Filters and Supporting Hardware

The path to new discoveries must be laid on a solid foundation. Backed by decades of research, our exhaustive portfolio of fundamental filters and supporting hardware has helped generations of scientists reach new milestones. With the needs of today's scientist at the top of our minds, we have continued to evolve, ensuring our products can continue to serve as the cornerstone for your latest innovation.

The life science business of Merck operates as MilliporeSigma in the U.S. and Canada.

Millipore®

Preparation, Separation, Filtration & Monitoring Products

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1.1 Membrane Filter and Filter Paper Characteristics

Selecting the ideal filter begins with understanding their basic characteristics. Matching characteristics to sample properties and the desired filtration outcome can provide guidance on the utility of a given membrane filter or filter paper in your application. While the terms membrane filter and filter paper are often used interchangeably, these distinct filter types have unique properties, advantages, and disadvantages.

Membrane Filters

Produced by the precipitation or stretching of polymeric materials, membrane filters are one of the most commonly utilized items within both industry and research. Properties of membrane filters vary widely with differences in composition, surface treatments, and pore size.

Chemical Compatibility

The filter material must be compatible with the chemical nature of the substance being filtered to avoid structural failure. The chemical compatibility of liquid samples is commonly focused solely on the liquid, but dissolved solutes could also interact with the membrane in an undesirable manner.

Wettability

For liquid filtration, the membrane must be wettable with the fluid being filtered, which is based upon the chemical properties of the membrane surface. Resistance can occur if the membrane is not wettable, causing back pressure and increasing the risk of membrane failure. Hydrophobic membranes can be wetted with alcohols (e.g., methanol) prior to use in the filtration of aqueous solutions.

Pore Size

For membrane filters, pore size provides an indication of largest pore diameter and can be related to the membrane's ability to filter out particles of a certain size. As membrane pores can be non-uniform, using the pore size rating alone is an unreliable measure of filter effectiveness. Bubble point and bacterial retention testing are two commonly used methods for measuring membrane pore size.

Flow Rate

Defined as the time required for the flow stream to pass through the filter, flow rate is critical in determining how rapidly a filtration can be completed. Flow rate generally decreases with smaller pore size, but altering the membrane material, thickness, porosity, and pore architecture can all lead to differences in flow rate.

Analyte Binding

Analyte binding refers to the loss of analytes during filtration, resulting in a filtrate with a different molecular composition than expected. With an internal surface area 100 to 600 times greater than the frontal surface area, polymeric microporous membranes provide a vast infrastructure for the non-specific binding of analytes. In addition to surface area, the presence of functional groups determines binding characteristics of membranes. Membranes with limited functionality (e.g., PVDF, PTFE) show very low analyte binding, whereas membranes with higher functionality (e.g., nylon, MCE) show a high level of analyte binding.

Optical Properties

When visually analyzing retentates, the membrane optical properties must be compatible with the imaging method, such that the membrane provides a consistent background over the entire sample surface and does not impart additional noise during testing. Four technique-specific parameters are commonly considered: reflectance, transmittance, chemiluminescence, and fluorescence.

Extractables

Extractables are contaminants present in the final filtrate that originate in the filter or device. Filter extractables occur as three different types: the shedding of filter materials or particulate extractables, residual chemicals from the manufacturing process, and surface modification chemistries washing off the filter. The presence of extractables can also be related to the chemical compatibility of the membrane with the solution being filtered. Generally, if a membrane is not chemically compatible with the solution, a higher level of extractables are observed in the filtrate.

Retentiveness

Retentiveness is the ability of a membrane to retain the particle or molecule of interest. Depending on the criticality of retentiveness in the final application (e.g. sterilizing-grade membranes), the manufacturer may not undergo retention testing for each membrane type.

Prefiltration and Depth Filters

Prefiltration utilizes large pore membrane filters to remove large particulates, such as dirt or sediment, from samples prior to filtration with a smaller pore membrane filter. Using prefiltration in sample preparation can prevent premature filter clogging or fouling, extending the filter lifespan. Depth filters differ from membrane filters as depth filters retain particles internally, rather than solely on the filter surface. Due to their high particle retention capacity, depth filters are frequently used for prefiltration.

Binders

Commonly used in non-woven, fiber-based materials, binders provide shape and strength to the final product. While binders are routinely used in glass fiber filters, these additives reduce thermal stability and can result in sample contamination by extractables.

Net Filters

With large and uniform pores, the net-like structure of net filters is used to remove large particulates, such as cells, proteins, or dirt, for solution clarification or particulate analysis.

Cellulose Filter Paper

Produced from α-cellulose, filter papers primarily differ from membrane filters in their structure, strength, and compatibility. The open fiber structure prevents the retention of particles smaller than 2 µm, as well as imparts reduced wet strength and chemical compatibility.

Retention Rating

Retention rating refers to the ability the filter paper to retain particles larger than the given size rating. This nominal measurement is highly variable with filtration conditions, including operating pressure, particle shape, and particle concentration.

Purity

Related to extractables, filter paper purity refers to the quantity of trace organic and inorganic contaminants found within the filter paper. Depending on the final application or analytical testing method, higher purity filter papers may need to be used to avoid inaccurate results.

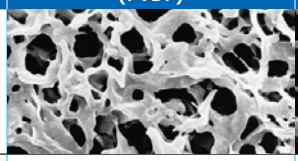
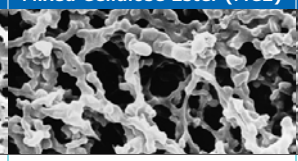
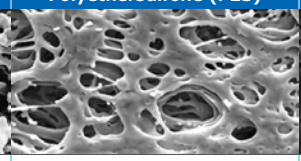
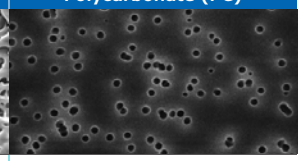
Hardness

Hardness refers to the physical hardness of the filter paper surface after mineral acid treatment. In addition to an increased wet strength and reduced risk of structural failure, hard filter papers also feature the absence of trace metal impurities and fiber shedding during use.

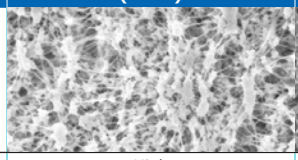
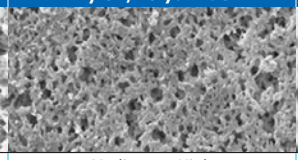
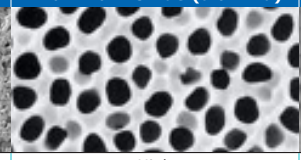
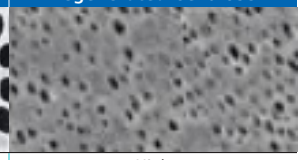
1.2 Filter Types by Characteristics

Membrane Filters

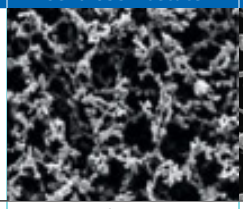
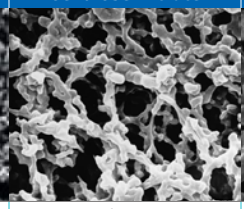
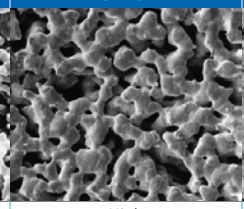
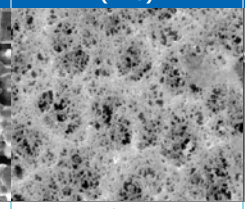
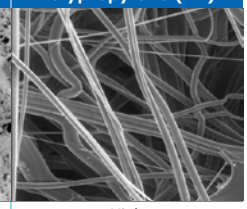
Membrane filter properties differ markedly based upon their composition, fabrication method, surface treatment, and pore size. The table below organizes membrane filters by composition, providing general characteristics for each membrane type. Product groups belonging to each membrane type can be found in the last row of each column.

Composition	Polyvinylidene Fluoride (PVDF)	Mixed Cellulose Ester (MCE)	Polyethersulfone (PES)	Polycarbonate (PC)
				
Chemical Compatibility	High	Medium	Low	Medium to Low
Wettability	Hydrophilic or Hydrophobic	Hydrophilic	Hydrophilic	Hydrophilic
Pore Size	0.1 – 5 µm	0.025 – 8 µm	0.22 – 0.45 µm	0.015 – 12 µm
Flow Rate	Slow to Medium	Medium	Fast	Slow
Protein Binding	Hydrophilic: Very Low Hydrophobic: High	Medium	Low	Low
Optical Properties	• White • Plain surface	• High-contrast • Available in black and white • Gridded and non-gridded surface	• White • Plain surface	• Low background interference • Smooth surface • Translucent • Black/brown formats reduce background fluorescence
Extractables	• Low	• Medium	• Low	• Medium to Low
Sterilization	• Ethylene oxide • Gamma irradiation • Autoclave	• Ethylene oxide • Gamma irradiation • Autoclave	• Ethylene oxide • Gamma irradiation • Autoclave	• Ethylene oxide • Gamma irradiation • Autoclave
Product Groups	• Durapore® membrane filters	• MF-Millipore™ membrane filters • Whatman® ME and WME membrane filters **Millipore® reinforced with polyester** • Reinforced (RW) membrane filters **Support pads** • Cellulose support pads	• Millipore Express® PLUS membrane filters	• Isopore™ membrane filters • Cyclopore® membrane filters **Treated with polyvinylpyrrolidone (PVP)** • Nuclepore® membrane filters

Membrane Filters (continued)

Composition	Polytetrafluoroethylene (PTFE)	Nylon/Polyamide	Aluminum Oxide (alumina)	Regenerated Cellulose
				
Chemical Compatibility	High	Medium to High	High	High
Wettability	Hydrophobic or Hydrophilic	Hydrophilic	Hydrophilic	Hydrophilic
Pore Size	0.1 – 10 µm	0.2 – 180 µm	0.02 – 0.2 µm	0.2 – 1.0 µm
Flow Rate	Slow to Medium	Medium	Medium	Medium
Protein Binding	Low	Medium	Low	Low
Optical Properties	• White • Gridded and non-gridded surface	• White • Plain surface	• Transparent when wet • Low autofluorescence	-
Extractables	Low	Medium to Low	Low	Low
Sterilization	• Ethylene oxide • Autoclave	• Ethylene oxide • Gamma irradiation	• Ethylene oxide • Gamma irradiation • Autoclave	• Ethylene oxide • Gamma irradiation • Autoclave
Product Groups	**Hydrophobic** • Fluoropore™ membrane filters • Mitex™ membrane filters • PTFE for PM2.5 Particle Monitoring • Whatman® WTP and TE membrane filters **Hydrophilic** • Omnipore™ membrane filters • LCR PTFE membrane filters	• Millipore® nylon membrane filters • Whatman® nylon membrane filters • Whatman® polyamide membrane filters	• Anodisc® inorganic membrane filters	• Whatman® regenerated cellulose membrane filters

Membrane Filters (continued)

Composition	Cellulose Acetate	Cellulose Nitrate	Silver	Polyvinyl Chloride (PVC)	Polypropylene (PP)
					
Chemical Compatibility	Low	Low	High	Low	High
Wettability	Hydrophilic	Hydrophilic	-	Hydrophobic	Hydrophobic
Pore Size	0.2 – 1.2 µm	0.1 – 12 µm	0.45 µm	0.5 µm	0.6 – 45 µm
Flow Rate	Medium	Medium	-	Slow	Medium to Fast
Protein Binding	Very Low	Very High	-	Medium to High	Low
Optical Properties	-	-	• Smooth, highly reflective surface • Low background	• White • Plain surface	• White • Plain surface
Extractables	Low	Low	Very Low	Low	Medium
Sterilization	• Ethylene oxide • Gamma irradiation • Autoclave	• Autoclave	• Autoclave	• Ethylene oxide • Gamma irradiation • Autoclave	• Ethylene oxide • Autoclave
Product Groups	• Whatman® cellulose acetate membrane filters	• Whatman® cellulose nitrate membrane filters	• Millipore® silver membrane filters	• Millipore® PVC membrane filters	• Millipore® polypropylene membrane and net filters

Glass and Quartz Fiber Filters

While glass and quartz fiber filters are typically classified as depth filters, they share the fibrous architecture and determining characteristics of cellulose-based fiber paper. Due to these differences, characteristics by each product group are highlighted in the table below.

Filter	Glass fiber without binder	Glass fiber with binder	Quartz fiber
Binder	No	Yes; Organic, Inorganic, or Both	No
Chemical Compatibility	High	Moderate to High	High
Retention Rating (µm)	0.6 – 2.7 µm	0.2 – 8 µm	-
Flow Rate	Medium to Fast	Slow to Fast	Slow to Medium
Product Groups	• Millipore® glass fiber filters • Whatman® glass fiber filters	• Millipore® glass fiber filters with binder resin • Whatman® glass fiber filters with binders	• Millipore® quartz fiber filters • Whatman® quartz fiber filters

Filter Paper

Cellulose-Based Filter Paper

Used commonly in quantitative and qualitative analysis, filter paper characteristics must be closely matched to the given application. Depending on the method and application, folded (prepleated) filter paper may be advantageous to save time during filtration. The table below organizes the general characteristics of filter paper by product group.

Filter Paper	Qualitative filter paper	Quantitative filter paper	Wet strengthened filter paper	General purpose filter paper
Format	Flat or Prepleated (folded)	Flat	Flat or Prepleated (folded)	Flat or Prepleated (folded)
Chemical Compatibility	Moderate	Moderate to High	Moderate	Moderate
Retention Rating (µm)	2 – 25 µm	2 – 25 µm	2 – 30 µm	2 – 25 µm
Flow Rate	Very Slow to Fast	Slow to Fast	Slow to Fast	Slow to Very Fast
Purity†	Available in low ash	Available in low ash or ashless	-	-
Hardness	Soft	Soft to Very Hard	Soft to Medium	Soft
Product Groups	• Whatman® qualitative filter paper	• Whatman® quantitative filter paper	• Whatman® wet strengthened filter paper	• Whatman® general purpose filter paper

†Purity reported as nominal ash content, as determined by ignition of the filter at 900 °C in air

1.3 Filter Types by Application

The tables below provide product recommendations for research, industrial, and analytical applications, based upon general physical characteristics of each product group. While this chart provides general recommendations, filter compatibility with the sample and filtration method should be verified prior to use.

Membrane Filters

Composition	Polyvinylidene Fluoride (PVDF)	Mixed Cellulose Ester (MCE)				Polyethersulfone (PES)
Product Groups	Durapore® membrane filters	MF-Millipore™ membrane filters	Whatman® ME membrane filters	Whatman® WME membrane filters	Millipore® reinforced (RW) membrane filters	Millipore Express® PLUS membrane filters
Lab Applications						
Air sterilization†	X					
Cell cytology		X	X	X		
Chemotaxis						
Clarification of cell lysates and tissue homogenates	X					X
Clarifying acids and bases	X					X
Epifluorescence microscopy						
Fluorescent bacteriological assays		X				
General filtration and clarification of aqueous solutions	X	X	X	X	X	X
Microdialysis of DNA and proteins		X				
Mycoplasma reduction†	X					
Prefiltration					X	
SEM analysis						
Solvent filtration	X					
Sterilizing liquid filtration†	X	X	X	X		X
Tissue culture media filtration	X					X
Venting applications						
Environmental Monitoring Applications						
Alpha particle monitoring						
Air monitoring		X	x	x		
Gravimetric analysis		X				
Industrial particle monitoring	X	X				
Particle collection and analysis		X	x	x		

Membrane Filters (continued)

Composition	Polycarbonate (PC)			Hydrophobic Polytetrafluoroethylene (PTFE)		
Product Groups	Isopore™ membrane filters	Cyclopore ® membrane filters	Nuclepore® membrane filters	Fluoropore™ membrane filters	Mitex™ membrane filters	Whatman® WTP membrane filters
Lab Applications						
Air sterilization†				X		X
Cell cytology	X	X	X			
Chemotaxis	X	X				
Clarification of cell lysates and tissue homogenates						
Clarifying acids and bases				X	X	X
Epifluorescence microscopy	X	X				
Fluorescent bacteriological assays	X	X				
General filtration and clarification of aqueous solutions						
Microdialysis of DNA and proteins						
Mycoplasma reduction†	X	X	X			
Prefiltration						
SEM analysis	X	X				
Solvent filtration				X	X	X
Sterilizing liquid filtration†	X	X	X			
Tissue culture media filtration						
Venting applications				X		
Environmental Monitoring Applications						
Alpha particle monitoring				X		
Air monitoring	X	X	X	X	X	X
Gravimetric analysis	X	X	X			
Industrial particle monitoring				X	X	X
Particle collection and analysis						

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

Membrane Filters (continued)

Composition	Hydrophobic Polytetrafluoro-ethylene (PTFE)	Hydrophilic Polytetrafluoroethylene (PTFE)		Nylon/Polyamide		
Product Groups	Whatman® TE membrane filters	Omnipore™ membrane filters	LCR PTFE membrane filters	Millipore® nylon membrane filters	Whatman® nylon membrane filters	Whatman® polyamide membrane filters
Lab Applications						
Air sterilization†	X					
Cell cytology						
Chemotaxis						
Clarification of cell lysates and tissue homogenates						
Clarifying acids and bases	X	X	X	X	X (bases only)	X
Epifluorescence microscopy						
Fluorescent bacteriological assays						
General filtration and clarification of aqueous solutions				X	X	X
Microdialysis of DNA and proteins						
Mycoplasma reduction†						
Prefiltration				X		
SEM analysis						
Solvent filtration	X	X	X	X	X	X
Sterilizing liquid filtration†						
Tissue culture media filtration					X	X
Venting applications						
Environmental Monitoring Applications						
Alpha particle monitoring	X					
Air monitoring	X					
Gravimetric analysis						
Industrial particle monitoring			X			
Particle collection and analysis						

Membrane Filters (continued)

Composition	Aluminum Oxide	Regenerated Cellulose	Cellulose Acetate	Cellulose Nitrate	Silver	Polyvinyl Chloride (PVC)	Polypropylene (PP)
Product Groups	Anodisc® inorganic membrane filters	Whatman® regenerated cellulose membrane filters	Whatman® cellulose acetate membrane filters	Whatman® cellulose nitrate membrane filters	Millipore® silver membrane filters	Millipore® PVC membrane filters	Millipore® PP membrane and net filters
Lab Applications							
Air sterilization†							
Cell cytology	X						
Chemotaxis							
Clarification of cell lysates and tissue homogenates							
Clarifying acids and bases	X	X					X
Epifluorescence microscopy	X						
Fluorescent bacteriological assays	X						
General filtration and clarification of aqueous solutions	X	X	X	X			
Microdialysis of DNA and proteins							
Mycoplasma reduction†	X			X			
Prefiltration							X
SEM analysis	X				X		
Solvent filtration	X	X					X
Sterilizing liquid filtration†	X		X	X			
Tissue culture media filtration							
Venting applications							
Environmental Monitoring Applications							
Alpha particle monitoring							
Air monitoring				X	X	X	
Gravimetric analysis	X						
Industrial particle monitoring						X	
Particle collection and analysis				X			

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

Glass and Quartz Fiber Filters

	Millipore® glass fiber filters with binder			Whatman® glass fiber filters with binder						
Grade/Filter type	AP15	AP20	AP25	GF6	GF8	GF9	GF10	GF92	HGF61	HGF65
Particle type										
Coarse particles					X	X		X		
Medium particles							X			
Fine particles				X						
Gelatinous precipitates										
Applications										
Air monitoring					X	X	X		X	X
Analytical testing				X	X	X	X	X		
Cell collection										
Environmental monitoring				X	X	X	X		X	X
Food and beverage testing				X				X		
General filtration										
Gravimetric analysis										
Liquid/Solution clarification	X	X	X							
Particle collection				X	X	X	X	X		
Prefiltration	X	X	X		X			X		
Sample preparation				X	X	X	X	X		
Scintillation measurements				X						

Glass and Quartz Fiber Filters (continued)

	Millipore® glass fiber filters						Whatman® glass fiber filters						
Grade/Filter type	APFA	APFB	APFC	APFD	APFF	AP40	31	32	TCLP	GMF150	GF/A	GF/B	GF/C
Particle type													
Coarse particles							X	X		X			
Medium particles										X	X		X
Fine particles	X		X		X				X	X	X	X	X
Gelatinous precipitates													
Applications													
Air monitoring											X		
Analytical testing			X									X	X
Cell collection	X		X								X	X	X
Environmental monitoring					X	X			X		X		X
Food and beverage testing											X	X	X
General filtration							X	X			X	X	
Gravimetric analysis							X				X		X
Liquid/Solution clarification	X	X		X	X					X	X	X	X
Particle collection	X	X	X						X		X	X	X
Prefiltration										X		X	
Sample preparation										X	X	X	X
Scintillation measurements		X											X

Glass and Quartz Fiber Filters (continued)

	Whatman® glass fiber filters				Millipore® quartz fiber filters	Whatman® quartz fiber filters		
Grade/Filter type	GF/D	GF/F	934-AH	EMP2000	AQFA	QM-A	QM-H	QM-B
Particle type								
Coarse particles								
Medium particles	X							
Fine particles		X	X					
Gelatinous precipitates								
Applications								
Air monitoring			X	X	X	X	X	X
Analytical testing		X	X	X	X	X	X	X
Cell collection	X		X					
Environmental monitoring		X	X	X		X	X	X
Food and beverage testing			X					
General filtration	X		X					
Gravimetric analysis			X	X		X	X	X
Liquid/Solution clarification	X	X	X					
Particle collection		X	X					
Prefiltration	X	X						
Sample preparation	X	X	X					
Scintillation measurements			X					

Filter Paper

Whatman® filter paper											
Flat grade	1	2	3	4	5	6	8	40	41	42	43
Prepleated (Folded) grade	1V	2V		4V	5V						
Particle type											
Coarse particles				X					X		
Medium particles	X	X	X					X			X
Fine particles					X	X				X	
Very fine particles											
Gelatinous precipitates				X					X		
Applications											
Air monitoring	X	X		X				X	X		X
Analytical testing							X				
Beverage testing or preparation											
Filtration of acidic/alkaline solutions											
Filtration of viscous liquids											
Food testing or preparation											X
Gas detection	X										
General filtration	X	X	X					X	X		
Gravimetric analysis								X		X	
Particle isolation/collection											
Sample preparation								X			
Soil analysis/monitoring	X	X			X						X
Solution clarification					X						
Water analysis					X	X					
Vacuum filtration											

Filter Paper (continued)

Whatman® filter paper											
Flat grade	44	50	52	54	71	72	91	93	113	114	201
Prepleated (Folded) grade									113V	114V	
Particle type											
Coarse particles				X					X	X	
Medium particles			X				X	X			X
Fine particles	X										X
Very fine particles		X									
Gelatinous precipitates				X					X	X	
Applications											
Air monitoring					X	X					
Analytical testing		X					X				
Beverage testing or preparation											
Filtration of acidic/alkaline solutions											
Filtration of viscous liquids											
Food testing or preparation							X				
Gas detection											
General filtration	X	X	X	X			X	X	X	X	X
Gravimetric analysis											
Particle isolation/collection										X	
Sample preparation											
Soil analysis/monitoring											
Solution clarification											
Water analysis											
Vacuum filtration		X	X	X					X	X	

*Folded filter papers are available for some Whatman filter paper grades. The pre-folded filter paper is offered in the choice of format (pyramid shaped, cone folded and flat quadrant)

Filter Paper (continued)

Whatman® filter paper											
Flat grade					520a	520 bII	540	541	542	589/1	589/2
Prepleated (Folded) grade	202	203	287 ½	512 ½	520 a½	520 b FF					
Particle type											
Coarse particles	X	X						X			
Medium particles							X				
Fine particles									X		X
Very fine particles											
Gelatinous precipitates								X			
Applications											
Air monitoring											
Analytical testing								X	X	X	X
Beverage testing or preparation					X			X			
Filtration of acidic/alkaline solutions							X	X			
Filtration of viscous liquids		X			X						
Food testing or preparation					X			X		X	X
Gas detection											
General filtration	X	X				X					
Gravimetric analysis							X	X	X	X	X
Particle isolation/collection							X				
Sample preparation			X								
Soil analysis/monitoring				X							
Solution clarification			X								
Water analysis											
Vacuum filtration							X	X	X		

Filter Paper (continued)

Whatman® filter paper											
Flat grade	589/3	591			595	597	597 L	598	602 h	602 eh	
Prepleated (Folded) grade			593½	594½	595 ½	597 ½		598 ½	602 h½		604 ½
Particle type											
Coarse particles											X
Medium particles		X						X			
Fine particles					X	X			X	X	
Very fine particles	X										
Gelatinous precipitates											
Applications											
Air monitoring											
Analytical testing	X										
Beverage testing or preparation									X		
Filtration of acidic/alkaline solutions											
Filtration of viscous liquids											
Food testing or preparation	X				X	X	X				
Gas detection											
General filtration		X						X			X
Gravimetric analysis											
Particle isolation/collection										X	
Sample preparation					X				X		
Soil analysis/monitoring											
Solution clarification											
Water analysis											
Vacuum filtration											

Filter Paper (continued)

Whatman® filter paper											
Flat grade	740E		989	1573	1574	1575	2294		2589 a	2589 c	2589 d
Prepleated (Folded) grade		802		1573½	1574½			2555½			
Particle type											
Coarse particles	X	X					X				
Medium particles							X		X		
Fine particles										X	X
Very fine particles											
Gelatinous precipitates		X									
Applications											
Air monitoring											
Analytical testing	X							X			
Beverage testing or preparation								X			
Filtration of acidic/alkaline solutions				X	X	X					
Filtration of viscous liquids											
Food testing or preparation											
Gas detection											
General filtration		X	X				X		X	X	X
Gravimetric analysis											
Particle isolation/collection	X			X							
Sample preparation								X			
Soil analysis/monitoring											
Solution clarification											
Water analysis											
Vacuum filtration											

Filter Paper (continued)

Whatman® filter paper									
Flat grade	3459	48		858		903	905	965	Shark Skin™ Filter
Prepleated (Folded) grade			0790½	0858½	0860½				
Particle type									
Coarse particles							X	X	
Medium particles				X					
Fine particles						X			
Very fine particles									
Gelatinous precipitates									
Applications									
Air monitoring									
Analytical testing			X						
Beverage testing or preparation				X					
Filtration of acidic/alkaline solutions									X
Filtration of viscous liquids									
Food testing or preparation	X	X		X					X
Gas detection									
General filtration				X		X	X	X	
Gravimetric analysis									
Particle isolation/collection									
Sample preparation									
Soil analysis/monitoring			X						
Solution clarification	X								
Water analysis									
Vacuum filtration									

1.4 Filter Product Tables

The product tables below have grouped our comprehensive filtration offering by material, providing more specific application recommendations, specific product characteristics, and dimensions. While these charts provide recommendations, filter compatibility with the sample and filtration method should be verified prior to use.

Cellulose

Millipore® Filtration Products

MF-Millipore™ Membrane Filters

Produced from biologically inert cellulose acetate and cellulose nitrate, MF-Millipore™ mixed cellulose ester membranes are a versatile choice for biological, analytical, environmental monitoring, and research applications. With a consistent thickness, uniform pore structure, and smoother surface than pure nitrocellulose membranes, hydrophilic MF-Millipore™ membranes are available in a variety of pore sizes, colors, surfaces, and diameters. MF-Millipore™ membranes without Triton® surfactant contain minimum amounts of wetting agent and have a lower water extractable content than standard MF-Millipore™ filters.

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Microdialysis of DNA and proteins	0.025 µm	White	Plain	13 mm	100	VSWP01300
				25 mm	100	VSWP02500
				47 mm	100	VSWP04700
				90 mm	25	VSWP09025
				142 mm	50	VSWP14250
	0.05 µm	White	Plain	13 mm	100	VMWP01300
				25 mm	100	VMWP02500
				47 mm	100	VMWP04700
				90 mm	25	VMWP09025
	0.1 µm	White	Plain	13 mm	100	VCWP01300
				25 mm	100	VCWP02500
				47 mm	100	VCWP04700
				90 mm	25	VCWP09025
				142 mm	50	VCWP14250
• Sterilizing filtration • Bioassays	0.22 µm	White	Plain	13 mm	100	GSWP01300
				25 mm	100	GSWP02500
				37 mm	100	GSWP03700[1]
				47 mm	100	GSWP04700
				90 mm	100	GSWP09000
				142 mm	50	GSWP14250
• Biological solutions • Cell contact • Very small volumes requiring surfactant-free surfaces	0.22 µm	White	Plain, Triton®-free	13 mm	100	GSTF01300
				25 mm	100	GSTF02500
				47 mm	100	GSTF04700
				90 mm	100	GSTF09000
				142 mm	50	GSTF14250
• Bioassays • Air monitoring • Particle monitoring • Particle removal	0.3 µm	White	Plain	25 mm	100	PHWP02500
				47 mm	100	PHWP04700
				90 mm	25	PHWP09025
				142 mm	50	PHWP14250
• Clarification of aqueous solutions • Particle removal • Particle analysis • Microbiology analysis	0.45 µm	White	Plain	13 mm	100	HAWP01300
				24 mm	100	HAWP02400
				25 mm	100	HAWP02500
				37 mm	100	HAWP03700[1]
				47 mm	50	HAWP0470M[2]
				47 mm	100	HAWP04700
				50 mm	100	HAWP05000
				90 mm	100	HAWP09000
				142 mm	50	HAWP14250
			Gridded	13 mm	100	HAWG01300
				25 mm	100	HAWG02500
				37 mm	100	HAWG03700[1]
				47 mm	100	HAWG04700
				47 mm	500	HAWG04705

[1]Monitor refills with thin absorbent pads for aerosol monitoring

[2]Matched weight filter pairs

MF-Millipore™ Membrane Filters (continued)

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Biological solutions • Cell contact • Very small volumes requiring surfactant-free surfaces	0.45 µm	White	Plain, Triton®-free	13 mm	100	HATF01300
				25 mm	100	HATF02500
				47 mm	100	HATF04700
				82 mm	50	HATF08250[6]
				85 mm	50	HATF08550[6]
				90 mm	25	HATF09025
				100 mm	50	HATF10050[6]
				142 mm	50	HATF14250
• Fluorescent bacteriological assays • Particle monitoring • Bioassays • Particle monitoring	0.45 µm	Black	Plain	25 mm	100	HABP02500
				47 mm	100	HABP04700
			Gridded	13 mm	100	HABG01300
				25 mm	100	HABG02500
				47 mm	100	HABG04700
• Particle removal • Dairy microbiology • Retention of yeasts, molds, and algae	0.65 µm	White	Plain	13 mm	100	DAWP01300
				25 mm	100	DAWP02500
				47 mm	100	DAWP04700
				90 mm	25	DAWP09025
				142 mm	50	DAWP14250
• Air monitoring • Particle monitoring • Particle removal • Bioassays	0.8 µm	White	Plain	13 mm	100	AAWP01300
				25 mm	100	AAWP02500
				37 mm	50	AAWP037PM[4]
				37 mm	100	AAWP03700[1]
				37 mm	100	AAWP037P0[3]
				47 mm	50	AAWP0470M[2]
				47 mm	100	AAWP04700
				90 mm	50	AAWP09050
				90 mm	100	AAWP09000
				142 mm	50	AAWP14250
			Gridded	13 mm	100	AAWG01300
				25 mm	100	AAWG0250C[5]
				37 mm	100	AAWG03700[1]
				47 mm	100	AAWG04700
• Fluorescent assays • Particle monitoring • Air monitoring	0.8 µm	Black	Plain	25 mm	100	AABP02500
				47 mm	100	AABP04700
			Gridded	13 mm	100	AABG01300
				25 mm	100	AABG02500
				37 mm	100	AABG03700[1]
				47 mm	100	AABG04700
• Clarification of aqueous solutions	1.2 µm	White	Plain	13 mm	100	RAWP01300
				25 mm	100	RAWP02500
				37 mm	100	RAWP03700
				47 mm	100	RAWP04700
				90 mm	25	RAWP09025
				142 mm	50	RAWP14250
			Gridded	25 mm	100	RAWG02500
				25 mm	100	RAWG0250C[5]
				47 mm	100	RAWG04700
• QC of fluid holding tanks • Fluid monitoring • Air monitoring • Particle collection • Particle analysis	3.0 µm	White	Plain	13 mm	100	SSWP01300
				25 mm	100	SSWP02500
				47 mm	100	SSWP04700
				90 mm	25	SSWP09025
				142 mm	50	SSWP14250
• QC of fluid holding tanks • Fluid monitoring • Particle collection • Particle analysis	5.0 µm	White	Plain	13 mm	100	SMWP01300
				19 x 42 mm	100	SMWP0190R
				25 mm	100	SMWP02500
				37 mm	100	SMWP03700[1]
				47 mm	100	SMWP04700
				90 mm	25	SMWP09025
				142 mm	50	SMWP14250
• QC of fluid holding tanks • Fluid monitoring • Air monitoring • Particle collection • Particle analysis	8.0 µm	White	Plain	13 mm	100	SCWP01300
				19 x 42 mm	100	SCWP0190R
				25 mm	100	SCWP02500
				47 mm	100	SCWP04700
				90 mm	25	SCWP09025
				142 mm	50	SCWP14250

[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]Matched-weight monitor refills with thick absorbent pads for liquid monitoring

[5]Minimal fiber contamination. For asbestos monitoring applications

[6]Immobilon®-NC Transfer Membrane for Western blotting

Millipore® Filtration Products

Reinforced Cellulose

Reinforced cellulose membranes (or RW filters) are rigid screen filters featuring a mixed cellulose ester membrane reinforced by a polyester web. Their rigidity, high-capacity, and low pressure drop make RW filters ideal for the removal of contaminants from heavily contaminated liquids and gasses, particularly for prefiltration. While traditional prefilter materials contain asbestos or fiberglass, reinforced cellulose membranes are produced from non-shedding materials, making them ideal for prefiltration prior to the use of sterilizing-grade (≤0.2 µm) filters.

Applications	Retention Rating (µm)	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Prefiltration before 0.22 µm membrane filtration	0.2	White	Plain	47 mm	100	RW0304700
				90 mm	100	RW0309000
• Prefiltration before 0.45 µm membrane filtration	0.5	White	Plain	47 mm	100	RW0604700
				90 mm	100	RW0609000
				142 mm	50	RW0614250
• Prefiltration before 1.2 µm membrane filtration	1.2	White	Plain	47 mm	100	RW1904700
				142 mm	50	RW1914250

Support Pads for Fluid and Air Sampling

Cellulose support pads are used to reinforce filters in monitors for contamination analysis, specifically during high pressure or fast flow conditions. When saturated with growth medium, they can also be used for microorganism culture. Woven mesh spacers are placed between filters during serial filtration to prevent the downstream screen filter from "blinding" the upstream filter pores, increasing flow rate and throughput.

Applications	Product Description	Filter Diameter	Pack Size	Catalog Number
• Air monitoring	Absorbent pad, cellulose	13 mm	100	AP1001300
• Environmental monitoring		25 mm	100	AP1002500
• Aerosol contamination monitoring		37 mm	100	AP1003700
• Protecting membrane filters during high pressure or fast flow conditions		47 mm	100	AP1004700
	Thick absorbent pad, cellulose	34 mm	100	AP30034P0
• Combining multiple filtration steps • Preventing upstream and downstream filters from blinding	Dacron® woven mesh spacer	124 mm	50	AP3212450

Whatman® Filtration Products

ME and WME Membrane Filters

Composed of cellulose acetate and cellulose nitrate, ME and WME membrane filters are biologically inert, thermally stable, and have a high loading capacity, making them an ideal choice for a variety of filtration applications. With a uniform microporous structure and a smooth, uniform surface, ME and WME membrane filters offer higher flow rates than pure nitrocellulose filters. For applications requiring manual particulate or colony counting, the gridded surface and color contrast facilitates particle detection and minimizes eye fatigue. ME membrane filters have a lower cellulose acetate content in comparison to WME membrane filters.

ME Membrane Filters

Applications	Pore Size	Color	Surface	Format	Filter Diameter	Pack Size	Catalog Number
• Clarification of aqueous solutions • Microbial analysis	0.2 µm	White	Plain	Nonsterile	25 mm	100	WHA10401706
					47 mm	100	WHA10401712
					50 mm	100	WHA10401714
					100 mm	50	WHA10401721
					110 mm	50	WHA10401726
					142 mm	25	WHA10401731
• Clarification or sterilization of aqueous solutions†	0.2 µm	White	Gridded	Sterile	47 mm	100	WHA10401770
				Sterile, Single Packed		100	WHA10406970
• Microbial analysis				Sterile, for Whatman Membrane-Butler		400	WHA10408712
• Particle counting				Sterile	50 mm	100	WHA10401772
• Bacteriological studies				Sterile, Single Packed		100	WHA10406972
				Sterile, for Whatman Membrane-Butler		400	WHA10408714
• Clarification of aqueous solutions • HPLC sample filtration (aqueous)	0.45 µm	White	Plain	Nonsterile	142 mm	25	WHA10401631
• Manual particle counting • Bacteriological studies	0.45 µm	White	Gridded	Nonsterile	47 mm	100	WHA10406812
					50 mm	100	WHA10406814
						100	WHA10409714
• Manual particle counting • Bacteriological studies	0.45 µm	Green	Gridded	Nonsterile	50 mm	100	WHA10409414

ME Membrane Filters (continued)

Applications	Pore Size	Color	Surface	Format	Filter Diameter	Pack Size	Catalog Number
• Clarification of aqueous solutions • HPLC sample filtration (aqueous) • Yeasts and mold	0.45 µm	White	Plain	Sterile	47 mm	100	WHA10401670
					50 mm	100	WHA10401672
• Manual particle counting • Bacteriological studies • Yeasts and mold	0.45 µm	White	Gridded	Sterile	47 mm	100	WHA10406512
						100	WHA10409770
						100	WHA10409771
					50 mm	100	WHA10406572
						100	WHA10409772
• Manual particle counting • Bacteriological studies • Yeasts and mold	0.45 µm	White	Gridded	Sterile, Single packed	47 mm	100	WHA10406870
						1000	WHA10406871
						100	WHA10406800
						100	WHA10407970
					50 mm	100	WHA10406872
						100	WHA10406801
• Manual particle counting • Bacteriological studies • Yeasts and mold	0.45 µm	Green	Gridded	Sterile, Single packed	47 mm	100	WHA10409470
					50 mm	100	WHA10409472
• Manual particle counting • Bacteriological studies • Yeasts and mold	0.45 µm	White	Gridded	Sterile, for Whatman Membrane-Butler	47 mm	400	WHA10407312
						400	WHA10406803
						400	WHA10407332
						400	WHA10407370
					50 mm	400	WHA10406802
						400	WHA10407314
						400	WHA10407324
						400	WHA10407334
						400	WHA10407372
• Particulate analysis and removal • Air monitoring	0.6 µm	White	Plain	Nonsterile	25 mm	100	WHA10401506
					47 mm	100	WHA10401512
					50 mm	100	WHA10401514
			Gridded		50 mm	100	WHA10409814
		Black	Gridded	Sterile, Single packed	47 mm	100	WHA10409870
					50 mm	100	WHA10409872
				Sterile, for Whatman Membrane-Butler	50 mm	400	WHA10409834
• Particulate analysis and removal • Air monitoring • Aqueous solution clarification	0.8 µm	White	Plain	Nonsterile	25 mm	100	WHA10400906
					37 mm	100	WHA10400909
					47 mm	100	WHA10400912
					50 mm	100	WHA10400914
					100 mm	50	WHA10400921
• Particulate analysis and removal • Air monitoring	0.8 µm	White	Gridded	Sterile, Single packed	47 mm	100	WHA10408970
				Sterile, for Whatman Membrane-Butler	50 mm	400	WHA10408915
		Black	Gridded	Sterile, Single packed	47 mm	100	WHA10409970
• Particulate analysis and removal • Aqueous solution clarification	1.2 µm	White	Plain	Nonsterile	25 mm	100	WHA10400806
					47 mm	100	WHA10400812
					50 mm	100	WHA10400814
					100 mm	50	WHA10400821
• Particulate analysis and removal	1.2 µm	White	Gridded	Sterile, Single packed	50 mm	100	WHA10408472
• Particulate analysis and removal • Aqueous solution clarification	3.0 µm	White	Plain	Nonsterile	25 mm	100	WHA10400706
					47 mm	100	WHA10400712
					50 mm	100	WHA10400714
				Sterile	50 mm	100	WHA10400772

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

WME Membrane Filters

Applications	Pore Size	Color	Surface	Format	Filter Diameter	Pack Size	Catalog Number
• Clarification or sterilization of aqueous solutions† • Microbial analysis • Particle counting • Bacteriological studies	0.2 µm	White	Gridded	Sterile	47 mm	100	WHA7187114
• Clarification of aqueous solutions • HPLC sample filtration (aqueous)	0.45 µm	White	Plain	Nonsterile	47 mm	100	WHA7140104
• Manual particle counting • Bacteriological studies • Yeasts and mold	0.45 µm	White	Gridded	Nonsterile	47 mm	100	WHA7141004
				Sterile, autoclave pack	47 mm	100	WHA7141204
				Sterile	47 mm	100	WHA7141104
						100	WHA7141114
						200	WHA7141124
						1000	WHA7141154
• Manual particle counting • Bacteriological studies • Yeasts and mold	0.45 µm	Black	Gridded	Nonsterile	47 mm	100	WHA7153104
• Particulate analysis and removal • Air monitoring	0.8 µm	White	Gridded	Nonsterile	25 mm	100	WHA7148002

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

Whatman® Filtration Products

Regenerated Cellulose Membrane Filters

Regenerated cellulose membrane filters are produced from pure cellulose, without the addition of wetting agents. These hydrophilic filters spontaneously wet in water and feature strong chemical resistance, allowing them to filter both aqueous and organic solutions. Regenerated cellulose membrane filters can be sterilized and have low protein binding and extractables, enabling their use with biological samples as well.

Applications	Pore Size	Filter Diameter	Pack Size	Catalog Number
• Microbiological or biotechnological applications • Application of membranes for diagnostic, medical, biological, pharmaceutical, consumer product and food and beverage purposes	0.2 µm	47 mm	100	WHA10410312
		50 mm	100	WHA10410314
		100 mm	25	WHA10410319
		300 x 600 mm	5	WHA10410380
	0.45 µm	25 mm	100	WHA10410206
		47 mm	100	WHA10410212
		50 mm	100	WHA10410214
		100 mm	25	WHA10410219
		110 mm	25	WHA10410224
		142 mm	25	WHA10410229
	1.0 µm	47 mm	100	WHA10410012
		50 mm	100	WHA10410014

Cellulose Acetate Membrane Filters

Made from pure cellulose acetate, cellulose acetate membrane filters are ideal for biological and clinical analysis, sterility tests, and scintillation measurements. With improved solvent and heat resistance (up to 180 ºC), these hydrophilic membranes are suitable for the filtration of either aqueous and alcoholic media. Cellulose acetate membrane filters exhibit very low protein binding capacity.

Applications	Pore Size	Filter Diameter	Pack Size	Catalog Number
• Biological and clinical analysis • Sterility tests† • Scintillation measurements	0.2 µm	25 mm	100	WHA10404106
		47 mm	100	WHA10404112
			100	WHA10404170
			100	WHA70010004
		50 mm	100	WHA10404114
		110 mm	50	WHA10404126
		142 mm	25	WHA10404131
		293 mm	25	WHA10404139
		300 x 600 mm	5	WHA10404180
	0.45 µm	13 mm	100	WHA10404001
		25 mm	100	WHA10404006
			100	WHA70000002
		47 mm	100	WHA10404012
			100	WHA70000004
		50 mm	100	WHA10404014
		85 mm	50	WHA10404044
		110 mm	50	WHA10404026
		142 mm	25	WHA10404031
	0.8 µm	47 mm	100	WHA10403112
	1.2 µm	47 mm	100	WHA10403012

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

Cellulose Nitrate Membrane Filters

Recommended for general filtration applications, cellulose nitrate membrane filters feature low extractable levels and a narrow pore size distribution. While nitrocellulose is often considered to be brittle and thermally instable, these filters offer increased strength and flexibility, as well as thermal stability up to 121 °C, allowing them to be autoclaved without shrinkage or integrity loss. Cellulose nitrate membrane filters feature high protein binding, which may result in sample loss when filtering biological samples.

Applications	Pore Size	Filter Diameter	Color	Surface	Pack Size	Catalog Number
• Microfiltration • Ultracleaning • Mycoplasma removal†	0.1 µm	25 mm	White	Plain	100	WHA7181002
					100	WHA7181002
		47 mm	White	Plain	100	WHA10402012
					100	WHA7181004
					100	WHA7181004
		50 mm	White	Plain	100	WHA10402014
• Sterile filtration† • Total bacterial count	0.2 µm	13 mm	White	Plain	100	WHA7182001
		25 mm	White	Plain	100	WHA7182002
		47 mm	White	Plain	100	WHA7182004
					100	WHA10401312
		50 mm	White	Plain	100	WHA10401314
		90 mm	White	Plain	100	WHA7182009
		142 mm	White	Plain	25	WHA7182014
• Bulk bacteria removal† • Bacterial colony counting • Sediment analysis • *E. coli* and coliforms	0.45 µm	13 mm	White	Plain	100	WHA7184001
		25 mm	White	Plain	100	WHA7184002
					100	WHA10401106
		47 mm	White	Plain	100	WHA10401112
					100	WHA10401170
					100	WHA7184004
				Sterile, with grid	100	WHA10407713
					400	WHA10407112
					400	WHA10407132
					400	WHA10407170
		50 mm	White	Plain	100	WHA10401114
					100	WHA7184005
				Sterile, with grid	100	WHA10407714
					400	WHA10407114
					100	WHA10407734
					400	WHA10407134
					400	WHA10407172
		90 mm	White	Plain	50	WHA10401118
					25	WHA7184009
		100 mm	White	Plain	50	WHA10401121
		110 mm	White	Plain	50	WHA10401126
		142 mm	White	Plain	25	WHA10401131
					25	WHA7184014
• Analytical precipitates	0.65 µm	47 mm	White	Plain	100	WHA7186004
• Asbestos monitoring (NIOSH)	0.80 µm	25 mm	White	Plain	100	WHA7188002
		37 mm	White	Plain	100	WHA7188003
		47 mm	White	Plain	100	WHA7188004
		90 mm	White	Plain	25	WHA7188009
• Clarifying filtration	1.0 µm	25 mm	White	Plain	100	WHA7190002
		47 mm	White	Plain	100	WHA7190004
	1.2 µm	25 mm	White	Plain	100	WHA7191005
		47 mm	White	Plain	100	WHA7191014
	3.0 µm	25 mm	White	Plain	100	WHA7193002
		47 mm	White	Plain	100	WHA7193004
• Particle removal • Suspended particles	5.0 µm	25 mm	White	Plain	100	WHA7195002
		47 mm	White	Plain	100	WHA7195004
		90 mm	White	Plain	100	WHA7195009
• Sample preparation • Microbiological studies • Filtration of aqueous solutions	8.0 µm	50 mm	White	Plain, with hydrophobic rim	100	WHA10405079

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

Polyvinylidene Fluoride (PVDF)

Millipore® Filtration Products

Durapore® Membrane Filters

Due to their solvent and heat resistance, Durapore® polyvinylidene fluoride (PVDF) membranes are utilized in a variety of biomedical research applications. Available in both hydrophilic and hydrophobic formats, Durapore® membrane filters provide high flow rates and throughput, low extractables, and broad chemical compatibility. Hydrophilic Durapore® membranes exhibit very low protein binding and have been shown to bind less protein than nylon, nitrocellulose, or PTFE membranes. Conversely, hydrophobic Durapore® membranes exhibit high protein binding, as seen with Immobilon® PVDF membranes for Western blotting.

Hydrophilic Durapore® Membranes

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Mycoplasma reduction in biological solutions†	0.1 µm	White	Plain	13 mm	100	VVLP01300
				25 mm	100	VVLP02500
				47 mm	100	VVLP04700
				63.5 mm	25	VVLP06225
				76 mm	25	VVLP07625
				90 mm	50	VVLP09050
				142 mm	50	VVLP14250
• Sterilizing filtration of biological solutions†	0.22 µm	White	Plain	1 x 10 ft roll	1	GVWP00010
				13 mm	100	GVWP01300
				25 mm	100	GVWP02500
				47 mm	100	GVWP04700
				63.5 mm	25	GVWP06225
				76 mm	25	GVWP07625
				90 mm	50	GVWP09050
				100 mm	50	GVWP10050
				142 mm	50	GVWP14250
• Clarifying filtration of biological solutions	0.45 µm	White	Plain	1 x 10 ft roll	1	HVLP00010
				13 mm	100	HVLP01300
				25 mm	100	HVLP02500
				47 mm	100	HVLP04700
				63.5 mm	25	HVLP06225
				76 mm	25	HVLP07625
				90 mm	50	HVLP09050
				142 mm	50	HVLP14250
			Gridded	47 mm	100	HVWG04700
• Clarifying filtration of biological solutions	0.65 µm	White	Plain	1 x 10 ft roll	1	DVPP00010
				13 mm	100	DVPP01300
				25 mm	100	DVPP02500
				47 mm	100	DVPP04700
				82 mm	50	DVPP08250
				90 mm	50	DVPP09050
				142 mm	50	DVPP14250
• Clarifying filtration of biological solutions • Particle monitoring	5.0 µm	White	Plain	13 mm	100	SVLP01300
				25 mm	100	SVLP02500
				47 mm	100	SVLP04700
				75 mm	50	SLVP07550
				90 mm	50	SVLP09050
			Gridded	47 mm	100	SVWG04700

Hydrophobic Durapore® Membranes

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Air sterilization† • Gas sterilization†	0.1 µm	White	Plain	47 mm	100	VVHP04700
• Air sterilization† • Gas sterilization† • Solvent filtration	0.22 µm	White	Plain	1 x 10 ft roll	1	GVHP00010
				13 mm	100	GVHP01300
				25 mm	100	GVHP02500
				47 mm	100	GVHP04700
				90 mm	50	GVHP09050
				142 mm	50	GVHP14250
• Air clarification • Gas and solvent filtration	0.45 µm	White	Plain	13 mm	100	HVHP01300
				25 mm	100	HVHP02500
				47 mm	100	HVHP04700
				90 mm	50	HVHP09050
				142 mm	50	HVHP14250

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

Polyethersulfone (PES)

Millipore® Filtration Products

Millipore Express® PLUS Membrane Filters

Known for their thermal stability, durability and resistance to acidic and alkaline solutions, Millipore Express® PLUS hydrophilic polyethersulfone (PES) membranes are commonly used as an alternative to cellulose membranes. Millipore Express® PLUS membranes offer fast flow, high filter capacity and low protein binding, while remaining bacterially retentive. The unique asymmetric structure of Millipore Express® PLUS membranes extends filtration capacity and lifetime, allowing them to tolerate higher particle loads and protein concentrations.

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Sterile filtration†	0.22 µm	White	Plain	13 mm	100	GPWP01300
• Buffer filtration				25 mm	100	GPWP02500
• Tissue culture media filtration				47 mm	100	GPWP04700
				90 mm	50	GPWP09050
				142 mm	50	GPWP14250
• Buffer filtration	0.45 µm	White	Plain	13 mm	100	HPWP01300
• Tissue culture media filtration				25 mm	100	HPWP02500
				47 mm	100	HPWP04700
				90 mm	50	HPWP09050
				142 mm	50	HPWP14250

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

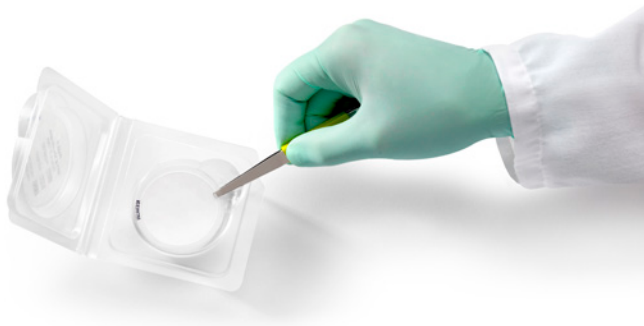
Polytetrafluoroethylene (PTFE)

Polytetrafluoroethylene (or PTFE) is a chemical-resistant, flexible, thermally resistant, non-adherent, high-strength fluoropolymer produced from the free-radical polymerization of tetrafluoroethylene. Due to its strength and broad chemical compatibility, PTFE is commonly used in membrane filters. Hydrophilic PTFE membranes are typically used in filtering aqueous solutions, while hydrophobic PTFE membranes are typically used for filtering organic solvents and gases, as well as particle monitoring. While PTFE is known for its high strength, the addition of a high-density polyethylene (HDPE) backing offers improved filter handling characteristics.

Millipore® Filtration Products

PTFE Membrane Filters

- Hydrophobic: Fluoropore™ membranes and Mitex™ membranes
- Hydrophilic: Omnipore™ membranes and LCR membranes
- With or without backing
- Solvent-compatible
- LCR membranes have low extractables for analytical applications



Fluoropore™ membrane filters (hydrophobic)

Applications	Pore Size	Color	Backing	Surface	Filter Diameter	Pack Size	Catalog Number
• Clarifying acids, bases, and solvents	0.22 µm	White	HDPE	Plain	13 mm	100	FGLP01300
• Filtering or venting gases					25 mm	100	FGLP02500
• UV spectroscopy					47 mm	100	FGLP04700
• Particle monitoring					90 mm	50	FGLP09050
					142 mm	50	FGLP14250
	0.45 µm	White	HDPE	Plain	13 mm	100	FHLP01300
					25 mm	100	FHLP02500
					37 mm	100	FHLP03700
					47 mm	100	FHLP04700
					90 mm	50	FHLP09050
					142 mm	50	FHLP14250
			None	Plain	47 mm	100	FHUP04700
	1.0 µm	White	HDPE	Plain	13 mm	100	FALP01300
					25 mm	100	FALP02500
					47 mm	100	FALP04700
					90 mm	50	FALP09050
					142 mm	50	FALP14250
	3.0 µm	White	HDPE	Plain	25 mm	100	FSLW02500
					47 mm	100	FSLW04700
					90 mm	25	FSLW09025
					142 mm	10	FSLW14200
	5.0 µm	White	PP, gridded	Plain	47 mm	100	FMLW04700
• Air monitoring	1.0 µm	White	HDPE	Plain, with pads	37 mm	100	FALP03700
	3.0 µm	White	HDPE	Plain, with pads	37 mm	100	FSLW03700

PTFE for PM2.5 particle monitoring

Applications	Pore Size	Color	Backing	Surface	Filter Diameter	Pack Size	Catalog Number
• PM 2.5 particle monitoring	2 .0 µm	White	None	Plain, with polypropylene ring, sequential serial numbering	47 mm	50	PM2547050

Mitex™ membrane filters (hydrophobic)

Applications	Pore Size	Color	Backing	Surface	Filter Diameter	Pack Size	Catalog Number
• Clarifying acids, bases and cryogenic fluids • Clarifying propellants • Isolating RNA • Air monitoring	5.0 µm	White	None	Plain	13 mm	100	LSWP01300
					25 mm	100	LSWP02500
					37 mm	100	LSWP03700[1]
					47 mm	100	LSWP04700
					90 mm	25	LSWP09025
					142 mm	50	LSWP14250
	10.0 µm	White	None	Plain	13 mm	100	LCWP01300
					25 mm	100	LCWP02500
					47 mm	100	LCWP04700
					90 mm	25	LCWP09025
					142 mm	50	LCWP14250
• Analyzing hydraulic fluids	5.0 µm	White	None	Gridded	25 mm	100	LSWG02500
					47 mm	100	LSWG04700
	10.0 µm	White	None	Gridded	25 mm	100	LCWG02500
					47 mm	100	LCWG04700

[1]Monitor refills with thin absorbent pads for aerosol monitoring

Omnipore™ membrane filters (hydrophilic)

Applications	Pore Size	Color	Backing	Surface	Filter Diameter	Pack Size	Catalog Number
• Filtration of aqueous solutions • Clarifying acidic and alkaline solutions	0.1 µm	White	None	Plain	13 mm	100	JVWP01300
					25 mm	100	JVWP02500
					47 mm	100	JVWP04700
					90 mm	25	JVWP09025
					142 mm	25	JVWP14225
	0.2 µm	White	None	Plain	13 mm	100	JGWP01300
					25 mm	100	JGWP02500
					47 mm	100	JGWP04700
					90 mm	25	JGWP09025
					142 mm	25	JGWP14225
	0.45 µm	White	None	Plain	13 mm	100	JHWP01300
					25 mm	100	JHWP02500
					47 mm	100	JHWP04700
					90 mm	25	JHWP09025
					142 mm	25	JHWP14225
	1.0 µm	White	None	Plain	13 mm	100	JAWP01300
					25 mm	100	JAWP02500
					47 mm	100	JAWP04700
					90 mm	25	JAWP09025
					142 mm	25	JAWP14225
	5.0 µm	White	None	Plain	13 mm	100	JMWP01300
					25 mm	100	JMWP02500
					47 mm	100	JMWP04700
					90 mm	25	JMWP09025
					142 mm	25	JMWP14225
	10.0 µm	White	None	Plain	13 mm	100	JCWP01300
					25 mm	100	JCWP02500
					47 mm	100	JCWP04700
					90 mm	25	JCWP09025
					142 mm	25	JCWP14225

LCR membrane filters (hydrophilic)

Applications	Pore Size	Color	Backing	Surface	Filter Diameter	Pack Size	Catalog Number
• HPLC mobile phase filtration • Clarifying acids, bases, and dilute protein solutions • Isolating RNA	0.45 µm	White	None	Plain	13 mm	100	FHLC01300
					25 mm	100	FHLC02500
					47 mm	100	FHLC04700

WTP and TE membrane filters

- WTP membrane filters use a polypropylene grid as a support
- TE membrane filters use a randomly arranged polypropylene support material
- Solvent-compatible and hydrophobic

WTP membrane filters

Applications	Pore Size	Filter Diameter	Pack Size	Catalog Number
• Clarification of corrosives, solvents, and aggressive fluids	0.2 µm	25 mm	100	WHA7582002
• Air and gas sterilization		47 mm	100	WHA7582004
• Sterile venting of vacuum manifolds, fermentation vessels, and sterile filtrate tanks				
• Clarification of corrosives, solvents, and aggressive fluids	0.5 µm	47 mm	100	WHA7585004
• Filtration prior to HPLC analysis				
• Removal of aqueous aerosols from air and gases				
• Clarification of corrosives, solvents, and aggressive fluids	1.0 µm	25 mm	100	WHA7590002
		47 mm	100	WHA7590004

TE membrane filters

Applications	Pore Size	Filter Diameter	Pack Size	Catalog Number
• Clarification of corrosives, solvents, and aggressive fluids	0.2 µm	25 mm	50	WHA10411405
• Air and gas sterilization		47 mm	50	WHA10411411
• Sterile venting of vacuum manifolds, fermentation vessels, and sterile filtrate tanks		50 mm	50	WHA10411413
• Clarification of corrosives, solvents, and aggressive fluids	0.45 µm	25 mm	50	WHA10411305
• Filtration prior to HPLC analysis		47 mm	50	WHA10411311
• Removal of aqueous aerosols from air and gases		50 mm	50	WHA10411313
• Clarification of corrosives, solvents, and aggressive fluids	1.0 µm	25 mm	50	WHA10411205
		47 mm	50	WHA10411211
		50 mm	50	WHA10411213
	5.0 µm	37 mm	50	WHA10411108
		47 mm	50	WHA10411111
		50 mm	50	WHA10411113
		90 mm	25	WHA10411116
		150 mm	25	WHA10411130

PM2.5 air monitoring membrane filters

Application	Pore Size	Filter Diameter	Pack Size	Catalog Number
• PM2.5 air monitoring†	2.0 µm	46.2 mm	50	WHA7592104

†Sequentially numbered with chemically resistant polypropylene support ring, low tare mass, and thermally stable design.

Polycarbonate (PC)

Millipore® Filtration Products

Isopore™ Membrane Filters

Produced from a smooth, glass-like polycarbonate film, Isopore™ membrane filters are recommended for all analyses in which the sample is viewed on the surface of the membrane, such as optical or electron microscopy. The unique membrane manufacturing process (track-etching) ensures a precise and consistent pore diameter for accurate sample separation by size.

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Chemotaxis • Bioassays • Cytology • Air monitoring	0.1 µm	White	Plain	13 mm	100	VCTP01300
				25 mm	100	VCTP02500
				47 mm	100	VCTP04700
				142 mm	50	VCTP14250
• Chemotaxis • Bioassays • Cytology • Air monitoring • SEM analysis • Sterility testing	0.22 µm	White	Plain	13 mm	100	GTTP01300
				25 mm	100	GTTP02500
				37 mm	100	GTTP03700
				47 mm	100	GTTP04700
				90 mm	30	GTTP09030
				142 mm	50	GTTP14250
• Epifluorescent microscopy • Particle monitoring • Air monitoring	0.22 µm	Brown	Plain	13 mm	100	GTBP01300
				25 mm	100	GTBP02500
				47 mm	100	GTBP04700
• Absorbable organic halides (AOX) • Particle monitoring • Air monitoring	0.4 µm	White	Plain	13 mm	100	HTTP01300
				25 mm	100	HTTP02500
				37 mm	100	HTTP03700
				47 mm	100	HTTP04700
				90 mm	30	HTTP09030
				142 mm	50	HTTP14250
• Fluorescent microscopy • Particle monitoring • Air monitoring	0.4 µm	Brown	Plain	13 mm	100	HTBP01300
				25 mm	100	HTBP02500
				47 mm	100	HTBP04700
• Reflective light microscopy • SEM analysis • Gravimetric analysis • Air monitoring	0.6 µm	White	Plain	13 mm	100	DTTP01300
				25 mm	100	DTTP02500
				47 mm	100	DTTP04700
• Reflective light microscopy • SEM analysis • Gravimetric analysis • Air monitoring • Asbestos monitoring	0.8 µm	White	Plain	13 mm	100	ATTP01300
				25 mm	100	ATTP02500
				37 mm	100	ATTP03700
				47 mm	100	ATTP04700
				142 mm	50	ATTP14250
• Chemotaxis • Bioassays • Cytology • Air monitoring	1.2 µm	White	Plain	13 mm	100	RTTP01300
				25 mm	100	RTTP02500
				47 mm	100	RTTP04700
				142 mm	50	RTTP14250
	2 µm	White	Plain	25 mm	100	TTTP02500
				47 mm	100	TTTP04700
	3 µm	White	Plain	13 mm	100	TSTP01300
				25 mm	100	TSTP02500
				47 mm	100	TSTP04700
				142 mm	50	TSTP14250
• Parasitology • Chemotaxis • Bioassays • Cytology • Air monitoring	5 µm	White	Plain	13 mm	100	TMTP01300
				25 mm	100	TMTP02500
				47 mm	100	TMTP04700
				90 mm	30	TMTP09030
				142 mm	50	TMTP14250
• Chemotaxis • Bioassays • Cytology • Air monitoring	8 µm	White	Plain	13 mm	100	TETP01300
				25 mm	100	TETP02500
				47 mm	100	TETP04700
	10 µm	White	Plain	13 mm	100	TCTP01300
				25 mm	100	TCTP02500
				47 mm	100	TCTP04700
				142 mm	50	TCTP14250

Cyclopore® Membrane Filters

Produced from the track-etching of pure polycarbonate films, Cyclopore® membrane filters feature a smooth, flat membrane surface and sharp cut-offs to offer reproducible microfiltration. Free of contaminants, Cyclopore® membrane filters have a low tare weight, minimum water adsorption, and very low levels of nonspecific protein binding. Particles are readily retained on the smooth membrane surface, ensuring they are easily visible under a microscope.

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Trace element and particulate analysis • Gravimetric analysis • Water analysis	0.1 µm	White	Plain	25 mm	100	WHA70602501
				47 mm	100	WHA70604701
• Trace element and particulate analysis • Gravimetric analysis	0.2 µm	White	Plain	25 mm	100	WHA10417606
				47 mm	100	WHA10417612
• Water analysis • HPLC sample preparation • Epifluorescence microscopy		Black	Plain	25 mm	100	WHA70632502
				47 mm	100	WHA70634702
• Trace element and particulate analysis • Gravimetric analysis • Water analysis • HPLC sample preparation • Electron microscopy • Direct optical microscopy	0.4 µm	White	Plain	13 mm	100	WHA70601304
				25 mm	100	WHA70602504
				47 mm	100	WHA70604704
• Epifluorescence microscopy	0.4 µm	Black	Plain	25 mm	100	WHA70632504
• Trace element and particulate analysis • General filtration • Gravimetric analysis • Water analysis • Blood filtration and cell analysis	1.0 µm	White	Plain	47 mm	100	WHA70604710
						WHA70914710
• General filtration • Cell culture and chemotaxis applications • Blood filtration and cell analysis	2.0 µm	White	Plain	25 mm	100	WHA70602511
	3.0 µm	White	Plain	47 mm	100	WHA70604712
	5.0 µm	White	Plain	25 mm	100	WHA70602513
						WHA70622513
				47 mm	100	WHA70604713
	8.0 µm	White	Plain	25 mm	100	WHA70602514
				47 mm	100	WHA70604714
• General filtration • Blood filtration and cell analysis	10.0 µm	White	Plain	47 mm	100	WHA10418450
	12.0 µm	White	Plain	25 mm	100	WHA10418552
				47 mm	100	WHA10418550

Nuclepore® Membrane Filters

Manufactured from high-quality polycarbonate treated with polyvinylpyrrolidone (PVP), hydrophilic Nuclepore® membrane filters feature sharply defined pore sizes, high flow rates, and a smooth, flat surface for high particle visibility. With low protein binding and extractables, Nuclepore® membrane filters reduce the risk of sample contamination and provide consistent tare and ash weights. In addition, Nuclepore® membrane filters exhibit high chemical and thermal resistance, allowing their use with a wide range of samples and solutions.

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Trace element and particulate analysis • Gravimetric analysis • Water analysis • General filtration	0.015 µm	White	Plain	13 mm	100	WHA110401
				25 mm	100	WHA110601
				47 mm	100	WHA111101
• Trace element and particulate analysis • Gravimetric analysis • Water analysis	0.03 µm	White	Plain	19 mm	100	WHA800307
				25 mm	100	WHA110602
				8 x 10 in	25	WHA113502
• Trace element and particulate analysis • Gravimetric analysis • Water analysis	0.05 µm	White	Plain	19 mm	100	WHA800308
				25 mm	100	WHA110603
				47 mm	100	WHA111103
				76 mm	100	WHA111503
				90 mm	25	WHA111703
				293 mm	25	WHA112803
• Trace element and particulate analysis • Gravimetric analysis • Water analysis	0.08 µm	White	Plain	25 mm	100	WHA110604
				47 mm	100	WHA111104
				142 mm	25	WHA112104
• Trace element and particulate analysis • Gravimetric analysis • Water analysis	0.1 µm	White	Plain	13 mm	100	WHA110405
				19 mm	100	WHA800309
				25 mm	100	WHA110605
				47 mm	100	WHA111105
				90 mm	25	WHA111705
				142 mm	25	WHA112105
				293 mm	25	WHA112805

Nuclepore® Membrane Filters (continued)

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Trace element and particulate analysis • Gravimetric analysis • Water analysis • HPLC sample preparation	0.2 µm	White	Plain	13 mm	100	WHA10417001
				19 mm	100	WHA10417004
				25 mm	100	WHA10417006
				47 mm	100	WHA10417012
				50 mm	100	WHA10417014
				90 mm	25	WHA10417018
				142 mm	25	WHA10417031
				8 x 10 in	25	WHA113506
• Epifluorescence microscopy	0.2 µm	Black	Plain	25 mm	100	WHA110656
				47 mm	100	WHA111156
• Trace element and particulate analysis • Gravimetric analysis • Water analysis • HPLC sample preparation • Electron microscopy • Direct optical microscopy	0.4 µm	White	Plain	13 mm	100	WHA10417101
				19 mm	100	WHA10417104
				25 mm	100	WHA10417106
				47 mm	100	WHA10417112
				50 mm	100	WHA10417114
				90 mm	25	WHA10417118
• Absorbable organic halides (AOX)	0.4 µm	White	Plain	25 mm	100	WHA110637
				47 mm	100	WHA111137
• Cell analysis • Epifluorescence microscopy	0.4 µm	Black	Plain	25 mm	100	WHA110657
• Trace element and particulate analysis • Gravimetric analysis • Water analysis	0.6 µm	White	Plain	25 mm	100	WHA10417206
				47 mm	100	WHA10417212
• Trace element and particulate analysis • Gravimetric analysis • Water analysis • Cell analysis • Electron microscopy • Direct optical microscopy	0.8 µm	White	Plain	13 mm	100	WHA10417301
				19 mm	100	WHA10417304
				25 mm	100	WHA10417306
				37 mm	100	WHA10417309
				47 mm	100	WHA10417312
					100	WHA111164
• Epifluorescence microscopy	0.8 µm	Black	Plain	25 mm	100	WHA110659
• Trace element and particulate analysis • General filtration • Gravimetric analysis • Water analysis • Blood filtration and cell analysis	1.0 µm	White	Plain	13 mm	100	WHA10418701
				19 mm	100	WHA10418704
				25 mm	100	WHA10418706
				47 mm	100	WHA10418712
				90 mm	25	WHA10418718
				142 mm	25	WHA10418731
				293 mm	25	WHA10418739
• General filtration • Cell culture and chemotaxis applications • Blood filtration and cell analysis	2.0 µm	White	Plain	25 mm	100	WHA10418806
				47 mm	100	WHA10418812
				90 mm	25	WHA10418818
	3.0 µm	White	Plain	13 mm	100	WHA10418301
				25 mm	100	WHA10418306
				47 mm	100	WHA10418312
				90 mm	25	WHA10418318
	5.0 µm	White	Plain	13 mm	100	WHA10417401
				25 mm	100	WHA10417406
				47 mm	100	WHA10417412
				50 mm	100	WHA10417414
				19 x 42 mm	100	WHA113313
		White	PVP-free	13 mm	100	WHA10418101
				25 x 80 mm	100	WHA155845
	8.0 µm	White	Plain	13 mm	100	WHA10417501
				25 mm	100	WHA10417506
				47 mm	100	WHA10417512
		White	PVP-free	13 mm	100	WHA150446
				25 x 80 mm	100	WHA155846
• General filtration • Blood filtration and cell analysis	10.0 µm	White	Plain	13 mm	100	WHA10418401
				25 mm	100	WHA10418406
				47 mm	100	WHA10418412
	12.0 µm	White	Plain	13 mm	100	WHA10418501
				25 mm	100	WHA10418506
				47 mm	100	WHA10418512
				50 mm	100	WHA10418514

Nylon and Polyamide

With their broad compatibility, strength, flexibility, and hydrophilicity, nylon and polyamide filters are routinely used for the filtration of aqueous and organic solutions.

Millipore® Filtration Products

Nylon Membrane and Net Filters

Nylon membrane filters and nylon net filters are made from the same material but utilize two different processing methods. Due to this difference, nylon net filters possess a uniform, large pore structure (similar to a mesh), a pore size ≥5.0 µm, and a reduced thickness in comparison to nylon membrane filters.

Nylon membrane filters

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Sterilizing filtration†	0.20 µm	White	Plain	25 mm	100	GNWP02500
• Bioassays				47 mm	100	GNWP04700
• Solvent filtration						
• Clarification of solutions	0.45 µm	White	Plain	25 mm	100	HNWP02500
• Particle removal				47 mm	100	HNWP04700
• Particle analysis						
• Air monitoring	0.8 µm	White	Plain	25 mm	100	ANWP02500
• Particle removal				47 mm	100	ANWP04700
• Particle analysis						
• Clarification of aqueous and organic solutions	1.2 µm	White	Plain	25 mm	100	RNWP02500
				47 mm	100	RNWP04700
• Collection of algae and cells	5.0 µm	White	Plain	25 mm	100	NY0502500
• Particle analysis				47 mm	100	NY0504700
• Large particulate filtration				90 mm	50	NY0509050
• Toxicology and drug screening on *C. elegans* and zebrafish	10.0 µm	White	Plain	25 mm	100	NY1002500
				47 mm	100	NY1004700
• Background filter for particle imaging systems				90 mm	50	NY1009000
• Prefiltration of solvents	11.0 µm	White	Plain	30 cm x 3 m roll	1	NY1100010
• Paint monitoring				25 mm	100	NY1102500
				47 mm	100	NY1104700
				90 mm	50	NY1109000
	20.0 µm	White	Plain	30 cm x 3 m roll	1	NY2000010
				25 mm	100	NY2002500
				47 mm	100	NY2004700
				90 mm	50	NY2009000
	30.0 µm	White	Plain	25 mm	100	NY3002500
				47 mm	100	NY3004700
				90 mm	50	NY3009000
	41.0 µm	White	Plain	30 cm x 3 m roll	1	NY4100010
				25 mm	100	NY4102500
				47 mm	100	NY4104700
				90 mm	50	NY4109000
	60.0 µm	White	Plain	30 cm x 3 m roll	1	NY6000010
				25 mm	100	NY6002500
				47 mm	100	NY6004700
				90 mm	50	NY6009000
	80.0 µm	White	Plain	25 mm	100	NY8002500
				47 mm	100	NY8004700
				90 mm	50	NY8009000
	100.0 µm	White	Plain	30 cm x 3 m roll	1	NY1H00010
				25 mm	100	NY1H02500
				47 mm	100	NY1H04700
				90 mm	50	NY1H09000
	120.0 µm	White	Plain	25 mm	100	NY2H02500
				47 mm	100	NY2H04700
				90 mm	50	NY2H09000
	140.0 µm	White	Plain	25 mm	100	NY4H02500
				47 mm	100	NY4H04700
				90 mm	50	NY4H09000
	160.0 µm	White	Plain	30 cm x 3 m roll	1	NY6H00010
				25 mm	100	NY6H02500
				47 mm	100	NY6H04700
				90 mm	50	NY6H09000
	180.0 µm	White	Plain	25 mm	100	NY8H02500
				47 mm	100	NY8H04700
				90 mm	50	NY8H09000

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

Whatman® Filtration Products

Nylon Membrane Filters

Nylon membranes are hydrophilic and suitable for filtering aqueous solutions and most organic solvents. With their flexibility, durability, and tear resistance, Whatman® nylon membranes are suitable for use with a wide range of biological preparations and can be autoclaved up to 135 ºC.

Applications	Pore Size	Filter Diameter	Pack Size	Catalog Number
• Sterile filtration†	0.2 µm	13 mm	100	WHA7402001
• Filtration of tissue culture or microbiological media		25 mm	100	WHA7402002
		47 mm	100	WHA7402004
		90 mm	50	WHA7402009
• Filtration of aqueous and organic mobile phases	0.45 µm	13 mm	100	WHA7404001
• Vacuum degassing		25 mm	100	WHA7404002
• Filtration of buffers and solutions		47 mm	100	WHA7404004
		90 mm	50	WHA7404009
	0.8 µm	47 mm	100	WHA7408004

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

Polyamide Membrane Filters

Produced from pure polyamide, Whatman® polyamide membrane filters are an ideal choice for solution clarification or sterilization†. Polyamide membrane filters exhibit high mechanical, wet, and dry strength and their hydrophilicity makes them suitable for the filtration of both aqueous and organic solutions.

Applications	Pore Size	Filter Diameter	Pack Size	Catalog Number
• Sterile filtration†	0.2 µm	25 mm	100	WHA10414006
• Filtration of tissue culture or microbiological media		47 mm	100	WHA10414012
		50 mm	100	WHA10414014
• Filtration of aqueous and organic mobile phase	0.45 µm	25 mm	100	WHA10414106
• Vacuum degassing		47 mm	100	WHA10414112
		50 mm	100	WHA10414114

†This application only applies to specific membrane filters within the product group. Please see specific application details for the product of interest on www.sigmaaldrich.com

Polypropylene (PP)

Millipore® Filtration Products

Polypropylene Prefilters and Net Filters

Millipore® polypropylene membrane and net filters feature both solvent-compatibility and thermal stability. Constructed from pristine polypropylene material, these filters are ideally suited for general solution clarification and prefiltration applications, including bioburden reduction. Millipore® polypropylene membrane and net filters provide high particle retention and dirt holding capacity, as well as a low pressure drop. While these filters are designed for use with organic solvents, they can also be used for the filtration of aqueous solutions, after wetting with an alcohol (e.g., methanol).

Applications	Filter Type	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Clarification of aqueous solutions • Prefiltration upstream of membrane filters with pore sizes of 0.2 – 0.6 µm	Prefilter	0.6 µm	White	Plain	47 mm	100	AN0604700
• Clarification of aqueous solutions • Prefiltration upstream of membrane filters with pore sizes of 0.5 – 2.0 µm		1.2 µm	White	Plain	47 mm	100	AN1204700
• Clarification of aqueous solutions • Prefiltration upstream of membrane filters with pore sizes of 0.8 – 8.0 µm		2.5 µm	White	Plain	47 mm	100	AN2504700
• Collection of cells and precipitates		5 µm	White	Plain	47 mm	100	AN5004700
		10 µm	White	Plain	47 mm	100	AN1H04700
• Clarification of aqueous and organic solutions		30 µm	White	Plain	47 mm	100	AN3H04700
• Collection of cells and protein precipitates	Net filter	25 µm	White	Plain	25 mm	100	PP2502500
					47 mm	100	PP2504700
					142 mm	50	PP2514250
• Large particle removal • Contamination analysis		45 µm	White	Plain	25 mm	100	PP4502500
					47 mm	100	PP4504700
					90 mm	30	PP4509030

Silver

Millipore® Filtration Products

Silver Membrane Filters

Constructed from pure silver, silver membranes are highly resistant to thermal stress and aggressive chemicals, while providing a low background for sensitive X-ray diffraction analysis. Silver membranes are specified in many standardized air monitoring methods from government organizations (e.g., NIOSH, OSHA) for monitoring carbon black, coal tar products, coke oven emissions, and silica.

Applications	Pore Size	Surface	Filter Diameter	Pack Size	Catalog Number
• Air monitoring for asbestos, lead sulfide, crystalline and amorphous silica • Crystalline silica analysis by x-ray diffraction	0.45 µm	Plain	25 mm	50	AG4502550

Polyvinylidene chloride (PVC)

Millipore® Filtration Products

PVC membrane filters

Due to their low weight and low water adsorption, Millipore® polyvinylidene chloride (PVC) membrane filters are preferentially used with gravimetric analysis to quantify silica, carbon black, or quartz air particulates. Millipore® PVC membrane filters are produced from high-quality PVC and have been developed for use with ASTM, NIOSH, and OSHA air monitoring methods.

Applications	Pore Size	Color	Surface	Filter Diameter	Pack Size	Catalog Number
• Air monitoring • Particle analysis • Silica particle analysis	5.0 µm	White	Plain	25 mm	100	PVC502500
				37 mm	100	PVC503700
				47 mm	100	PVC504700

Aluminum Oxide (alumina)

Whatman® Filtration Products

Anodisc® Inorganic Membrane Filters

Composed of high-purity alumina, non-toxic Anodisc® membrane filters are compatible with most solvents and aqueous solutions. The precise, nondeformable, honeycomb pore structure eliminates lateral crossover between pores, ensuring exact filter cut-offs and a narrow pore size distribution. Anodisc™ membrane filters exhibit low protein binding, have minimal autofluorescence, become virtually transparent when wet, and support cellular growth. Anodisc™ membrane filters are available with a bonded polypropylene support ring, to allow for easier handling.

Applications	Pore Size	Filter Diameter	Support Ring	Pack Size	Catalog Number
• HPLC mobile phase filtration and degassing • Ultra cleaning of solvents • Gravimetric analysis • Liposome extrusion • Scanning electron microscopy studies • Bacterial analysis by epifluorescence light microscopy • Micrometer and nanometer filtration • Metal nanorod formation	0.02 µm	13 mm	No	100	WHA68097003
		25 mm	Yes	50	WHA68096002
		47 mm	Yes	50	WHA68095002
			No	50	WHA68095502
	0.1 µm	13 mm	No	100	WHA68097013
		25 mm	Yes	50	WHA68096012
		47 mm	Yes	50	WHA68095012
	0.2 µm	13 mm	No	100	WHA68097023
		25 mm	Yes	50	WHA68096022
		47 mm	Yes	50	WHA68095022
			No	50	WHA68095522

Glass and Quartz Fiber Filters

Glass Fiber Filters

Produced from borosilicate glass fibers, glass fiber filters are typically used to filter large particles or viscous solutions. In addition to a wide variety of flow rates and capacities, we also offer filters both with and without binder resin. While the addition of binder resin improves the wet strength for filtering heavily contaminated solutions, the resin renders the filter unsuitable for gravimetric analysis or hot gas filtration due to mass loss upon heating. Glass fiber filters without a binder resin can be heated up to 500 °C without mass loss.

Millipore® glass filter fibers, with binders

Binder	Applications	Grade/Filter Code	Filter Diameter	Pack Size	Catalog Number
Resin	• Prefiltration for 0.2 to 0.6 µm filters • Qualitative analysis • Clarification of aqueous solutions	AP 15	25 mm	100	AP1502500
			42 mm	100	AP1504200
			47 mm	100	AP1504700
			75 mm	100	AP1507500
			90 mm	100	AP1509000
			124 mm	50	AP1512450
			142 mm	50	AP1514250
	• Prefiltration for 0.8 to 8.0 µm filters • Qualitative analysis • Clarification of aqueous solutions	AP 20	13 mm	100	AP2001300
			25 mm	100	AP2002500
			42 mm	100	AP2004200
			47 mm	100	AP2004700
			55 mm	100	AP2005500
			75 mm	100	AP2007500
			90 mm	100	AP2009000
			124 mm	50	AP2012450
			142 mm	50	AP2014250
	• Prefiltration for 0.9 to 8.0 µm filters • Qualitative analysis • Clarification of aqueous solutions	AP 25	10 mm	100	AP2501000
			13 mm	100	AP2501300
			22 mm	100	AP2502200
			25 mm	100	AP2502500
			42 mm	100	AP2504200
			47 mm	100	AP2504700
			75 mm	100	AP2507500
			90 mm	100	AP2509000
			124 mm	50	AP2512450
			142 mm	50	AP2514250

Whatman® glass fiber filters, with binder

Binder	Applications	Grade/Filter Code	Filter Diameter	Pack Size	Catalog Number
Inorganic	• Very fine particle retention • Water pollution • Removing protein from difficult to filter beers • Determination of chlorophyll and phytoplankton residues • Determination of filterable substances and residue on ignition • Analysis of aggressive media • Scintillation measurements • Elemental iron content in iron oxides	GF 6	25 mm	200	WHA10370018
			47 mm	200	WHA10370019
			50 mm	200	WHA10370002
			55 mm	100	WHA10370003
			70 mm	100	WHA10370004
			90 mm	100	WHA10370005
			100 mm	100	WHA10370020
			110 mm	100	WHA10370006
			125 mm	100	WHA10370007
			150 mm	100	WHA10370008
			185 mm	100	WHA10370010
			200 mm	100	WHA10370011
			240 mm	100	WHA10370012
			610 x 620 mm	100	WHA10370050
	• Filtration of coarse particles • Environmental analysis • Determination of PCB, DDE, DDT, furans and dioxins in the air • Pollution measurements in industrial, urban and populated areas, cement factories, iron and steel industry	GF 8	47 mm	200	WHA10370119
			90 mm	100	WHA10370105
			200 mm	100	WHA10370111
			60 x 90 mm	100	WHA10370172
	• Dust measurements in the workplace • Dust fraction in industrial gases • Effectiveness of dust collecting	GF 9	50 mm	200	WHA10370202
			90 mm	100	WHA10370205
			110 mm	100	WHA10370206
Organic	• Weighing aid for infrared weighing • Roll filter in automatic air filtration units	GF 10	47 mm	200	WHA10370319
			50 mm	200	WHA10370302
			90 mm	100	WHA10370305
			100 mm	100	WHA10370320
			150 mm	100	WHA10370308
			60 mm x 42 m roll	1	WHA10370391

Whatman® glass fiber filters, with binder (continued)

Binder	Applications	Grade/Filter Code	Filter Diameter	Pack Size	Catalog Number
Inorganic and organic	• Membrane prefilter • Determination of crop protection agent residues by GC or HPLC • Cold sludge determination of beer • Soot separation before gas analyzers • Roll filter in automatic air filtration units	GF 92	42 mm	200	WHA10421019
			47 mm	200	WHA10421026
			50 mm	200	WHA10421030
			100 mm	100	WHA10421043
			135 mm	100	WHA10421057
			142 mm	100	WHA10421060

Millipore® glass fiber filters, without binders

Applications	Grade/Filter Code	Filter Diameter	Pack Size	Catalog Number
• Fine particle retention • Monitoring wastewater • Collecting suspended particles in gases • Collection of cells • Filtration of protein or nucleic acid precipitates	APFA	37 mm	100	APFA03700
		47 mm	100	APFA04700
		90 mm	50	APFA09050
• Liquid clarification • Quantification of solids in suspensions of fine particles • Scintillation counting	APFB	25 mm	100	APFB02500
		37 mm	100	APFB03700
		47 mm	100	APFB04700
		150 mm	50	APFB15050
• Removal of fine particles and microorganisms • Determining total suspended solids • Filtering proteins or nucleic acid TCA precipitates • Collecting cells and microorganisms	APFC	25 mm	100	APFC02500
		37 mm	100	APFC03700
		47 mm	100	APFC04700
		90 mm	50	APFC09050
• Clarifying suspensions containing particulates >1.0 µm	APFD	25 mm	100	APFD02500
		47 mm	100	APFD04700
		90 mm	50	APFD09050
• Filtering extremely fine precipitates • Filtration of protein, nucleic acids, or serum precipitates • EPA method 1311 for TCLP analysis	APFF	25 mm	100	APFF02500
		47 mm	100	APFF04700
		90 mm	50	APFF09050
		124 mm	50	APFF12450
		142 mm	50	APFF14250
• Total Suspended Solids 2540D • EPA method 1311 for TCLP analysis • Determining volatile suspended matter in wastewater and industrial effluents	AP40	8 x 10 in	50	AP408X105
		10 mm	100	AP4001000
		24 mm	500	AP4002405
		25 mm	100	AP4002500
		37 mm	500	AP4003705
		47 mm	100	AP4004700
			500	AP4004705
		70 mm	100	AP4007000
		90 mm	100	AP4009000
		142 mm	50	AP4014250

Whatman® glass fiber filters, without binders

Applications	Grade/Filter Code	Filter Diameter	Pack Size	Catalog Number
• General-purpose filters with fine porosity and fast flow rate • Weighing aid during infrared weighing • Automatic sampling	Grade 31	55 mm	100	WHA10372803
• General filtration with a fast flow rate	Grade 32	4 x 12 in	50	WHA10372968
• EPA method 1311 • Leaching potential in a landfill for hazardous contaminants to migrate into groundwater	TCLP	47 mm	100	WHA1810047
		90 mm	50	WHA1810090
		110 mm	100	WHA1810110
		125 mm	50	WHA1810125
		142 mm	50	WHA1810142
		150 mm	100	WHA1810150
• Prefiltration	GMF 150, 1 µm	47 mm	40	WHA1841047
	GMF 150, 2 µm	47 mm	40	WHA1842047
		90 mm	20	WHA1842090

Whatman® glass fiber filters, without binders (continued)

Applications	Grade/Filter Code	Filter Diameter	Pack Size	Catalog Number
• Fine particle retention • General purpose filtration • Water pollution monitoring of effluents • Filtration of water, algae, bacteria cultures • Food stuff analysis • Protein filtration • Radioimmunoassay of weak beta emitters • Gravimetric determination of airborne particles, stack sampling, and absorption methods of air pollution monitoring • Static sample and air sampling applications • Aerosol sampling and particulate monitoring	GF/A	1.3 cm	100	WHA18208013
		2.1 cm	100	WHA1820021
		2.4 cm	100	WHA1820024
		2.5 cm	100	WHA1820025
		3.7 cm	100	WHA1820037
		4.25 cm	100	WHA1820042
		4.7 cm	100	WHA1820047
		5.0 cm	100	WHA1820050
		5.5 cm	100	WHA1820055
		6.0 cm	100	WHA1820060
		6.0 cm, with reinforced rim	50	WHA1820061
		7.0 cm	100	WHA1820070
		8.1 cm	100	WHA18206537
		9.0 cm	100	WHA1820090
		11.0 cm	100	WHA1820110
		12.5 cm	100	WHA1820125
		15 cm	100	WHA1820150
		24 cm	100	WHA1820240
		8 x 10 in	100	WHA1820866
		46 x 57 cm	25	WHA1820915
		32 mm, in holder	100	WHA18208296
		34 mm, in holder	80	WHA1820900086
• Fine particle retention • Liquid clarification • Solids quantification • Prefiltration • Used in LSC techniques requiring high loading capacity	GF/B	2.1 cm	100	WHA1821021
		2.4 cm	100	WHA1821024
		2.5 cm	100	WHA1821025
		3.7 cm	100	WHA1821037
		4.25 cm	100	WHA1821042
		4.7 cm	100	WHA1821047
		5.5 cm	100	WHA1821055
		7.0 cm	100	WHA1821070
		9.0 cm	25	WHA1821090
		11.0 cm	25	WHA1821110
		12.5 cm	25	WHA1821125
		15 cm	25	WHA1821150
		18.5 cm	25	WHA1821185
		2.25 x 12.25 in	100	WHA1821271
		46 x 57 cm	5	WHA1821914
			25	WHA1821915
• Fine particle retention • Collection of suspended solids in potable water, natural and industrial waste • Clarification of aqueous solutions • Cell harvesting • Liquid scintillation counting • Binding assays • Total suspended solids/dissolved solids	GF/C	2.1 cm	100	WHA1822021
		2.4 cm	100	WHA1822024
		2.5 cm	100	WHA1822025
			400	WHA18226580
		3.7 cm	100	WHA1822037
		4.25 cm	100	WHA1822042
		4.7 cm	100	WHA1822047
		5.0 cm	100	WHA1822050
		5.5 cm	100	WHA1822055
		7.0 cm	100	WHA1822070
		9.0 cm	100	WHA1822090
		10.0 cm	100	WHA1822100
		10.0 cm, individually packaged	100	WHA18229916
		11.0 cm	100	WHA1822110
		12.5 cm	100	WHA1822125
		15 cm	100	WHA1822150
		32 cm	100	WHA1822320
		10.2 x 25.4 cm	50	WHA1822849
		8 x 10 in	100	WHA1822866
		46 x 57 cm	25	WHA1822915

Whatman® glass fiber filters, without binders (continued)

Applications	Grade/Filter Code	Filter Diameter	Pack Size	Catalog Number
• Prefiltration filter for membranes	GF/D	1.0 cm	100	WHA1823010
		1.7 cm	100	WHA1823007
		2.1 cm	100	WHA1823021
		2.4 cm	100	WHA1823024
		2.5 cm	100	WHA1823025
		3.5 cm	100	WHA1823035
		4.25 cm	100	WHA1823042
		4.7 cm	100	WHA1823047
		5.5 cm	100	WHA1823055
		7.0 cm	100	WHA1823070
		9.0 cm	25	WHA1823090
		11.0 cm	25	WHA1823110
		12.5 cm	25	WHA1823125
		14.2 cm	25	WHA1823142
		15.0 cm	25	WHA1823150
		25.7 cm	25	WHA1823257
		46 x 57 cm	25	WHA1823915
• Fine particle retention • Toxicity characteristic leaching procedure (EPA TCLP 1311) • DNA binding and purification • Filtration of finely precipitates proteins • Prefiltration • Clarification of biochemical solutions and fluids, and nucleic acids	GF/F	1.5 cm	25	WHA1825015
		2.1 cm	100	WHA1825021
		2.4 cm	100	WHA1825024
		2.5 cm	100	WHA1825025
		3.7 cm	100	WHA1825037
		4.25 cm	100	WHA1825042
		4.7 cm	100	WHA1825047
		5.5 cm	100	WHA1825055
		7.0 cm	100	WHA1825070
		9.0 cm	25	WHA1825090
		11.0 cm	25	WHA1825110
		12.5 cm	25	WHA1825125
		14.2 cm	25	WHA1825142
		15.0 cm	25	WHA1825150
		25.7 cm	25	WHA1825257
		29.3 cm	25	WHA1825293
		46 x 57 cm	25	WHA1825915
• Fine particle retention • Total suspended solids in water • Removal of turbidity • Filtration of bacterial cultures • Water pollution monitoring • Cell harvesting • Liquid scintillation counting • Air pollution monitoring	934-AH	2.1 cm	100	WHA1827021
		2.4 cm	100	WHA1827024
		2.5 cm	100	WHA1827025
		2.8 cm	100	WHA1827028
		3.0 cm	100	WHA1827030
		3.2 cm	100	WHA1827032
		3.5 cm	100	WHA1827035
		3.7 cm	100	WHA1827037
		4.25 cm	100	WHA1827042
		4.25 cm, RTU format	100	WHA9907042[1]
		4.7 cm	100	WHA1827047
		4.7 cm, RTU format	100	WHA9907047[1]
		5.5 cm	100	WHA1827055
		5.5 cm, RTU format	100	WHA9907055[1]
		7.0 cm	100	WHA1827070
		8.26 cm	100	WHA1827082
		8.5 cm	100	WHA1827085
		9.0 cm	100	WHA1827090
		9.0 cm, RTU format	100	WHA9907090[1]
		10.5 cm	100	WHA1827105
		11.0 cm	100	WHA1827110
		12.5 cm	100	WHA1827125
		15.0 cm	100	WHA1827150
		18.5 cm	100	WHA1827185
		24.0 cm	100	WHA1827240
		32.0 cm	100	WHA1827320
		2 x 12 in	100	WHA1827808
		8 x 10 in	100	WHA1827866
		12 x 15 in	100	WHA1827889
		19 x 28 in	100	WHA1827957
• High volume air sampling for atmospheric particles and aerosols • Chemical analysis of trace pollutants	EMP 2000	4.7 cm	100	WHA1882047
		8 x 10 in	100	WHA1882866

[1]Ready-to-use (RTU) format includes a pre-washed, pre-weighed filter packaged in a barcoded aluminum pan, with the filter weight printed clearly on a heat-resistant label

Quartz Fiber Filters

Quartz fiber filters are manufactured from pure quartz fibers, preventing any surface filter reaction with acidic gases. Due to their inertness, quartz fiber filters are well suited for measuring heavy metal concentrations and small particle quantities. Quartz fiber filters also exhibit good weight and form stability.

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Millipore® quartz fiber filters				
• Measuring heavy metal concentrations and small amounts of particles • EPA PM10 monitoring • PM2.5 monitoring	AQFA	8 x 10 in	50	AQFA8X105
		37 mm	100	AQFA03700
		47 mm	100	AQFA04700
		90 mm	50	AQFA09050
		110 mm	50	AQFA11050
Whatman® quartz fiber filters				
• Air sampling in acidic gases, stacks, flues, aerosols • PM2.5/PM10 • Trace element analysis	QM-A	2.5 cm	100	WHA1851025
		3.2 cm	100	WHA1851032
		3.7 cm	100	WHA1851037
		4.7 cm	100	WHA1851047
		5.0 cm	100	WHA1851050
		5.5 cm	100	WHA1851055
		8.26 cm	100	WHA1851082
		8.5 cm	100	WHA1851085
		9.0 cm	100	WHA1851090
		10.16 cm	100	WHA1851101
		11.0 cm	100	WHA1851110
		11.8 cm	100	WHA1851118
		15.0 cm	100	WHA1851150
		8 x 10 in	25	WHA1851865
		8 x 10 in, numbered	100	WHA18518866
• Air sampling	QM-H	37 mm	50	WHA185303750
		47 mm	50	WHA185304750
		50 mm	50	WHA185305050
		90 mm	50	WHA185309050
		150 mm	50	WHA185315050
	QM-B	42 mm	50	WHA1852042

Filter Paper

Whatman® Filtration Products

Qualitative Filter Paper

Qualitative filter paper is designed for use in qualitative analytical techniques for the identification of particles, contaminants, or components

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Flat				
• General liquid clarification • Qualitative analytical separations for precipitates • Soil analysis and seed testing • Separation of solid foodstuffs in food industry • Air monitoring • Gas detection	1	1.5 cm	500	WHA10010155
		2.0 cm	400	WHA1001020
		2.5 cm	100	WHA1001325
			400	WHA1001025
		3.0 cm	100	WHA1001329
			400	WHA1001030
		3.2 cm	100	WHA1001032
		4.25 cm	100	WHA1001042
		4.5 cm	100	WHA1001045
		4.7 cm	100	WHA1001047
		5.5 cm	100	WHA1001055
		7.0 cm	100	WHA1001070
		8.5 cm	100	WHA1001085
		9.0 cm	100	WHA1001090
		11.0 cm	100	WHA1001110
			500	WHA10016508
		12.5 cm	100	WHA1001125
		15.0 cm	100	WHA1001150
		18.5 cm	100	WHA1001185
		24.0 cm	100	WHA1001240
		27.0 cm	100	WHA1001270
		32.0 cm	100	WHA1001320
		38.5 cm	100	WHA1001385
		40.0 cm	100	WHA1001400
		50.0 cm	100	WHA1001500
		147 cm x 100 m	1	WHA1001734
		12.6 x 3.1 cm	1000	WHA1001813
		17.5 x 10 cm	500	WHA1001824
		146 x 57 cm	100	WHA1001917
			500	WHA1001918
		160 x 60 cm	100	WHA1001929
		158 x 68 cm	100	WHA1001931
			500	WHA1001932
• General filtration • Plant growth trials • Contaminant monitoring in soil and air	2	4.25 cm	100	WHA1002042
		4.7 cm	100	WHA1002047
		5.5 cm	100	WHA1002055
		7.0 cm	100	WHA1002070
		9.0 cm	100	WHA1002090
		11.0 cm	100	WHA1002110
		12.5 cm	100	WHA1002125
		15.0 cm	100	WHA1002147[1]
				WHA1002150
		18.5 cm	100	WHA1002185
		24.0 cm	100	WHA1002240
		27.0 cm	100	WHA1002270
		32.0 cm	100	WHA1002320
		38.5 cm	100	WHA1002385
		46 x 57 cm	100	WHA1002917
		60 x 60 cm	100	WHA1002929
		58 x 68 cm	100	WHA1002931
• General filtration	3	2.3 cm	100	WHA1003323
		5.5 cm	100	WHA1003055
		7.0 cm	100	WHA1003070
		9.0 cm	100	WHA1003090
		11.0 cm	100	WHA1003110
		12.5 cm	100	WHA1003125
		15.0 cm	100	WHA1003150
		18.5 cm	100	WHA1003185
		24.0 cm	100	WHA1003240
		32.0 cm	100	WHA1003320
		46 x 57 cm	100	WHA1003917

[1]IP certified

Qualitative Filter Paper (continued)

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Flat				
• Filtration of coarse particles and gelatinous precipitates • Filtration of biological fluids • Filtration of organic extracts • Air monitoring	4	2.7 cm	400	WHA1004027
		4.1 cm	100	WHA1004041
		4.25 cm	100	WHA1004042
		4.7 cm	100	WHA1004047
		5.0 cm	100	WHA1004050
		5.5 cm	100	WHA1004055
		7.0 cm	100	WHA1004070
		9.0 cm	100	WHA1004090
		11.0 cm	100	WHA1004110
		12.5 cm	100	WHA1004125
		15.0 cm	100	WHA1004150
		18.5 cm	100	WHA1004185
		24.0 cm	100	WHA1004240
		27.0 cm	100	WHA1004270
		32.0 cm	100	WHA1004320
		40.0 cm	100	WHA1004400
		3.8 x 11.4 cm, roll	1	WHA1004648
		46 x 57 cm	100	WHA1004917
		58 x 58 cm	100	WHA1004930
• Fine particle retention • Clarification of cloudy suspensions • Water and soil analysis	5	2.5 cm	100	WHA1005325
		4.25 cm	100	WHA1005042
		4.7 cm	100	WHA1005047
		5.5 cm	100	WHA1005055
		7.0 cm	100	WHA1005070
		9.0 cm	100	WHA1005090
		11.0 cm	100	WHA1005110
		12.5 cm	100	WHA1005125
		15.0 cm	100	WHA1005150
		18.5 cm	100	WHA1005185
		24.0 cm	100	WHA1005240
		32.0 cm	100	WHA1005320
• Fine particle retention • Boiler water analysis applications	6	4.25 cm	100	WHA1006042
		7.0 cm	100	WHA1006070
		9.0 cm	100	WHA1006090
		11.0 cm	100	WHA1006110
		12.5 cm	100	WHA1006125
		15.0 cm	100	WHA1006150
		18.5 cm	100	WHA1006185
		24.0 cm	100	WHA1006240
• General filtration of solutions containing medium-fine precipitate	201	9.0 cm	100	WHA5201090
		11.0 cm	100	WHA5201110
		15.0 cm	100	WHA5201150
		18.5 cm	100	WHA5201185
		24.0 cm	100	WHA5201240
		32.0 cm	100	WHA5201320
		33.0 cm	100	WHA5201330
		14 x 19 cm	500	WHA5201911
		58 x 58 cm	500	WHA5201935
		47 x 58 cm	500	WHA5201940
• Filtration of medium and coarse precipitates	591	58 x 58 cm	250	WHA10311387
• Medium to fine particles • Particle separation from food extracts • Filtration of solids from digested environmental samples for ICP/AAS analysis	595	110 mm	100	WHA10311610
		125 mm	100	WHA10311611
		150 mm	100	WHA10311612
		58 x 58 cm	500	WHA10311687
• Medium to fine particle retention • Food testing • Determination of fat content • Removal of CO_2 and turbidity from beverages (beer analysis)	597	12.7 mm	1000	WHA10311862
		45 mm	100	WHA10311804
		55 mm	100	WHA10311807
		70 mm	100	WHA10311808
		90 mm	100	WHA10311809
		110 mm	100	WHA10311810
		125 mm	100	WHA10311811
		150 mm	100	WHA10311812
		185 mm	100	WHA10311814
		240 mm	100	WHA10311820
		320 mm	100	WHA10311822
		58 x 58 cm	100	WHA10311897
			500	WHA10311887

Qualitative Filter Paper (continued)

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Flat				
• Medium particle retention	598	90 mm	100	WHA10312209
		58 x 58 cm	250	WHA10312287
• Small particle collection • Removal of fine particulates • Beverage industry sample preparation – residual sugar determination, acidic spectra, refractometric analysis and HPLC	602 h	125 mm	100	WHA10312611
		150 mm	100	WHA10312612
		185 mm	100	WHA10312614
		240 mm	100	WHA10312620
• Identification of materials	602 eh	10 mm × 50 m roll	1	WHA10312500
• Filtration of fine particulates		125 mm	100	WHA10312544
• Recovery of microfine ultrapure crystalline components (<1 µm) in alkaline tests in waste analysis (e.g. soils, filter dust, ash, ore/slag waste)		150 mm	100	WHA10312545
Prepleated (folded)				
• General liquid clarification • Qualitative analytical separations for precipitates • Soil analysis and seed testing • Separation of solid foodstuffs in food industry • Air monitoring • Gas detection	1V	12.4 cm	100	WHA1201125
		15.0 cm	100	WHA1201150
		18.5 cm	100	WHA1201185
		24.0 cm	100	WHA1201240
		27.0 cm	100	WHA1201270
		32.0 cm	100	WHA1201320
• General filtration • Plant growth trials • Contaminant monitoring in soil and air	2V	12.5 cm	100	WHA1202125
		15.0 cm	100	WHA1202150
		18.5 cm	100	WHA1202185
		24.0 cm	100	WHA1202240
		27.0 cm	100	WHA1202270
		32.0 cm	100	WHA1202320
		38.5 cm	100	WHA1202385
		40.0 cm	100	WHA1202400
		50.0 cm	100	WHA1202500
• Filtration of coarse particles and gelatinous precipitates • Filtration of biological fluids • Filtration of organic extracts • Air monitoring	4V	12.5 cm	100	WHA1204125
		15.0 cm	100	WHA1204150
		18.5 cm	100	WHA12040185
		24.0 cm	100	WHA1204240
		27.0 cm	100	WHA1204270
		32.0 cm	100	WHA1204320
• Fine particle retention • Clarification of cloudy suspensions • Water and soil analysis	5V	18.5 cm	100	WHA1205185
• Coarse particles • General filtration	202	9.0 cm	100	WHA5202090
		11.0 cm	100	WHA5202110
		12.5 cm	100	WHA5202125
		15.0 cm	100	WHA5202150
		18.5 cm	100	WHA5202185
		20.0 cm	100	WHA5202200
		24.0 cm	100	WHA5202240
		25.0 cm	100	WHA5202250
		32.0 cm	100	WHA5202320
		33.0 cm	100	WHA5202330
		40.0 cm	100	WHA5202400

Qualitative Filter Paper (continued)

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Prepleated (folded)				
• Coarse particles • Oil chemistry • Fast filtration speed with high loading capacity	230	9.0 cm	50	WHA5230090
		11.0 cm	50	WHA5230110
		12.5 cm	50	WHA5230125
		15.0 cm	50	WHA5230150
		18.5 cm	50	WHA5230185
		20.0 cm	50	WHA5230200
		24.0 cm	50	WHA5230240
		25.0 cm	50	WHA5230250
		33.0 cm	50	WHA5230330
		40.0 cm	50	WHA5230400
		50.0 cm	50	WHA5230500

Qualitative Filter Paper (continued)

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Prepleated (folded)				
• Medium to fine particles • Particle separation from food extracts • Filtration of solids from digested environmental samples for ICP/AAS analysis	595 ½	70 mm	100	WHA10311641
		90 mm	100	WHA10311642
		110 mm	100	WHA10311643
		125 mm	100	WHA10311644
		150 mm	100	WHA10311645
		185 mm	100	WHA10311647
		210 mm	100	WHA10311649
		240 mm	100	WHA10311651
		270 mm	100	WHA10311652
		320 mm	100	WHA10311653
		385 mm	100	WHA10311654
		500 mm	100	WHA10311656
• Medium to fine particle retention • Food testing • Determination of fat content • Removal of CO_2 and turbidity from beverages (beer analysis)	597 ½	70 mm	100	WHA10311841
		90 mm	100	WHA10311842
		110 mm	100	WHA10311843
		125 mm	100	WHA10311844
		150 mm	100	WHA10311845
		185 mm	100	WHA10311847
		240 mm	100	WHA10311851
		270 mm	100	WHA10311852
		320 mm	100	WHA10311853
		385 mm	100	WHA10311854
		500 mm	100	WHA10311856
• Medium particle retention	598 ½	125 mm	50	WHA10312244
		185 mm	50	WHA10312247
		240 mm	50	WHA10312251
		500 mm	50	WHA10312256
• Small particle collection • Removal of fine particulates • Beverage industry sample preparation – residual sugar determination, acidic spectra, refractometric analysis, and HPLC	602 h ½	90 mm	100	WHA10312642
		125 mm	100	WHA10312644
		150 mm	100	WHA10312645
		185 mm	100	WHA10312647
		240 mm	100	WHA10312651
• Filtration of coarse particles	604 ½	125 mm	100	WHA10312744
		150 mm	100	WHA10312745
		185 mm	100	WHA10312747
		240 mm	100	WHA10312751
		320 mm	100	WHA10312753
• Filtration of coarse particles or gelatinous precipitates • For use with conical filter funnel	802	12.5 cm	100	WHA5802125
		15.0 cm	100	WHA5802150
		18.5 cm	100	WHA5802185
		24.0 cm	100	WHA5802240
			1000	WHA58026698
		32.0 cm	100	WHA5802320
		38.5 cm	100	WHA5802385

Quantitative Filter Paper

Designed for sample preparation and gravimetric analysis, quantitative filter paper is available in three formats: ashless, hardened low ash, and hardened ashless. Whatman® quantitative filter paper is typically selected based upon the level of surface toughness and ash content required for the filtration procedure.

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Ashless, Flat				
• General filtration • Gravimetric analysis for components in cement, clays, iron and steel products • Primary filter in soil analysis • Quantitative determination of milk sediments • Sample prep for AAS • Collection of trace elements and radionuclides in the atmosphere	40	1.27 cm	400	WHA1440012
		3.0 cm	100	WHA1440329
		3.2 cm	100	WHA1440032
		4.25 cm	100	WHA1440042
		4.7 cm	100	WHA1440047
		5.5 cm	100	WHA1440055
		7.0 cm	100	WHA1440070
		9.0 cm	100	WHA1440090
		11.0 cm	100	WHA1440110
		12.5 cm	100	WHA1440125
		15.0 cm	100	WHA1440150
		18.5 cm	100	WHA1440185
		24.0 cm	100	WHA1440240
		32.0 cm	100	WHA1440320
		45.0 cm	100	WHA14406168
		46 x 57 cm	100	WHA1440917
• Use with coarse particles of gelatinous precipitates • Quantitative air pollution when determining gaseous compounds at high flow rates	41	2.5 cm	10,000	WHA14416309
		4.25 cm	100	WHA1441042
		4.7 cm	100	WHA1441047
		5.0 cm	100	WHA1441050
		5.5 cm	100	WHA1441055
		6.0 cm	100	WHA1441060
		7.0 cm	100	WHA1441070
		9.0 cm	100	WHA1441090
		11.0 cm	100	WHA1441110
		12.5 cm	100	WHA1441125
		15.0 cm	100	WHA1441150
		18.5 cm	100	WHA1441185
		24.0 cm	100	WHA1441240
		32.0 cm	100	WHA1441320
		20.3 x 25.4 cm	100	WHA1441866
		46 x 57 cm	100	WHA1441917
• Critical gravimetric analysis • Fine particle retention	42	4.25 cm	100	WHA1442042
		4.7 cm	100	WHA1442047
		5.5 cm	100	WHA1442055
		7.0 cm	100	WHA1442070
		9.0 cm	100	WHA1442090
		11.0 cm	100	WHA1442110
		12.5 cm	100	WHA1442125
		15.0 cm	100	WHA1442150
		18.5 cm	100	WHA1442185
		24.0 cm	100	WHA1442240
		32.0 cm	100	WHA1442320
		2.54 x 9 cm	100	WHA14426551
		46 x 57 cm	100	WHA1442917
• Foodstuff analysis • Soil analysis • Particle collection in air pollution monitoring • Inorganic analysis in the construction, mining, and steel industries	43	9.0 cm	100	WHA1443090
		11.0 cm	100	WHA1443110
		12.5 cm	100	WHA1443125
		15.0 cm	100	WHA1443150
		18.5 cm	100	WHA1443185
• Fine particle retention	44	7.0 cm	100	WHA1444070
		9.0 cm	100	WHA1444090
		11.0 cm	100	WHA1444110
		12.5 cm	100	WHA1444125
		15.0 cm	100	WHA1444150
		18.5 cm	100	WHA1444185
		24.0 cm	100	WHA1444240

Quantitative Filter Paper (continued)

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Ashless, Flat				
• Quantitative standard methods • Gravimetric analysis • Determination of ash content in foodstuffs • Blaine test in the cement industry	589/1	90 mm	100	WHA10300009
		110 mm	100	WHA10300010
		125 mm	100	WHA10300011
		150 mm	100	WHA10300012
			100	WHA10300045[1]
		185 mm	100	WHA10300014
• Medium fine precipitates • Routine quantitative analysis • Determination of sand content in foodstuffs • Determination of flour grade • Analysis of aqueous suspensions in the paper industry	589/2	12.7 mm	1000	WHA10300102
		40.5 mm	100	WHA10300103
		50 mm	100	WHA10300106
		55 mm	100	WHA10300107
		70 mm	100	WHA10300108
		90 mm	100	WHA10300109
		110 mm	100	WHA10300110
			100	WHA10300143[1]
		125 mm	100	WHA10300111
		150 mm	100	WHA10300112
			100	WHA10300145[1]
		185 mm	100	WHA10300114
		240 mm	100	WHA10300120
• Very fine precipitates • Analytical routine methods in industry • Determination of insoluble contaminants in animal and vegetable fats and oils	589/3	12.8 mm	100	WHA10300263
		110 mm	100	WHA10300210
		125 mm	100	WHA10300211
		150 mm	100	WHA10300212
		185 mm	100	WHA10300214
Hardened Low Ash, Flat				
• Retention of very fine crystalline precipitates • Filtrations requiring vacuum assistance • Carriers for integrated circuits in the electronics industry • Wipe testing of surfaces for radionuclide contamination	50	4.25 cm	100	WHA1450042
		5.5 cm	100	WHA1450055
		7.0 cm	100	WHA1450070
		9.0 cm	100	WHA1450090
		11.0 cm	100	WHA1450110
		12.5 cm	100	WHA1450125
		15.0 cm	100	WHA1450150
		18.5 cm	100	WHA1450185
		24.0 cm	100	WHA1450240
		32.0 cm	100	WHA1450320
		50.0 cm	100	WHA1450500
		15 x 23 cm	100	WHA1450916
		46 x 57 cm	100	WHA1450917
		White smear tab	100	WHA1450993
• Medium particle retention	52	9.0 cm	100	WHA1452090
		11.0 cm	100	WHA1452110
		12.5 cm	100	WHA1452125
		15.0 cm	100	WHA1452150
		24.0 cm	100	WHA1452240
• Filtration of coarse particles or gelatinous precipitates • Filtrations requiring vacuum assistance	54	5.5 cm	100	WHA1454055
		7.0 cm	100	WHA1454070
		9.0 cm	100	WHA1454090
		11.0 cm	100	WHA1454110
		12.5 cm	100	WHA1454125
		15.0 cm	100	WHA1454150
		18.5 cm	100	WHA1454185
		24.0 cm	100	WHA1454240
		32.0 cm	100	WHA1454320
		50.0 cm	100	WHA1454500
		46 x 57 cm	100	WHA1454917
• Medium particle retention • Filtration of acidic and alkaline solutions • Gravimetric analysis of metals in acidic/alkaline solutions • Collecting hydroxides after precipitation	540	2.1 cm	100	WHA1540321
		2.4 cm	100	WHA1540324
		4.25 cm	100	WHA1540042
		5.5 cm	100	WHA1540055
		9.0 cm	100	WHA1540090
		11.0 cm	100	WHA1540110
		12.5 cm	100	WHA1540125
		15.0 cm	100	WHA1540150
		18.5 cm	100	WHA1540185
		24.0 cm	100	WHA1540240
		32.0 cm	100	WHA1540320

[1]Prepleated (folded) format

Quantitative Filter Paper (continued)

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Hardened Ashless, Flat				
• Filtration of coarse particles and gelatinous precipitates • Filtration of acidic and alkaline solutions • Gravimetric analysis • Fiber in animal foodstuffs • Gelatin in milk and cream • Chloride in cement • Chloride and phosphorous in coal and coke	541	4.25 cm	100	WHA1541042
		4.7 cm	100	WHA1541047
		5.5 cm	100	WHA1541055
		7.0 cm	100	WHA1541070
		9.0 cm	100	WHA1541090
		11.0 cm	100	WHA1541110
		12.5 cm	100	WHA1541125
		15.0 cm	100	WHA1541150
		18.5 cm	100	WHA1541185
		24.0 cm	100	WHA1541240
		27.0 cm	100	WHA1541270
		32.0 cm	100	WHA1541320
		40.0 cm	100	WHA1541400
		46 x 57 cm	100	WHA1541917
• Retention of fine particles • Excellent chemical resistance • Gravimetric analysis of metals	542	5.5 cm	100	WHA1542055
		7.0 cm	100	WHA1542070
		9.0 cm	100	WHA1542090
		11.0 cm	100	WHA1542110
		12.5 cm	100	WHA1542125
		15.0 cm	100	WHA1542150
		18.5 cm	100	WHA1542185
		24.0 cm	100	WHA1542240
		40.0 cm	100	WHA1542400

Whatman® Filtration Products

Wet-Strengthened Filter Paper

With the addition of a chemically stable resin, wet strengthened filter paper features a high wet strength. When used in normal qualitative applications, significant impurities should not be introduced into the filtrate. If the filtrate is to be tested for nitrogen content (e.g., Kjeldahl estimations), wet strengthened filter paper should not be used.

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Flat				
• General analysis • Assay sucrose in cane sugar • Routine filtration in pharmaceutical labs	91	11.0 cm	4000	WHA1091110
		12.5 cm	4000	WHA1091125
		15.0 cm	1000	WHA1091150
		16.5 cm	1000	WHA1091165
		18.5 cm	1000	WHA1091185
		19.0 cm	1000	WHA1091190
		24.0 cm	1000	WHA1091240
		58 x 58 cm	500	WHA1091930
		61 x 61 cm	500	WHA1091935
• Medium particle retention	93	11.0 cm	100	WHA1093110
			50x25[1]	WHA1093111
		12.5 cm	100	WHA1093125
			50x25[1]	WHA1093126
		15.0 cm	10x100[1]	WHA10936215
		58 x 58 cm	500	WHA1093930
		61 x 61 cm	500	WHA1093935
• High loading capacity • Filtration of course and gelatinous precipitates	113	9.0 cm	100	WHA1113090
		11.0 cm	100	WHA1113110
		12.5 cm	100	WHA1113125
		15.0 cm	100	WHA1113150
		18.5 cm	100	WHA1113185
		24.0 cm	100	WHA1113240
		32.0 cm	100	WHA1113320
		50.0 cm	100	WHA1113500
		46 x 57 cm	100	WHA1113917
• Filtration of course and gelatinous precipitates • Precipitate recovery	114	9.0 cm	100	WHA1114090
		12.5 cm	100	WHA1114125
		15.0 cm	100	WHA1114150
		18.5 cm	100	WHA1114185
		24.0 cm	100	WHA1114240
		40.0 cm	100	WHA1114400

[1]Unit is sold as a dispenser pack, which can be attached to the wall or bench or placed on a shelf either upright or flat, for use as a normal carton or as a convenient dispenser. Envelopes are released individually for easy one-at-a-time removal and are clearly marked with size and contents.

Wet-Strengthened Filter Paper (continued)

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Flat				
• Precipitate recovery • Filtration of sulfuric, nitric, hydrochloric acid, and alkali solutions	1573	150 mm	100	WHA10314712
		185 mm	100	WHA10314714
		290 mm	100	WHA10314726
		25.5 mm x 210 m	1	WHA10314766
• Filtration of sulfuric, nitric, hydrochloric acid, and alkali solutions	1574	70 mm x 100 m	1	WHA10314871
	1575	200 mm	100	WHA10314916
Prepleated (folded)				
• High loading capacity • Filtration of course and gelatinous precipitates	113V	12.5 cm	100	WHA1213125
		15.0 cm	100	WHA1213150
		18.5 cm	100	WHA1213185
		24.0 cm	100	WHA1213240
		27.0 cm	100	WHA1213270
		32.0 cm	100	WHA1213320
		50.0 cm	100	WHA1213500
• Filtration of course and gelatinous precipitates • Precipitate recovery	114V	12.5 cm	100	WHA1214125
		15.0 cm	100	WHA1214150
		18.5 cm	100	WHA1214185
		24.0 cm	100	WHA1214240
		32.0 cm	100	WHA1214320
• Precipitate recovery • Filtration of sulfuric, nitric, hydrochloric acid, and alkali solutions	1573 ½	125 mm	100	WHA10314744
		150 mm	100	WHA10314745
		185 mm	100	WHA10314747
		240 mm	100	WHA10314751
		270 mm	100	WHA10314752
		320 mm	100	WHA10314753
• Filtration of sulfuric, nitric, hydrochloric acid, and alkali solutions	1574 ½	125 mm	100	WHA10314844

Whatman® Filtration Products

General Purpose Filter Paper

Produced from super-refined cellulose, Whatman® general purpose filter papers have been designed to meet the needs of a variety of specific applications.

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Flat				
• Optical assessment • Investigation of foreign substances in samples	8[1]	45 mm	100	WHA10347004
		70 mm	100	WHA10347008
		75 mm	100	WHA10347033
		90 mm	100	WHA10347009
• Absorb radioactive iodine in air pollution monitoring and nuclear installations	72	4.7 cm	100	WHA1872047
• Filtration of viscous liquids and emulsions • Used in food industries sweetened juices, spirits and syrups, resin solutions, oils, or plant extracts	520 a	58 x 58 cm	250	WHA10331487
• General purpose	520 bII	58 x 58 cm	250	WHA10331687
• Medium particle retention • Filtration of extracts, oils, beer, syrups • Suitable for use in filter presses • Aspiration of liquids	858	11 x 58 cm	500	WHA10334365
		390 x 390 mm	500	WHA10334383
		450 x 450 mm	500	WHA10334385
• Small particle retention	903	450 x 450 mm	500	WHA10334885
• Coarse particle retention	905	580 x 580 mm	500	WHA10334987
• General coarse particle filtration	965	110 mm	100	WHA10340810
• General filtration	989	110 mm	100	WHA10308210
• Medium to coarse particle retention	2294	110 mm	100	WHA10342810
		180 mm	100	WHA10342860
		210 mm	100	WHA10342862
• Medium particle retention	2589 a	140 mm	500	WHA10343630
		580 x 580 mm	100	WHA10343687
• Small particle retention	2589 c	25 x 75 mm	100	WHA10343876
• Fine particle retention	2589 d	25 x 75 mm	100	WHA10343976

[1]Filter paper is ruled for visual analysis

General Purpose Filter Paper (continued)

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Flat				
• Clarifying filtration of dried beet pulp extract • Polarmetric determination of sugar in beet juice • Venema unit (lead acetate method)	3459	230 mm	1000	WHA10316619
• Optical testing of baby food (artificial milk) for textile fibers	48	32 mm	1000	WHA10348903
• Protective paper for filter press cloths • Processing of cocoa butter and edible oils	Shark Skin™ filter	90 mm	100	WHA10347509
		110 mm	100	WHA10347510
		125 mm	100	WHA10347511
		150 mm	100	WHA10347513
		185 mm	100	WHA10347512
		240 mm	100	WHA10347519
		270 mm	100	WHA10347521
		290 mm	100	WHA10347577
		320 mm	100	WHA10347530
		340 mm	100	WHA10347522
		385 mm	100	WHA10347523
		500 mm	100	WHA10347525
		8 x 10 in	100	WHA10538877
		21 in x 750 ft	1	WHA10537138
Prepleated (folded)				
• Kieselguhr paper with a medium to slow flow rate • Separation of very fine semi-colloidal turbidity • Clarifying milk serum, starch solutions, soil suspensions, or sugar-containing solutions prior to polarimetry or refractometry	287 ½	150 mm	50	WHA10310245
		185 mm	50	WHA10310247
• Soil analysis • Filtration of calcium lactate extracts to determine [K] and [P] in soil samples	512 ½	110 mm	100	WHA10310643
		150 mm	100	WHA10310645
		185 mm	100	WHA10310647
• Filtration of viscous liquids and emulsions • Used in food industries sweetened juices, spirits and syrups, resin solutions, oils, or plant extracts	520 a ½	240 mm	100	WHA10331451
		500 mm	100	WHA10331456
• General filtration	520 b	240 mm	50	WHA10331551
		320 mm	50	WHA10331553
		385 mm	50	WHA10331554
		500 mm	50	WHA10331556
		600 mm	20	WHA10331558
• Filtration of fine precipitates	593 ½	185 mm	100	WHA10311447
		240 mm	100	WHA10311451
• Filtration of fine precipitates	594 ½	185 mm	100	WHA10311547
• Analytical testing of trace elements • Soil analysis • Filtration in the sugar industry	0790 ½	150 mm	100	WHA10301645
		185 mm	100	WHA10301647
• Medium particle retention • Filtration of extracts, oils, beer, syrups • Suitable for use in filter presses • Aspiration of liquids	0858 ½	150 mm	100	WHA10334345
		185 mm	100	WHA10334347
		240 mm	100	WHA10334351
		270 mm	100	WHA10334352
		320 mm	100	WHA10334353
• Medium particle retention • Filtration of extracts, oils, beer, syrups • Suitable for use in filter presses • Aspiration of liquids	0860 ½	185 mm	100	WHA10334547
		240 mm	100	WHA10334551
		320 mm	100	WHA10334553
• Filtration of mash for determining the extract in malt and wort • Removing CO_2 from beer	2555 ½	185 mm	100	WHA10313947
		240 mm	100	WHA10313951
		320 mm	100	WHA10313953
Pyramid folded				
• Fine particle retention • Boiler water analysis application	6	125 mm	1000	WHA9891-128
• Ashless filter paper with medium speed and retention • Gravimetric analysis • Primary filter for separating solid matter from aqueous extracts • Quantitative determination of sediments • Clean-up prior to AA spectrometry • High-purity filter in collection of trace elements and radionuclides	40	125 mm	1000	WHA9892-128

General Purpose Filter Paper (continued)

Applications	Grade	Filter Diameter	Pack Size	Catalog Number
Flat Quadrant folded				
• Widely used for routine applications with medium retention and flow rate. • Wide range of laboratory applications. • Used for clarifying liquids. • Qualitative analytical separations for precipitates	1	110 mm	500	WHA10380404
		125 mm	500	WHA10380405
		150 mm	500	WHA10380406
• Ashless filter paper with medium speed and retention • Gravimetric analysis • Primary filter for separating solid matter from aqueous extracts	40	110 mm	500	WHA10380004
		125 mm	500	WHA10380005
		150 mm	500	WHA10380006
• Quantitative determination of sediments • Clean-up prior to AA spectrometry • High-purity filter in collection of trace elements and radionuclides	41	110 mm	500	WHA10380204
		125 mm	500	WHA10380205
		150 mm	500	WHA10380206

1.5 Supporting Hardware, Vacuum Pumps, and Pressure Vessels

Complementing our comprehensive filter offering, our supporting hardware, vacuum pumps, and pressure vessels provide robust solutions for a variety of filtration applications and conditions. Each section provides product specifications and recommendations for each category of filtration accessories.

Supporting Hardware

Millipore® Filtration Products

Filter Holders

Regardless of the scale or method, membranes must be housed in a device during filtration. Filter housings provide structural support and create a seal around the membrane, preventing filtrate contamination. Reusable housings, (i.e. filter holders) are constructed from either glass, plastic, or metal and must be matched to the diameter of the filter. The table below organizes our filter holders by material, filter diameter, and filtration conditions.

Material	Glass	Stainless Steel (SS)		Plastic	
Filtration Conditions	**Vacuum**	**Vacuum**	**Pressure**	**Vacuum**	**Pressure**
13 mm		Epifluorescence Filter Holder 	Swinny Filter Holder 		Swinnex® Filter Holder
		Analytical Filter Holder 			
25 mm	Microanalysis filter holder 	Analytical Filter Holder 	High-Pressure Filter Holder 	1225 Sampling Manifold 	Swinnex® Filter Holder
			Microsyringe Filter Holder 		
			Solvent Filtering Dispenser 		
			Filterjet™ Solvent Dispenser 		
47 mm	All-Glass Filter Holder 	Analytical Filter Holder 	SS Pressure Filter Holder 	Millicup-FLEX™ Filtration Unit 	Swinnex® Filter Holder 
	Classic Glass Filter Holder 	Hydrosol™ Filter Holder 	High-Pressure Filter Holder 	Pressure Vessel 	In-Line Filter Holder 
	MilliSolve™ Kit, Bottle-to-Bottle Filtration System 		Filter Holder 	Sterifil® Filter Holder 	
90 mm	All-Glass Filter Holder 		Standing SS Filter Holder 		
142 mm	All-Glass Filter Holder 		Standing SS Filter Holder 		

Glass Filter Holders

Due to their inert nature and broad chemical resistance, borosilicate glass filter holders are commonly used for research and small-scale filtrations. Depending on the application and sample volume, there are several different glass filter holder formats. Recent design improvements to our glass filter holders have included the addition of an alignment guide, enabling quick assembly and protecting glassware from damage.

Product Description	Applications	Funnel Volume	Filter Diameter	Membrane Support Type	Catalog Number
Microanalysis Filter Holder	• Contamination analysis	15 mL	25 mm	Glass frit	XX1012500
				Stainless steel screen	XX1012530
All-Glass Filter Holder	• Particle contamination analysis • HPLC solvent filtration • General filtration and clarification	300 mL	47 mm	Glass frit	XX1514700
		500 mL	47 mm	Glass frit	XX5514700
		1000 mL	90 mm	Glass frit	XX1019022
				Stainless steel screen	XX1019020
Classic Glass Filter Holder	• General clarification • Bacteriological analysis • Particulate contamination analysis of oils and hydraulic fluids • Exfoliative cytology	300 mL	47 mm	Glass frit	XX1014700
				PTFE-faced	XX1014720
				Stainless steel screen	XX1014730
		500 mL	47 mm	Glass frit	XX5014700

Stainless Steel (SS) Filter Holders

Stainless steel filter holders feature corrosion resistance, strength, and resistance to bacterial adherence. Due to these advantages, stainless steel filter holders are most commonly used in industrial applications requiring pressure or high-pressure filtration. Stainless steel filter holders are also used for small-scale filtrations of organic or corrosive solutions, or when bacterial adherence must be avoided.

Product Description	Applications	Filter Diameter	Reservoir Capacity	Catalog Number
Epifluorescence Filter Holder	• Bacteriological analysis by epifluorescence	13 mm	-	XF3001200
Analytical Filter Holder	• Bacteriological analysis • Particle analysis	13 mm	25 mL	XX3001240
		25 mm	50 mL	XX1012540
		47 mm	100 mL	XF2014710
			250 mL	XF2014725
Hydrosol™ Filter Holder	• Vacuum filtration of flammable liquids	47 mm	650 mL	XX2004720
Swinny Filter Holder	• Ultracleaning or sterilization of liquids	13 mm	-	XX3001200
High-Pressure Filter Holder	• In-line filtration of fluid process streams up to 700 bar	25 mm	-	XX4502500
		47 mm	-	XX4504700
Microsyringe Filter Holder	• Ultracleaning or sterilization of liquids	25 mm	-	XX3002500
				XX3002514
SS Filter Holder	• In-line filtration of fluid process streams	47 mm	-	XX4404700
SS Pressure Filter Holder	• Batch filtration	47 mm	100 mL	XX4004700
			340 mL	XX4004740
Standing SS Filter Holder	• Ultracleaning or sterilization of liquids or gases	90 mm	-	YY3009000
		142 mm	-	YY3014236

Plastic Filter Holders

With increased durability, plastic filter holders are often sought as an alternative to glass. Depending on the polymeric material, plastic filter holders may not offer the same broad compatibility obtained with glass. Polypropylene-based filter holders, such as the Millicup-FLEX™ filtration unit, are compatible with both aqueous and organic solutions, making them an ideal alternative to fragile glass filter holders.

Product Description	Applications	Filter Diameter	Catalog Number
Swinnex® Filter Holder	• Ultracleaning or sterilization of liquids	13 mm	SX0001300
		25 mm	SX0002500
		47 mm	SX0004700
1225 Sampling Manifold	• General filtration of 15 – 50 mL samples • Preparation for scintillation counting	25 mm	XX2702550
In-Line Filter Holder	• General in-line filtration	47 mm	XX4304700
Millicup-FLEX™ Filtration Unit, 250 mL	• General filtration of aqueous and organic solutions	47 mm	MCFLX4702
			MCFLX4710

Solvent Dispensers

Particle and contamination monitoring methods in industrial applications often require that filtered solvent is used in analysis and rinsing containers prior to sample collection. Our solvent dispensers include an in-line filter holder to eliminate an extra step. The Millipore® solvent filtering dispenser allows the user to dispense small volumes of solvent by squeeze-bottle action, eliminating the need for an external pump. The Filterjet™ solvent dispenser connects directly to a pressure vessel, allowing the user to dispense a concentrated jet spray of ultraclean solvent or rinse solution.

Product Description	Applications	Filter Diameter	Catalog Number
Solvent Filtering Dispenser	• Solvent filtration prior to contamination analysis	25 mm	XX6602500
Filterjet™ Solvent Dispenser	• Solvent rinsing of machined parts and collection containers	25 mm	XX6702500

Filter Forceps

To avoid damaging or contaminating membranes, filter forceps should be used to transfer membranes from the package to the filter holder. Our beveled, stainless steel forceps may be sterilized prior to use by autoclaving or flame-sterilization.

Product Description	Applications	Catalog Number
Filter forceps, blunt end, stainless steel	• Membrane handling	XX6200006P

Vacuum pumps

Our high output and chemical duty pumps support high flow rates to decrease process filtration time. The high output pump features a piston-driven design to offer greater power. The chemical duty pump has a chemically resistant head and diaphragm, allowing it to be used with corrosive chemicals and solvents. The table below highlights the specifications of each vacuum pump.

	High Output Pump	Chemical Duty Pump
Maximum Vacuum, mbar (inHg)	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	¼ in stepped hose barb	¼ in stepped hose barb

Product Description	Voltage	Catalog Number
High Output Pump	115 V / 60 Hz	WP6211560
	220 V / 50 Hz	WP6222050
	100 V / 50-60 Hz	WP6210060
Chemical Duty Pump	115 V / 60 Hz	WP6111560
	220 V / 50 Hz	WP6122050
	100 V / 50-60 Hz	WP6110060

Pressure vessels

Dispensing pressure vessels hold solutions or solvent prior to pressure-driven filtration. To dispense, the pressure vessel must be connected to an external pressure source, providing an inlet pressure ≤6.9 bar (100 psi). All Millipore® dispensing pressure vessels meet ASME®-UM code requirements and closures are secured by a cam-lock handle.

Product Description	Application	Volume	Catalog Number
Dispensing Pressure Vessels	• Large volume filtration • Reservoir for buffer or solvent dispensing	1 gal	XX6700P01
		5 L	XX6700P05
		10 L	XX6700P10
		20 L	XX6700P20

flex your choice

Millicup™-FLEX Disposable Vacuum Filtration Unit

Millicup™-FLEX disposable vacuum filtration units provide the convenience of a disposable filtration unit with the flexibility and compatibility of a traditional, glass vacuum filtration apparatus. Our innovative, three-piece design eliminates the need for cleaning prior to filtration – saving you time, and reducing the risk of sample contamination.

Advantages of the Millicup™-FLEX Disposable Filtration Unit

- Compatible with organic and aqueous solvents
- Ergonomic, clampless design
- Reduce contamination risk
- Filter directly into vacuum-rated storage bottles
- Easy access to membrane after filtration
- Fully recyclable components

Take filtration into your own hands.
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