
	Glass Fiber	1.0, 1.2	96, 384	0.25, 0.1	MultiScreen®-FB or -FC Plate	169
	Glass Fiber	1.2	96	2.0	MultiScreen® High Volume Plate with FC	169
Protein kinase/ phosphatase assays	PVDF	0.45, 0.22	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
	Glass Fiber	1.0, 1.2	96, 384	0.25, 0.1	MultiScreen®-FB or -FC Plate	169
ELISA	Mixed Cellulose Esters	0.45	96	0.25	MultiScreen®-HA Plate	35, 36
Membrane absorbance assays	PVDF	0.45	96	0.25	MultiScreen® Plate with Immobilon®-P membrane	35, 36
Protein kinase assays	Negatively Charged Phosphocellulose	NA	96	0.25	MultiScreen®-PH Plate	165
Reverse transcriptase assays	Positively Charged DEAE	NA	96	0.25	MultiScreen®-DE Plate	See web
Enzyme assays with precipitation	Glass Fiber	1.0, 1.2	96, 384	0.25, 0.1	MultiScreen®-FB or -FC Plate	169
Virus concentration	Regenerated Cellulose Ultrafiltration Membrane	10,000 MWCO	96	0.25	MultiScreen® Plate with Ultracel®-10 Membrane	See web

MultiScreen® Selection Guide

Application	Membrane Type(s)	Pore Size (µm)	Number of Samples	Sample Volume (mL)	Plate Type(s)	Page
Bacteria	PVDF	0.22, 0.45	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
	Mixed Cellulose Esters	0.45	96	0.25	MultiScreen®-HA Plate	35, 36
Cell fragment/ receptor-binding assays (radiometric)	Glass Fiber	1.0, 1.2	96	0.1	MultiScreen® Harvest Plate	169
	PVDF	0.45	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
	Glass Fiber	1.0, 1.2	96, 384	0.25, 0.1	MultiScreen®-FB or -FC Plate	169
Calcium uptake measurements	PVDF	0.45	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
Studies using cell monolayers	Polycarbonate	0.45, 1.0	96	0.25	Millicell® 96- or 24-Well Insert Plates for Transporter Assays	24
Elispot assays to determine immune response	Mixed Cellulose Esters	0.45	96	0.25	MultiScreen®-HA Plate	35, 36
	PVDF	0.45	96	0.25	MultiScreen® Plate with Immobilon®-P Membrane	35, 36
Migration, invasion, chemotaxis	Polycarbonate	8.0, 5.0, 3.0	96	0.25	MultiScreen®-MIC Plate	34
Cell proliferation and whole cell receptor binding assays (radiometric)	Glass Fiber	1.0, 1.2	96	0.1	MultiScreen® Harvest Plate	169
	PVDF	0.22, 0.45	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
	Glass Fiber	1.0, 1.2	96, 384	0.25, 0.1	MultiScreen®-FB or -FC Plate	169
Viral infection studies	PVDF	0.45	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
	Mixed Cellulose Esters	0.45	96	0.25	MultiScreen®-HA Plate	35, 36
	Polycarbonate	0.45, 1.0	96	0.25	MultiScreen®-96 or 24 Assay System	24
Immune response assays	PVDF		96	0.25	MultiScreen® Plate with Durapore® Membrane	168
Chromatography - affinity capture	PVDF	0.45, 1.2	96	0.25	MultiScreen® Plate with Durapore® Membrane	168
Chromatography - gel permeation	PVDF	0.45, 1.2	96	0.25	MultiScreen® Plate with Durapore® Membrane	168
Chromatography - ion exchange (resins)	PVDF	0.45, 1.2	96	0.25	MultiScreen® Plate with Durapore® Membrane	168
Environmental samples	PVDF	0.45	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
Whole tissue radiometric receptor binding assays	Glass Fiber	0.45, 1.2	96	0.1	MultiScreen® Harvest Plate	169
	PVDF	0.45	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
	Glass Fiber	1.0, 1.2	96, 384	0.25, 0.1	MultiScreen®-FB or -FC Plate	169
Neurotransmitter release from brain tissue	PVDF	0.45	96, 384	0.25, 0.1	MultiScreen® Plate with Durapore® Membrane	168
Whole organisim cytotoxicity, paralysis, and morbidity	Nylon Mesh	Variable	96	0.25	MultiScreen®-MESH Plate	38
Luminex® bead-based assays	PVDF	0.45, 1.2	96	0.25	MultiScreen® Plate with Durapore® Membrane	168

Chemical Compatibility of Filter Components

Compatibility of materials used in the construction of Merck Millipore products

The tables on the following pages contain recommendations based solely upon ratings found in several published solubility and compatibility tables. A listing of sources appears below. The tables do not contain results from any actual usage experiments conducted at Merck Millipore.

Ratings for this table were made on the following basis:

R = **Recommended**. Chosen for only those polymer-solvent combinations that showed top ratings in the published compatibility tables.

GR = **Generally Recommended**. Where no polymer-solvent specific information was available, general compatibility with a solvent type was stated; e.g., PES is compatible with alcohols.

LTD = **Limited**. Chosen for those polymer-solvent combinations that showed both top and less-than-top ratings in published compatibility tables where exposure times of less than 24 hours at room temperature are recommended. Component materials may stress crack or swell affecting filtration efficiency.

NR = **Not Recommended**. Chosen for those polymer-solvent combinations that showed less-than-top ratings in the published compatibility tables.

CAUTION

Please note the following:

1. These recommendations assume pure solutions at room temperature and pressure without applied stresses. Time of exposure is not considered. These are critical assumptions as polymer properties are strongly affected by environmental conditions, time, the presence of external stress and the presence of additives. It is not safe to assume that property changes are linearly related to changing temperature. A 10 °C increase in temperature, for example, may place the test conditions closer to the glass transition of the polymer, thus allowing greater penetration of solvent molecules. This has a plasticizing effect, further lowering the glass transition and resulting in a modulus drop of up to three orders of magnitude. The glass transition of nylons, for example, has been shown to range from below -50 °C to +70 °C depending upon their moisture content.

2. These recommendations assume that each polymer category has a uniform chemistry, molecular weight distribution and thermomechanical history. This assumption will never be true and, in some cases, variation has a distinct influence on compatibility. For example, solvent compatibility of cellulose esters is strongly dependent upon their degree of substitution (acetylation/nitration). Crystalline morphology and degree of crystallinity influences compatibility of semi-crystalline polymers and can vary significantly. Polyethyleneterephthalate, for example, can be quenched to obtained samples with almost no crystallinity or annealed to obtain samples with >50% crystallinity. The response time of these two polyesters, although chemically identical, will be quite different. The effect of molecular weight distribution and degree of branching on solvent compatibility can be seen by comparing the solvent compatibility of LDPE, LLDPE, HDPE and UPE. Such specific information concerning polymers evaluated does not accompany published compatibility tables.

3. The definition of solvent compatibility for Merck Millipore products differs from that used in determining the ratings given in published compatibility tables. Such tables are generally concerned with chemical attack and significant losses in strength and/or dimensional changes. A top designation, for example, might be designated for solvent-polymer combinations with <10% swelling, which is high. Other compatibility tables may make recommendations based upon dimensional change as a function of time. This is difficult to relate to a membrane that may respond almost immediately to immersion in solvent. In addition, solvent-membrane compatibility requires additional consideration of filtration-specific factors. None of these published compatibility guides, for example, monitors the solvent's ability to wet a membrane or increase extractables.

4. This table does not consider solvent safety issues.

References used in developing this table:

1. Polymer Handbook, ed III., Section VII p. 379-402 lists solvents and nonsolvents for a variety of polymers
2. Organic Polymer Chemistry, 2nd edition, K.J.Saunders, Chapman & Hall, 1988.
3. Appropriate sections in Encyclopedia of Polymer Science and Engineering
4. Chemical Resistance Guide for Elastomers, Compass Publications. Kenneth M.Pruett, 1988.
5. Compass Corrosion Guide II, Compass Publications. Kenneth M.Pruett, 1983.
6. http://www.pspglobal.com/nfvitongrades.html (Compatibility of vinylidiene fluoride-hexafluoropropylene copolymer)
7. http://www.pspglobal.com/nfmaterials.html (Compatibility of O-ring materials)
8. http://www.ab.ust.hk/sepo/tips/ch/ch004.htm (General polymer compatibility)
9. http://www.customadvanced.com/chemical-resistance-chart.html
10. Merck Index, 10th edition
11. Chapiro, Mankowski & Schmitt, J.Polymer Science: Chemistry edition, Vol.20, 1982, p. 1791-1796
12. Bottino, Capannelli, Munari & Turturro, J.Polymer Science: Polymer Physics, Vol 26, 1988, p. 785-94.
13. CRC Handbook of Polymer-Liquid Interaction Parameters and Solubility Parameters, Allan F.M. Barton, CRC Press, 1990.

Chemical Compatibility of Filter Components

Chemical Compatibility of Merck Millipore Products

This table shows the chemical compatibility of materials used in the fabrication of Merck Millipore devices and membranes. Please refer to the specification tables on product-specific pages for materials found in specific Merck Millipore devices.

	Acetic Acid (glacial) acid, organic	Acetone ketone	Acetonitrile (ACN) nitrile	Alconox®, 1% surfactant/detergent	Ammonium Hydroxide caustic	Ammonium Sulfate (saturated) salt, aqueous solution	Amyl Acetate ester	Amyl Alcohol alcohol	Benzene HC, aromatic	Benzyl Alcohol HC aromatic/alcohol	Boric Acid (aqueous solution) acid, inorganic
Housing Materials											
HDPE (high density polyethylene)	R	R	R	TST	R	R	R	R	NR	NR	R
PP (polypropylene)	TST	R	R	ND	TST	R	TST	R	NR	TST	R
PS (polystyrene)	NR	NR	NR	ND	TST	ND	NR	GR	NR	ND	GR
PVC (polyvinyl chloride)	R	NR	NR	ND	TST	R	NR	R	NR	NR	R
MMA (modified acrylic copolymer)	NR	GNR	ND	ND	ND	GR	GNR	TST	NR	ND	TST
ABS (acrylonitrile-butadiene-styrene polymer)	GNR	TST	ND	ND	ND	ND	GNR	GR	GNR	ND	TST
SAN (styrene-acrylonitrile polymer)	ND	ND	ND	ND	ND	ND	ND	GR	GNR	ND	ND
PC (polycarbonate)	R	NR	NR	TST	NR	R	NR	R	NR	NR	GR
PET (polyethylene terephthalate)	NR	R	ND	ND	ND	R	TST	R	R	NR	R
EASTAR® (copolyester)	ND	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND
Filter Materials											
PP (polypropylene)	R	R	NR	ND	TST	R	TST	R	NR	R	R
PVC (polyvinyl chloride)	R	NR	NR	ND	TST	R	NR	R	NR	NR	R
PC (polycarbonate)	R	GNR	NR	R	TST	R	R	R	NR	TST	GR
PTFE (polytetrafluoroethylene)	R	R	R	TST	GR	GR	R	R	R	R	GR
PVDF (polyvinylidene fluoride)	R	NR	LTD	TST	R	NR	R	R	R	R	TST
MCE (mixed cellulose esters)	NR	NR	NR	TST	NR	NR	NR	NR	GR	NR	GR
PES (polyether sulfone)	R	GNR	NR	ND	NR	ND	GR	GR	NR	ND	GR
NYL (nylon)	NR	R	R	TST	TST	R	TST	TST	R	TST	R
O-ring Materials											
EPR (ethylene propylene rubber)	TST	R	R	ND	R	R	R	R	NR	R	R
Buna-N (nitrile rubber)	NR	NR	NR	ND	NR	R	NR	R	NR	R	TST
Fluoroelastomer (vinylidiene fluoride-hexafluoropropylene copolymer)	NR	NR	NR	ND	R	R	NR	R	R	R	R
Silicone (silicone)	R	R	NR	ND	R	R	NR	NR	NR	R	R
Filter Holder Material											
316 SS (stainless steel)	R	R	R	LTD	LTD	R	R	R	R	R	R

The following descriptions are abbreviated. Please see the beginning of this section for complete information.
R = Recommended; GR = Generally Recommended LTD = Limited Recommendation; NR = Not Recommended; GNR = Generally Not Recommended; TST = Testing Recommended; ND = No Data Presently Available

Chemical Compatibility of Filter Components

Chemical Compatibility of Merck Millipore Products

This table shows the chemical compatibility of materials used in the fabrication of Merck Millipore devices and membranes. Please refer to the specification tables on product-specific pages for materials found in specific Merck Millipore devices.

	Butyl Acetate ester	Butyl Alcohol alcohol	Carbon Tetrachloride HC, halogenated	Cellosolve (Ethyl) glycol ether	CHAPS (aqueous solution) surfactant/detergent	Chloroform HC, halogenated	Cyclohexanone ketone	Diethyl Pyrocarbonate, 0.2% carboxylic anhydride	Dimethyl Sulfoxide (DMSO), sulfoxide	Dimethylacetamide amide	Dimethylformamide amide
Housing Materials											
HDPE (high density polyethylene)	R	R	NR	R	TST	LTD	R	ND	R	R	R
PP (polypropylene)	TST	R	NR	R	ND	NR	NR	ND	R	R	R
PS (polystyrene)	NR	R	NR	NR	ND	NR	NR	ND	R	NR	NR
PVC (polyvinyl chloride)	NR	R	NR	NR	ND	NR	NR	ND	NR	NR	NR
MMA (modified acrylic copolymer)	GNR	TST	NR	NR	ND	NR	GNR	ND	NR	ND	ND
ABS (acrylonitrile-butadiene-styrene polymer)	GNR	GR	ND	ND	ND	ND	TST	ND	NR	NR	NR
SAN (styrene-acrylonitrile polymer)	ND	GR	ND	ND	ND	ND	ND	ND	ND	ND	ND
PC (polycarbonate)	NR	R	NR	NR	TST	NR	NR	ND	NR	NR	NR
PET (polyethylene terephthalate)	R	R	R	ND	ND	R	R	ND	ND	ND	NR
EASTAR® (copolyester)	ND	ND	ND	R	ND	ND	NR	ND	ND	ND	ND
Filter Materials											
PP (polypropylene)	TST	R	TST	R	ND	TST	R	ND	R	R	R
PVC (polyvinyl chloride)	NR	R	NR	NR	ND	NR	NR	ND	NR	NR	NR
PC (polycarbonate)	R	R	TST	R	TST	NR	TST	ND	NR	TST	NR
PTFE (polytetrafluoroethylene)	GR	GR	GR	GR	TST	R	R	ND	R	GR	GR
PVDF (polyvinylidene fluoride)	TST	R	R	ND	ND	R	NR	TST	NR	NR	NR
MCE (mixed cellulose esters)	NR	R	R	NR	ND	R	NR	NR	NR	NR	NR
PES (polyether sulfone)	GNR	GR	GNR	GR	ND	GNR	GNR	ND	NR	NR	ND
NYL (nylon)	R	R	TST	R	TST	NR	R	ND	R	NR	R
O-ring Materials											
EPR (ethylene propylene rubber)	R	R	NR	R	ND	NR	TST	ND	NR	NR	NR
Buna-N (nitrile rubber)	NR	R	NR	NR	ND	NR	NR	ND	NR	NR	NR
Fluoroelastomer (vinylidiene fluoride-hexafluoropropylene copolymer)	NR	R	R	TST	TST	R	NR	ND	NR	NR	NR
Silicone (silicone)	NR	R	NR	NR	ND	NR	TST	ND	NR	R	R
Filter Holder Material											
316 SS (stainless steel)	R	R	R	LTD	LTD	R	R	R	NR	R	R

The following descriptions are abbreviated. Please see the beginning of this section for complete information.
R = Recommended; GR = Generally Recommended LTD = Limited Recommendation; NR = Not Recommended; GNR = Generally Not Recommended; TST = Testing Recommended; ND = No Data Presently Available

Chemical Compatibility of Filter Components

Chemical Compatibility of Merck Millipore Products

This table shows the chemical compatibility of materials used in the fabrication of Merck Millipore devices and membranes. Please refer to the specification tables on product-specific pages for materials found in specific Merck Millipore devices.

	Dioxane ether	Ethers ether	Ethyl Acetate ester	Ethyl Alcohol alcohol	Ethylene Glycol glycol	Formaldehyde aldehyde	Formic Acid, 50% acid, organic	Freon (TF or PCA) HC, halogenated	Gasoline HC	Glycerine (Glycerol) glycol	Guanidine Hydrochloride, 6 M salt, aqueous solution
Housing Materials											
HDPE (high density polyethylene)	R	R	R	R	R	R	R	R	LTD	R	GR
PP (polypropylene)	R	NR	TST	R	R	R	R	R	NR	R	ND
PS (polystyrene)	NR	NR	NR	TST	ND	NR	NR	NR	NR	R	ND
PVC (polyvinyl chloride)	NR	NR	NR	R	TST	TST	TST	NR	NR	R	ND
MMA (modified acrylic copolymer)	NR	TST	NR	TST	ND	ND	TST	ND	ND	ND	GR
ABS (acrylonitrile-butadiene-styrene polymer)	ND	ND	GNR	GR	ND	ND	ND	ND	ND	ND	ND
SAN (styrene-acrylonitrile polymer)	NR	ND	ND	GR	ND	ND	ND	ND	ND	ND	ND
PC (polycarbonate)	NR	NR	NR	TST	R	R	R	NR	NR	R	ND
PET (polyethylene terephthalate)	GR	NR	ND	R	R	R	NR	R	R	R	ND
EASTAR® (copolyester)	ND	ND	NR	R	ND	ND	ND	ND	ND	ND	ND
Filter Materials											
PP (polypropylene)	R	NR	TST	R	R	R	R	R	NR	R	ND
PVC (polyvinyl chloride)	NR	NR	NR	R	TST	TST	TST	NR	NR	R	ND
PC (polycarbonate)	NR	TST	TST	R	R	R	R	GR	R	R	R
PTFE (polytetrafluoroethylene)	NR	TST	TST	R	R	R	R	GR	R	R	R
PVDF (polyvinylidene fluoride)	R	R	R	R	R	R	R	R	R	R	ND
MCE (mixed cellulose esters)	NR	NR	NR	NR	NR	NR	ND	R	R	R	ND
PES (polyether sulfone)	ND	ND	GNR	GR	GR	ND	ND	ND	GR	GR	ND
NYL (nylon)	R	R	R	TST	R	R	NR	R	R	R	ND
O-ring Materials											
EPR (ethylene propylene rubber)	NR	NR	NR	R	R	R	R	NR	NR	R	TST
Buna-N (nitrile rubber)	NR	NR	NR	TST	R	TST	NR	R	R	R	NR
Fluoroelastomer (vinylidiene fluoride-hexafluoropropylene copolymer)	NR	NR	NR	R	R	NR	ND	GR	R	R	ND
Silicone (silicone)	NR	TST	NR	TST	R	R	GR	R	NR	R	ND
Filter Holder Material											
316 SS (stainless steel)	R	R	R	R	R	R	R	R	R	R	R

The following descriptions are abbreviated. Please see the beginning of this section for complete information.
R = Recommended; GR = Generally Recommended LTD = Limited Recommendation; NR = Not Recommended; GNR = Generally Not Recommended; TST = Testing Recommended; ND = No Data Presently Available

Chemical Compatibility of Filter Components

Chemical Compatibility of Merck Millipore Products

This table shows the chemical compatibility of materials used in the fabrication of Merck Millipore devices and membranes.
Please refer to the specification tables on product-specific pages for materials found in specific Merck Millipore devices.

	Guanidine Thiocyanate, 5 M salt, aqueous solution	Helium gas	Hexane HC, aliphatic	Hydrochloric Acid, 1 N (HCL) acid, inorganic	Hydrochloric Acid, 6 N (HCL) acid, inorganic	Hydrochloric Acid, conc. (HCL) acid, inorganic	Hydrofluoric Acid acid, inorganic	Hydrogen gas	Hydrogen Peroxide, 3% peroxide	Hydrogen Peroxide, 30% peroxide	Hydrogen Peroxide, 90% peroxide
Housing Materials											
HDPE (high density polyethylene)	GR	R	LTD	R	R	R	R	R	R	R	NR
PP (polypropylene)	ND	R	NR	GR	TST	NR	NR	R	R	TST	R
PS (polystyrene)	ND	ND	NR	R	TST	NR	NR	ND	R	R	R
PVC (polyvinyl chloride)	ND	ND	NR	GR	TST	NR	NR	R	R	TST	R
MMA (modified acrylic copolymer)	GR	ND	GR	GR	ND	ND	GNR	ND	ND	ND	ND
ABS (acrylonitrile-butadiene-styrene polymer)	ND	ND	GNR	GR	ND	ND	GNR	ND	ND	ND	ND
SAN (styrene-acrylonitrile polymer)	ND	ND	GR	ND	ND	ND	ND	ND	ND	ND	ND
PC (polycarbonate)	ND	R	NR	GR	TST	NR	NR	R	R	R	R
PET (polyethylene terephthalate)	ND	ND	R	GR	R	R	NR	R	R	R	R
EASTAR® (copolyester)	ND	ND	R	ND	ND	ND	ND	ND	ND	ND	ND
Filter Materials											
PP (polypropylene)	ND	R	NR	GR	TST	NR	NR	R	R	TST	R
PVC (polyvinyl chloride)	ND	ND	NR	GR	TST	NR	NR	R	R	TST	R
PC (polycarbonate)	R	R	R	R	R	R	TST	R	R	R	R
PTFE (polytetrafluoroethylene)	GR	R	R	R	R	R	R	R	R	R	R
PVDF (polyvinylidene fluoride)	ND	TST	R	R	TST	NR	NR	R	R	R	R
MCE (mixed cellulose esters)	ND	R	GR	GR	NR	GNR	NR	R	NR	NR	NR
PES (polyether sulfone)	ND	ND	GR	GR	GR	ND	NR	ND	ND	ND	ND
NYL (nylon)	ND	R	R	GR	TST	NR	NR	R	R	TST	NR
O-ring Materials											
EPR (ethylene propylene rubber)	TST	R	NR	NR	NR	NR	NR	R	R	R	NR
Buna-N (nitrile rubber)	NR	R	R	NR	NR	NR	NR	R	NR	NR	NR
Fluoroelastomer (vinylidiene fluoride-hexafluoropropylene copolymer)	ND	ND	R	GR	TST	NR	NR	R	R	R	R
Silicone (silicone)	ND	R	NR	GR	R	R	NR	NR	R	R	NR
Filter Holder Material											
316 SS (stainless steel)	R	R	R	R	R	NR	NR	R	R	R	R

The following descriptions are abbreviated. Please see the beginning of this section for complete information.
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Chemical Compatibility of Filter Components

Chemical Compatibility of Merck Millipore Products

This table shows the chemical compatibility of materials used in the fabrication of Merck Millipore devices and membranes. Please refer to the specification tables on product-specific pages for materials found in specific Merck Millipore devices.

	HYPO (aqueous solution) salt, aqueous solution	Isobutyl Alcohol alcohol	Isopropyl Acetate ester	Isopropyl Alcohol alcohol	Kerosene HC	Lactic Acid, 50% acid, organic/alcohol	Lubrol® PX (aqueous solution) surfactant/detergent	Methyl Ethyl Ketone (MEK) ketone	Mercaptoethanol, 0.1 M alcohol/mercaptan	Methyl Acetate ester	Methyl Alcohol alcohol
Housing Materials											
HDPE (high density polyethylene)	R	R	R	R	LTD	TST	R	R	ND	TST	R
PP (polypropylene)	R	R	TST	R	TST	R	ND	R	ND	TST	R
PS (polystyrene)	ND	R	NR	R	NR	TST	ND	NR	ND	NR	NR
PVC (polyvinyl chloride)	R	TST	NR	TST	TST	TST	ND	NR	ND	NR	TST
MMA (modified acrylic copolymer)	GR	TST	GNR	TST	ND	ND	ND	GNR	ND	GNR	TST
ABS (acrylonitrile-butadiene-styrene polymer)	ND	GR	GNR	GR	ND	ND	ND	TST	ND	GNR	GR
SAN (styrene-acrylonitrile polymer)	ND	GR	ND	GR	ND	ND	ND	ND	ND	ND	GR
PC (polycarbonate)	R	R	NR	R	R	R	TST	NR	ND	NR	TST
PET (polyethylene terephthalate)	R	ND	R	R	TST	R	ND	R	ND	TST	ND
EASTAR® (copolyester)	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	R
Filter Materials											
PP (polypropylene)	R	R	TST	R	TST	R	ND	R	R	TST	R
PVC (polyvinyl chloride)	R	TST	NR	TST	TST	TST	ND	NR	ND	NR	TST
PC (polycarbonate)	R	R	R	R	R	R	TST	R	ND	NR	R
PTFE (polytetrafluoroethylene)	GR	R	R	R	LTD	GR	TST	R	ND	R	R
PVDF (polyvinylidene fluoride)	R	R	R	R	R	TST	ND	NR	ND	NR	R
MCE (mixed cellulose esters)	R	R	NR	NR	R	ND	ND	NR	NR	NR	NR
PES (polyether sulfone)	ND	GR	GNR	GR	GR	ND	ND	GNR	ND	GNR	GR
NYL (nylon)	R	TST	R	TST	R	TST	ND	R	ND	R	TST
O-ring Materials											
EPR (ethylene propylene rubber)	R	R	R	R	NR	R	ND	R	GR	R	R
Buna-N (nitrile rubber)	R	R	NR	R	R	R	TST	NR	NR	NR	R
Fluoroelastomer (vinylidiene fluoride-hexafluoropropylene copolymer)	R	R	NR	R	R	R	ND	NR	NR	NR	TST
Silicone (silicone)	R	R	NR	R	NR	R	ND		ND	NR	R
Filter Holder Material											
316 SS (stainless steel)	R	R	R	R	R	R	R	R	R	R	R

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Chemical Compatibility of Filter Components

Chemical Compatibility of Merck Millipore Products

This table shows the chemical compatibility of materials used in the fabrication of Merck Millipore devices and membranes. Please refer to the specification tables on product-specific pages for materials found in specific Merck Millipore devices.

	Methylene Chloride HC, halogenated	Methyl Isobutyl Ketone ketone	Mineral Spirits HC	Nitric Acid, 6 N acid, inorganic	Nitric Acid (concentrated) acid, inorganic	Nitrobenzene HC, aromatic	Nitrogen gas	Nonidet-P40 (aqueous solution) surfactant/detergent	Ozone gas	Paraldehyde aldehyde	Pentane HC, aliphatic
Housing Materials											
HDPE (high density polyethylene)	LTD	R	NR	R	NR	R	ND	TST	TST	R	LTD
PP (polypropylene)	NR	NR	NR	TST	NR	NR	ND	ND	NR	TST	NR
PS (polystyrene)	NR	NR	NR	NR	NR	NR	ND	ND	ND	NR	NR
PVC (polyvinyl chloride)	NR	NR	NR	NR	NR	NR	R	ND	NR	TST	NR
MMA (modified acrylic copolymer)	NR	GNR	ND	ND	ND	NR	ND	ND	ND	ND	GR
ABS (acrylonitrile-butadiene-styrene polymer)	ND	TST	ND	ND	ND	GNR	ND	ND	ND	ND	GNR
SAN (styrene-acrylonitrile polymer)	NR	ND	ND	ND	ND	GNR	ND	ND	ND	ND	GR
PC (polycarbonate)	NR	NR	NR	TST	NR	NR	ND	TST	R	NR	NR
PET (polyethylene terephthalate)	NR	R	ND	R	NR	NR	ND	ND	R	ND	R
EASTAR® (copolyester)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	R
Filter Materials											
PP (polypropylene)	NR	NR	NR	TST	NR	NR	ND	ND	NR	TST	NR
PVC (polyvinyl chloride)	NR	NR	NR	NR	NR	NR	R	ND	NR	TST	NR
PC (polycarbonate)	NR	NR	R	R	R	TST	ND	TST	R	NR	R
PTFE (polytetrafluoroethylene)	R	R	R	R	ND	R	R	ND	GR	GR	GR
PVDF (polyvinylidene fluoride)	NR	NR	R	R	NR	R	R	ND	R	TST	GR
MCE (mixed cellulose esters)	NR	GNR	R	NR	GNR	GNR	R	ND	R	NR	GR
PES (polyether sulfone)	GNR	GNR	GR	R	ND	ND	ND	ND	ND	ND	GR
NYL (nylon)	TST	R	R	NR	NR	R	R	ND	NR	R	R
O-ring Materials											
EPR (ethylene propylene rubber)	NR	R	NR	TST	NR	NR	R	TST	TST	GR	NR
Buna-N (nitrile rubber)	NR	NR	R	NR	NR	NR	R	TST	NR	R	R
Fluoroelastomer (vinylidiene fluoride-hexafluoropropylene copolymer)	NR	NR	R	R	R	R	R	ND	NR	NR	GR
Silicone (silicone)	NR	NR	NR	NR	NR	NR	R	ND	NR	R	NR
Filter Holder Material											
316 SS (stainless steel)	R	R	R	R	NR	NR	R	LTD	NR	R	R

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Chemical Compatibility of Filter Components

Chemical Compatibility of Merck Millipore Products

This table shows the chemical compatibility of materials used in the fabrication of Merck Millipore devices and membranes. Please refer to the specification tables on product-specific pages for materials found in specific Merck Millipore devices.

	Petroleum Ether ether	Phenol (aqueous solution) phenol	Potassium Hydroxide, 3 N caustic	Pyridine amine	Silicone Oils silicone	Sodium Carbonate (aqueous solution) salt, aqueous solution	Water (Brine) salt, aqueous solution	Sodium Chloride (aqueous solution) salt, aqueous solution	Sodium Dodecyl Sulfate surfactant/detergent	Sodium Hydroxide, 3 N caustic	Sodium Hydroxide (concentrated) caustic
Housing Materials											
HDPE (high density polyethylene)	LTD	NR	R	R	R	TST	R	R	TST	R	R
PP (polypropylene)	ND	NR	R	R	R	R	R	R	ND	R	R
PS (polystyrene)	ND	NR	R	NR	R	ND	ND	ND	ND	R	R
PVC (polyvinyl chloride)	GNR	NR	R	NR	R	R	R	R	ND	R	NR
MMA (modified acrylic copolymer)	ND	ND	ND	TST	ND	GR	GR	GR	ND	ND	ND
ABS (acrylonitrile-butadiene-styrene polymer)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SAN (styrene-acrylonitrile polymer)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PC (polycarbonate)	R	NR	TST	NR	R	R	R	R	TST	TST	NR
PET (polyethylene terephthalate)	R	GNR	R	NR	ND	TST	R	R	ND	TST	NR
EASTAR® (copolyester)	ND	ND	ND	ND	ND	ND	ND	ND	ND	R	ND
Filter Materials											
PP (polypropylene)	NR	NR	R	R	R	R	R	R	ND	R	R
PVC (polyvinyl chloride)	GNR	NR	R	NR	R	R	R	R	ND	R	NR
PC (polycarbonate)	R	NR	NR	NR	R	R	R	R	TST	NR	NR
PTFE (polytetrafluoroethylene)	GR	GR	R	GR	GR	R	R	R	ND	R	R
PVDF (polyvinylidene fluoride)	R	R	R	NR	R	R	R	R	ND	R	R
MCE (mixed cellulose esters)	R	NR	NR	NR	R	R	R	R	R	NR	NR
PES (polyether sulfone)	ND	ND	ND	NR	ND	ND	ND	ND	ND	R	R
NYL (nylon)	R	NR	R	TST	R	TST	R	R	ND	R	NR
O-ring Materials											
EPR (ethylene propylene rubber)	NR	R	R	NR	NR	R	R	R	TST	R	R
Buna-N (nitrile rubber)	R	NR	R	NR	R	R	R	R	GR	R	NR
Fluoroelastomer (vinylidiene fluoride-hexafluoropropylene copolymer)	R	R	R	NR	R	R	R	R	R	R	R
Silicone (silicone)	NR	NR	NR	NR	NR	R	R	R	R	R	R
Filter Holder Material											
316 SS (stainless steel)	R	R	R	R	R	R	LTD	R	LTD	R	NR

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Chemical Compatibility of Filter Components

Chemical Compatibility of Merck Millipore Products

This table shows the chemical compatibility of materials used in the fabrication of Merck Millipore devices and membranes. Please refer to the specification tables on product-specific pages for materials found in specific Merck Millipore devices.

	Sulfuric Acid (concentrated) acid, inorganic	Tetrahydrofuran (THF) ether	Toluene HC, aromatic	TCA (aqueous solution) acid, organic	Trichloroethane HC, halogenated	Trichloroethylene HC, halogenated	Tween® 20 (aqueous solution) surfactant/detergent	Urea, 8 M salt, aqueous solution	Xylene HC, aromatic
Housing Materials									
HDPE (high density polyethylene)	R	R	LTD	R	LTD	NR	TST	R	LTD
PP (polypropylene)	NR	NR	NR	R	NR	NR	ND	R	NR
PS (polystyrene)	NR	NR	NR	ND	NR	NR	ND	R	NR
PVC (polyvinyl chloride)	NR	NR	NR	NR	NR	NR	ND	TST	NR
MMA (modified acrylic copolymer)	GNR	NR	NR	ND	GNR	GNR	ND	GR	NR
ABS (acrylonitrile-butadiene-styrene polymer)	NR	NR	GNR	ND	ND	ND	ND	ND	GNR
SAN (styrene-acrylonitrile polymer)	NR	ND	GNR	ND	ND	ND	ND	ND	GNR
PC (polycarbonate)	NR	NR	NR	TST	NR	NR	TST	NR	NR
PET (polyethylene terephthalate)	NR	R	ND	NR	TST	R	ND	R	NR
EASTAR® (copolyester)	ND	ND	NR	ND	ND	ND	ND	ND	ND
Filter Materials									
PP (polypropylene)	NR	NR	NR	R	NR	NR	ND	R	NR
PVC (polyvinyl chloride)	NR	NR	NR	NR	NR	NR	ND	TST	NR
PC (polycarbonate)	NR	TST	TST	TST	NR	NR	TST	NR	NR
PTFE (polytetrafluoroethylene)	R	GR	R	GR	R	R	R	GR	R
PVDF (polyvinylidene fluoride)	TST	NR	R	R	TST	R	TST	R	R
MCE (mixed cellulose esters)	NR	NR	GR	NR	NR	NR	R	R	GR
PES (polyether sulfone)	GNR	ND	R	ND	GNR	GNR	ND	ND	ND
NYL (nylon)	NR	R	R	TST	TST	TST	TST	R	R
O-ring Materials									
EPR (ethylene propylene rubber)	TST	NR	NR	NR	NR	NR	TST	R	NR
Buna-N (nitrile rubber)	NR	NR	NR	NR	NR	NR	R	R	NR
Fluoroelastomer (vinylidiene fluoride-hexafluoropropylene copolymer)	R	NR	R	NR	R	R	R	R	R
Silicone (silicone)	NR	NR	NR	NR	NR	NR	NR	R	NR
Filter Holder Material									
316 SS (stainless steel)	NR	NR	R	NR	R	R	R	R	R

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Chemical Compatibility of UF Products

	Microcon® Filter	Centriprep® Filter	Centricon® Plus-70 Filter	Amicon® Ultra Filter	Ultrafree MC/CL with PVDF Membrane	Ultrafiltration Disc (Ultracel® Membrane)	Ultrafiltration Disc (Biomax® Membrane)	Stirred Cells
Solvents								
Acetone	NR	NR	R	ND	NR	R	NR	NR
Acetonitrile	NR	NR	R	ND	R	R	R	R
Acetonitrile (10%)	R	R	R	R	R	R	R	R
Acetonitrile (40% in 1% TFA)	TST	TST	R	ND	TST	R	R	R
Alconox® (1%)	R	R	R	ND	R	R	R	R
Ammonium Acetate	R	R	R	ND	R	R	R	R
Ammonium Sulfate (50%)	R	R	R	R	R	R	R	R
Ammonium Sulfate	R	R	R	R	R	R	R	R
Amyl Alcohol	NR	NR	R	ND	R	R	R	R
Benzyl Alcohol (1%)	R	R	R	ND	R	R	R	R
n-Butanol	NR	NR	TST	ND	TST	TST	TST	TST
CAPS (250 mM, pH 11)	R	R	R	ND	TST	R	R	R
CHAPS (100 mM)	R	R	R	ND	R	R	R	R
Decon-90 (1%)	R	R	R	ND	R	R	R	R
Diethyl Pyrocarbonate (DEPC, 0.2%)	R	R	R	R	R	R	R	R
Digitonin (0.5%) in EtOH	R	R	R	ND	R	R	R	R
Dimethylacetamide	NR	NR	TST	ND	NR	TST	NR	NR
Dimethylformamide	NR	NR	TST	ND	NR	TST	NR	NR
Dimethylformamide (10%)	R	R	R	R	R	R	R	R
Dioxane	NR	NR	TST	ND	TST	TST	TST	TST
Dioxane (10%)	R	R	R	ND	R	R	R	R
Dithiothreitol (0.1M)	TST	R	R	R	R	R	R	R
DMSO (10%)	R	R	R	ND	R	R	R	R
DMSO	NR	NR	TST	ND	NR	TST	NR	NR
DTT/Benzamidine HCl (1 mM each)	R	R	R	ND	R	R	R	R
Ethanol	TST	NR	TST	ND	TST	TST	TST	TST
Ethanol (10%)	R	R	R	R	R	R	R	R
Ethylene Glycol	NR	NR	TST	ND	TST	TST	TST	TST
Ethylene Glycol (10%)	R	R	R	ND	R	R	R	R
Formaldehyde (5%)	R	R	R	R	R	R	R	R
Formamide	NR	NR	TST	ND	NR	TST	NR	NR
Glycerine (Glycerol)	R	R	R	R	R	R	R	R
Guanidine HCl (6 M)	R	R	R	R	R	R	R	R
Guanidine Thiocyanate (0.5 M)	R	R	R	ND	R	R	R	R
Guanidine Thiocyanate (5 M)	NR	NR	R	ND	NR	R	R	R
Hydrogen Peroxide (3%)	R	R	R	ND	R	R	R	R
Hydrogen Peroxide/MeOH (1:3)	NR	NR	TST	ND	TST	TST	TST	TST

The following descriptions are abbreviated. Please see the beginning of this section for complete information.
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Chemical Compatibility of UF Products

	Microcon® Filter	Centriprep® Filter	Centricon® Plus-70 Filter	Amicon® Ultra Filter	Ultrafree MC/CL with PVDF Membrane	Ultrafiltration Disc (Ultracel® Membrane)	Ultrafiltration Disc (Biomax® Membrane)	Stirred Cells
Solvents								
Hydroxylamine (2 M)	R	R	R	ND	R	R	R	R
Imidazole (100 mM)	R	R	R	ND	R	R	R	R
Imidazole (300 mM)	R	R	R	ND	R	R	R	R
Isobutyl Alcohol	NR	NR	TST	ND	NR	TST	TST	TST
Isopropyl Alcohol	NR	NR	TST	ND	NR	TST	TST	TST
Isopropyl Alcohol (10%)	R	R	R	ND	R	R	R	R
Lubrol® PX (0.1%)	R	R	R	ND	R	R	R	R
Mercaptoethanol (0.1 M)	R	R	R	R	R	R	R	R
Methanol	NR	NR	TST	ND	NR	TST	TST	TST
Methanol (10%)	R	R	R	R	R	R	R	R
Nonidet P-40 (2%)	R	R	R	R	TST	R	R	R
Paraldehyde	TST	TST	R	ND	R	R	R	R
Phenol (5%)	R	R	R	ND	R	R	R	R
Phosphate Buffer (1 M, pH 8.2)	R	R	R	R	R	R	R	R
Polyethylene Glycol (10%)	R	R	R	R	R	R	R	R
Propanol	NR	NR	TST	ND	NR	TST	NR	NR
Propanol (10%)	R	R	R	R	R	R	R	R
Sodium Carbonate (20%)	R	R	R	R	R	R	R	R
Sodium Cholate	R	R	R	ND	R	R	R	R
Sodium Chloride (2 M)	R	R	R	ND	R	R	R	R
Sodium Deoxycholate (5%)	R	R	R	R	R	R	R	R
Sodium Dodecyl Sulfate (3%)	R	R	R	ND	R	R	R	R
Sodium Dodecyl Sulfate (2%)	R	R	R	ND	R	R	R	R
Sodium Dodecyl Sulfate (0.1 M)	R	R	R	ND	R	R	R	R
Sodium Thiocyanate (3 M)	TST	TST	R	ND	R	R	R	R
Terg-A-Zyme (1%)	R	R	R	R	R	R	R	R
Tetrahydrofuran	NR	NR	TST	ND	NR	TST	NR	NR
Triethylamine (2%)	R	R	R	ND	R	R	R	R
Tris Buffer (1 M, pH 8.2)	R	R	R	R	R	R	R	R
Triton® X-100 (5 mM)	R	R	R	R	R	R	R	R
Tween® 20 (0.1%)	R	R	R	R	R	R	R	R
Urea (8 M)	R	R	R	R	R	R	R	R

The following descriptions are abbreviated. Please see the beginning of this section for complete information.
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Chemical Compatibility of UF Products

	Microcon® Filter	Centriprep® Filter	Centricon® Plus-70 Filter	Amicon® Ultra Filter	Ultrafree MC/CL with PVDF Membrane	Ultrafiltration Disc (Ultracel® Membrane)	Ultrafiltration Disc (Biomax® Membrane)	Stirred Cells
Acids								
Acetic Acid, 10%	R	R	R	R	R	R	R	R
Acetic Acid (glacial)	NR	NR	NR	ND	R	NR	TST	TST
Boric Acid	R	R	R	ND	R	R	R	R
Formic Acid (5%)	R	R	R	R	R	R	R	R
Formic Acid (70%)	NR	NR	NR	ND	R	NR	R	R
Hydrochloric Acid (1.0 N)	R	R	R	R	R	NR	R	R
Lactic Acid (50%)	R	R	R	R	R	R	R	R
Nitric Acid (10%)	R	R	R	TST	R	R	R	R
Perchloric Acid (5%)	TST	TST	R	ND	TST	R	R	R
Phosphoric Acid (5%)	R	R	R	R	R	R	R	R
Sulfamic Acid (3%)	R	R	R	ND	R	R	R	R
Sulfuric Acid (3%)	R	R	R	R	R	R	R	R
Trichloroacetic Acid (10%)	R	R	R	R	R	R	R	R
Trichloroacetic Acid (50%)	NR	NR	NR	ND	NR	R	NR	TST
Trifluoroacetic Acid (10%)	R	R	R	R	R	R	R	R
Trifluoroacetic Acid (50%)	NR	R	NR	TST	NR	R	NR	TST
Bases								
Ammonium Hydroxide (5%)	R	R	R	R	R	R	R	R
Ammonium Hydroxide (6 N)	R	R	R	ND	R	R	R	R
Sodium Hydroxide (0.1 N)	R	R	R	ND	R	R	R	R
Sodium Hydroxide (2.5 N)	NR	R	R	ND	R	NR	R	NR

The following descriptions are abbreviated. Please see the beginning of this section for complete information.
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Chemical Compatibility Guide for MultiScreen® Filter Plates

Ratings are based on 100% or concentrated solutions, unless otherwise indicated. Aromatic hydrocarbons (especially ketones, DMF, DMAC, DMSO, THF, acetonitrile) and chlorinated hydrocarbons will attack both membranes and plastics. A chemical listed as NR may be suitable in low concentrations for short exposures, but this must be determined on an individual assay basis.

Compatibility of MultiScreen®$_{HTS}$ and MultiScreen® Classic Filter Plates with Various Reagents

Plate Material/Membrane	Polyolefin copolymer/PTFE	Acrylic or Classic Styrene/Durapore®	Acrylic or Styrene/ MCE	Barex®/TiO_2/ Durapore®, MCE, DEAE	Acrylic or Barex®/ TiO_2/Styrene, Immobilon®-P
Acids					
Acetic (5%)	R	R	R	R	R
Acetic, Glacial	R	L to NR	NR	R/L to NR	L
Boric	R	R	R	R	R
Trichloroacetic (<20%)	R	R	R	R	R
Trichloroacetic (20 to 40%)	R	R	L	R/L to NR	L
Trichloroacetic (>40%)	R	L to NR	NR	L/NR	NR
Hydrochloric (0.1 N)	R	R	R	R	R
Hydrochloric (1 N)	R	R	L to NR	R/L to NR	R to L
Hydrochloric (>1 N)	R	R	NR	R/L to NR	R
Hydrofluoric	R	R (20% max.)	NR	NR	R (20% max.)
Nitric (conc)	R	L to NR	NR	NR	L
Sulfuric (conc)	R	L	NR	L/NR	L
Bases					
NH_4OH (6 N)	R	L to NR	NR	L to NR	R
NaOH (0.1 N)	R	R to L	L to NR	R/L to NR	R
NaOH (1 N)	R	L to NR	NR	L/NR	L
NaOH (>6 N)	R	NR	NR	NR	NR
Urea	R	R	–	R (Durapore® only)	R
Triethylamine	R	R	R	R	R
Diethanolamine (≤3 mol)	R	R	R	R	R
Alcohols					
Amyl	R	R	NR	R/NR	R
Benzyl (1%)	R	R	R	R	R
Butyl	R	R	R	R	R
Ethanol (40%)	R	R	NR	R	R
Ethanol (≥50%)	R	R	NR	R/NR	R (no filtrate collection)
Isobutyl	R	R	R	R	R
Isopropyl	R	R	L to NR	R/L to NR	R
Methanol	R	R to L	NR	R/NR	R
Triton® X-100 Surfactant (<1%)	R	R	R	R	R

R = Recommended, no known restrictions, NR = Not recommended, membrane or plate severely attacked by chemical, L = Limited, chemical resistance marginal, short time exposures should be tested individually for application. Dilution with water or other non-solvent will likely enhance compatibility

1. Scintillants should only be used with Barex® or SAN plates.

2. Surfactants are in general readily usable with all MultiScreen® plate types. However, before quantitative fluid transfer to a receiver plate, it is essential that the plate be rinsed with non-surfactant containing fluid (e.g., 100 µL PBS) and then the underdrain be thoroughly blotted prior to adding the material which will ultimately be collected. Triton®-X 100 should not be used with MCE membrane in concentrations greater than 5% (the membrane will appear to lose flow).

Chemical Compatibility Guide for MultiScreen® Filter Plates

Compatibility of MultiScreen®$_{HTS}$ and MultiScreen® Classic Filter Plates with Various Reagents

Plate Material/Membrane	Polyolefin copolymer/PTFE	Acrylic or Classic Styrene/Durapore®	Acrylic or Styrene/ MCE	Barex®/TiO_2/ Durapore®, MCE, DEAE	Acrylic or Barex®/ TiO_2/Styrene, Immobilon®-P
Solvents					
Acetone	R	NR	NR	NR	NR
Acetonitrile (no filtrate collection, centrifuge)	R	NR	NR	NR	L (<35%)
Amyl Acetate	R	NR	NR	R/NR	R
Carbon Tetrachloride	R	L to NR	L to NR	R	R
Chloroform	R	NR	NR	NR	NR
Cyclohexanone	R	NR to L	NR to L	R/ NR to L	NR to L
DMAC	R	NR	NR	NR	NR
DMF	R	NR	NR	NR	NR
DMSO (no filtrate collection)	R	L (70%)	NR	NR	L (10%) max.
Ethylene Glycol	R	R	R	R	R
Formaldehyde	R	R (10% max.)	NR	R (<40%) /NR	R (<40%)
Hexane	NR	R	R	R	R
Methylene Chloride	L	NR	NR	NR	NR
MEK	R	NR	NR	NR	NR
MIBK	R	NR	NR	L/NR	NR/L
Phenol (5%)	R	L to NR	L to NR	R	R
Pyridine	R	R	R	R	R
Scintillants	NR	NR	NR	R	NR/R(1)
Triethylamine	R	R	R	R	R
Toluene	NR	NR to L	NR to L	R	NR to L/R
THF	R	NR	NR	L/NR	NR/L
Xylene	R	NR	NR	R	R
Other Organics					
Attophos® Reagent	R	R	R	R	R
Fluorescein	R	R	R	R	R
Glycerine	R	R	R	R	R
Hydrogen Peroxide	R	R	NR	R (3%)	R
Polyethylene Glycol	R	R	R	R	R
Tween® Surfactant (<5%)(2)	R	R	R	R	R
Triton® X-100 Surfactant (<1%)	R	R	R	R	R
Triton® X-100 Surfactant (<5%)	R	R	L	R/L	R
Inorganic Salts					
Carbon Disulfite	R	NR	NR	NR	NR
Sodium Hypochlorite	R	R	NR	R (5%)/ NR	R

R = Recommended, no known restrictions, NR = Not recommended, membrane or plate severely attacked by chemical, L = Limited, chemical resistance marginal, short time exposures should be tested individually for application. Dilution with water or other non-solvent will likely enhance compatibility

1. Scintillants should only be used with Barex® or SAN plates.

2. Surfactants are in general readily usable with all MultiScreen® plate types. However, before quantitative fluid transfer to a receiver plate, it is essential that the plate be rinsed with non-surfactant-containing fluid (e.g., 100 µL PBS) and then the underdrain be thoroughly blotted prior to adding the material which will ultimately be collected. Triton®-X 100 should not be used with MCE membrane in concentrations greater than 5% (the membrane will appear to lose flow).

Chemical Compatibility Guide for the MultiScreen® Vacuum Manifold

The following tables outline the solvents that have been evaluated for compatibility with the various components of the MultiScreen®$_{HTS}$ vacuum manifold. In general the manifold will tolerate the same chemicals as the rest of the system.

However, when using concentrated acids, it is important to rinse through the entire manifold at the end of procedures, especially if collection is done through the manifold into a trap, rather than using the collection trays.

MultiScreen®$_{HTS}$ Vacuum Manifold Components

Component	Manifold Base/ Collar Gasket Frame	Gaskets/Tubing	Standard Collar	Support Grid	Tubing Fittings	Droplet Trap Array
Materials of Construction	HDPE/ Polypropylene, Polyolefin	Silicone	Nylon	Stainless Steel	PP with EPDM or Fluoroelastomer Seals	PTFE
Acetone	R	G	G	E	G	E
Acetonitrile	E	G	E	E	G	E
Dimethyl Formamide (DMF)	E	G	R	E	G	E
Dimethyl Sulfoxide (DMSO)	E	G	E	E	G	E
Ethyl Acetate	E	G	E	E	G	E
Ethanol	E	G	G	E	E	E
Formic Acid	E	G	NR	G	G	R
Hexane	NR	NR	R	E	G	E
Hydrochloric Acid (37%)	E	R	NR	R	R	R
Isopropanol	E	E	R	E	E	E
Methanol	E	E	R	E	E	E
Methylene Chloride	NR	NR	R	E	R	E
Sodium Hypochlorite	E	G	NR	G	G	R
Tetrahydrofuran (THF)	R	NR	E	E	NR	E
Toluene	NR	NR	E	E	R	E
Trichloroacetic Acid (TCA)	E	NR	G	G	R	R
Trifluoroacetic Acid (TFA)	E	NR	R	R	G	R

E = Excellent performance, G = Good performance, R = Rinse after contact, NR = Not recommended

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