Filtration for environmental testing

cytiva

Quality, consistency and compliance

At Cytiva, we are committed to quality. We manufacture our Whatman™ filtration products from high-purity raw materials, our factories all operate to the latest version of ISO 9001 standards, or higher. Our filter selection recommendations are based on our deep expertise in modern methods, building on our heritage of almost 300 years history in the paper and membrane filtration industry.

Accurate and reliable analytical results are paramount when monitoring air, water, and soil. Efficient, reproducible filtration that preserves the integrity of your sample is an essential step. Whether you are using one of our glass papers, syringe filters, or other Whatman™ lab filtration products, you can count on Cytiva for consistent high quality.

This brochure highlights our filtration solutions for environmental applications. We also offer interactive filter selection tools to help you quickly and easily find a filtration product that will work well for you.

Select your filter online at cytiva.com/solutions/lab-filtration/whatman-filter-selector

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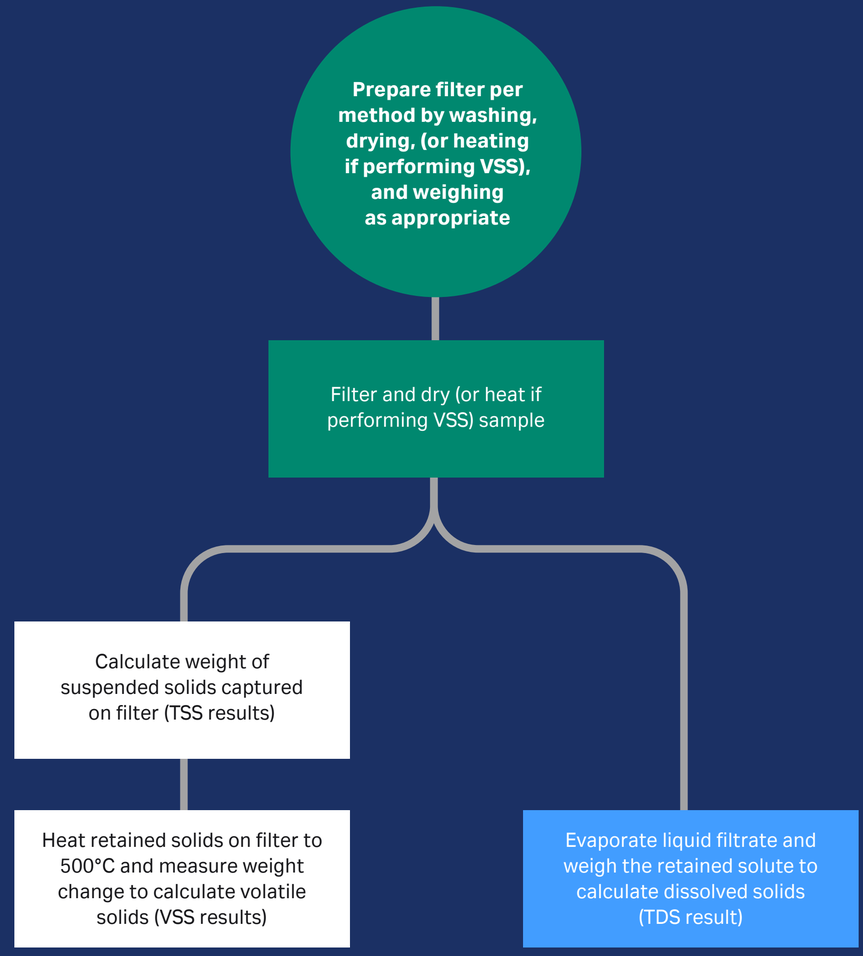
01 Water testing

Physical analysis

Solids analysis

The level of suspended solids in a water sample is determined by pouring a carefully measured volume of water through a preweighed filter with a specified pore size, drying the filter to remove the water, and then weighing the filter again. The weight gain of the filter is a dry weight measure of the particulates present in the water sample expressed in units derived or calculated from the volume of water filtered (typically milligrams per liter).

Suspended solids measurements are typically performed using glass fiber filter circles that need additional preparation prior to use. However, we have developed ready-to-use 934-AH™ RTU and GF/C™ RTU glass fiber filters, which are supplied in a prewashed and pre-weighed format, enabling considerable time savings in the laboratory. Our RTU filters provide reproducible results with low background contamination.



Total solids analysis workflow using filtration-based methods.

What are you testing for?	Product	Characteristics and benefits
Solids, including: • total suspended solids • total dissolved solids • total volatile solids	**GF/C™ glass fiber filter** **934-AH™ glass fiber filter** Ordering information p. 7	• Conform to requirements of standard methodologies: GF/C™ for EN 872; 934-AH™ for Standard Method 2540D and Method 2540C for TDS. • High loading capacity enabling filtration of very turbid samples. • Retention of very fine particles.
	934-AH™ RTU glass microfiber filter **GF/C™ RTU Microfiber Glass Filter** Ordering information p. 7	• Share same benefits as traditional 934-AH™ and GF/C™ glass fiber filters. • Ready-to-use format saves time. • GF/C™ RTU is prewashed to meet weight loss requirements of EN872. • Prewashed, preweighed according to EN872 and 2540D. • Each pretreated filter comes in an aluminum pan, with the filter weight clearly noted. • Each pan has its own unique barcode.

GF/C™ and 934-AH™ glass fiber filters meets the requirements of EN872 and EPA 2540D.

Ordering information

Glass fiber filters for solids analysis, 100/pack

	Standard glass microfiber filters		Ready-to-use (RTU) glass fiber filters							
Grades	GF/C™	934-AH™	934-AH™ RTU prewashed, dried, and weighed*	934-AH™ RTU economy (prewashed and dried)	934-AH™ RTU prewashed, dried and weighed to 5 decimal places	GF/C™ RTU prewashed, dried, and weighed	GF/C™ RTU Economy (prewashed and dried)	934-AH™ prewashed, fired, and weighed	934-AH™ RTU for Volatiles Economy (prewashed and fired)	934-AH™ RTU prewashed, twice dried and weighed
Typical particle retention (µm)**	1.2 µm	1.5 µm	1.5 µm	1.5 µm	1.5 µm	1.2 µm	1.2 µm	1.5 µm	1.5 µm	1.5 µm
Diameter (mm)	Product code	Product code	Product code	Product code	Product code	Product code	Product code	Product code	Product code	Product code
35	–	–	–	–	–	–	–	3827-035	4827-035	–
42.5	1822-042	1827-042	9907-042	–	–	–	–	3827-042	4827-042	–
47	1822-047	1827-047	9907-047	2827-047	9907-9436	3822-047	2822-047	3827-047	4827-047	9927-047
55	1822-055	1827-055	9907-055	–	–	–	–	–	–	–
70	1822-070	1827-070	9907-070	–	–	3822-070	2822-070	3827-070	4827-070	9927-070
90	1822-090	1827-090	9907-090	–	–	3822-090	2822-090	3827-090	4827-090	9927-090

* Each filter is supplied in an individual aluminum pan

** Particle retention rating at 98% efficiency

Chemical analysis

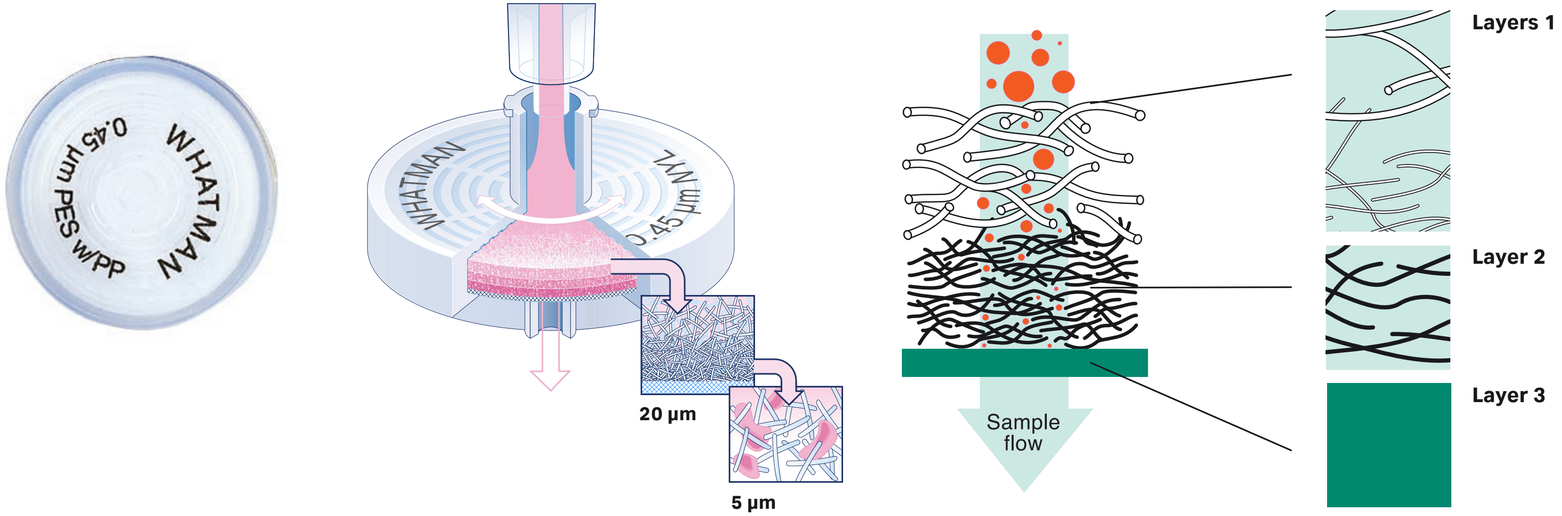
Dissolved heavy metals

Chemical analyses are commonly performed using analytic instrumentation. Filtration of water samples prior to analysis is good practice in order to remove unwanted particles from the analysis and to protect delicate instrumentations from potentially damaging compounds.

Accurate analysis of heavy metals such as lead or mercury depends on not introducing any interference into the sample from consumables used in the analytical preparation process. Water samples are often high in particulate matter, which can present filtration challenges because the particulates can readily block membrane filters. Traditionally, a glass fiber pre-filter has been used to alleviate this problem. However, filters containing some types of glass fiber can introduce trace metals into the sample. To avoid potential sample contamination, we offer a syringe filter that incorporates an effective pre-filter composed of polypropylene rather than glass fiber.

GD/XP syringe filters

GD/XP syringe filters can be used with samples that require inorganic ion analysis (e.g., trace metal analysis using inductively coupled plasma-mass spectrometry (ICP-ICP-OES).



GD/XP syringe filters contain multiple filtration layers, which subsequently reduce blockage and increase volume throughput.

What are you testing for?	Product	Characteristics and benefits
Dissolved heavy metals	**GD/XP syringe filters, 25 mm** (filtration in the lab) Ordering information p. 10	• Pre-filter made of polypropylene for minimization of ion extractables • Integrated prefiltration with a dual-layer prefilter stack and one final 0.45 µm membrane • Easy filtration of hard-to-filter samples • Filtration of larger sample volumes compared to filters without pre-filters
	Polydisc GW and Polycap GW in-line filters (filtration in the field) Ordering information p. 10	• Integrated prefilter • Easy filtration of hard-to-filter samples • Filtration of larger sample volumes compared to filtration devices without pre-filters • Suitable for filtration procedure outlined in EPA Method 3005 for ground water analysis

Polycap GW (left) and Polydisc GW (right) are designed for sample preparation of ground water samples for the analysis of dissolved heavy metals.

Ordering information

GD/XP syringe filters

Membrane	Nylon	PVDF	DpPP	PP	PES	
Pore size (µm)	Product code	Product code	Product code	Product code	Product code	Quantity
0.45	6970-2504	6972-2504	6992-2504	6978-2504	6994-2504	150/pack
0.45	6971-2504	6973-2504	6993-2504	–	6995-2504	1500/pack

In-line filters

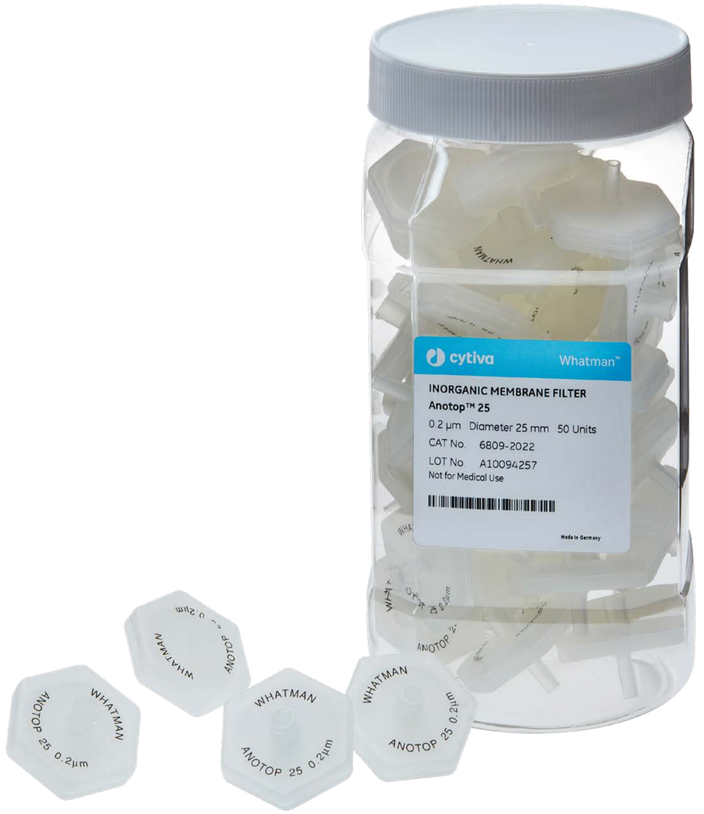
Product	Pack size	Product code
Polydisc GW Filter 50 mm, nylon with quartz fiber prefilter, 0.45 µm	20	10463400
Polydisc GW Filter 50 mm, nylon with quartz fiber prefilter, 0.45 µm	50	10463401
Polycap GW 75, 0.45 µm, PES membrane	1	6714-6004
Polycap GW 75, 0.45 µm, PES membrane	100	6724-6004

Dissolved ions

Filters for sample preparation prior to ion chromatography testing should feature very low levels of anion leaching.

What are you testing for?	Product	Characteristics and benefits
Dissolved ions	Anotop™ IC syringe filters	• Contain a proprietary alumina-based Anopore™ membrane that exhibits very low levels of anion leaching (e.g., fluoride, sulfide, nitrate, nitrite) during ion chromatography (IC) testing • Pigment-free PP* housing to eliminate sample contamination • Flexibility – available in either 10 mm or 25 mm diameter • Certified and guaranteed low levels of anion leaching

* Polypropylene



Ordering information

Anotop™ IC syringe filters

Membrane, pore size	Diameter	Quantity	Product code
Aluminum oxide, 0.2 µm	10 mm	50/pack	6809-9232
Aluminum oxide, 0.2 µm	10 mm	100/pack	6809-9233
Aluminum oxide, 0.2 µm	10 mm	200/pack	6809-9234
Aluminum oxide, 0.2 µm	25 mm	200/pack	6809-9244
Aluminum oxide, 0.2 µm	10 mm	250/pack individually blister packed	6809-9235

Dissolved organic carbons

Organic matter content is usually measured as dissolved organic carbon (DOC), an important component of the carbon cycle. DOC is defined as the organic matter that can pass through a filter, typically one with a 0.45 µm pore size.

Puradisc™ Aqua syringe filters are specifically designed for filtration of environmental samples prior to DOC analysis.

What are you testing for?	Product	Characteristics and benefits
Dissolved organic carbons	Puradisc™ Aqua 30 syringe filters	• Contain prewashed membranes (prior to assembly) to reduce organic carbon level and ensure low background • Designed for aqueous samples • Hydrophilic cellulose acetate membrane, 30 mm diameter

Ordering information

Puradisc™ Aqua syringe filters

Membrane, pore size	Diameter	Quantity	Product code
Cellulose acetate, 0.45 µm	30 mm	50/pack	10462656
Cellulose acetate, 0.45 µm	30 mm	100/pack	10462655
Cellulose acetate, 0.45 µm	30 mm	500/pack	10462650

HPLC, UHPLC, and other analytical techniques

What are you testing for?	Low solids content		Hard-to-filter samples		HPLC/GC autosamplers	
Product	**Puradisc™ H-PTFE syringe filter** Ordering information p. 14 	**SPARTAN™ syringe filter** Ordering information p. 14 	**Whatman GD/X™ Syringe Filters** Ordering information p. 15 	**GD/XP** Ordering information p. 17 	**Mini-UniPrep™ Syringeless Filters** Ordering information p. 19 	**Mini-UniPrep™ (G2) Syringeless Filters** Ordering information p. 18 
Characteristics and benefits	• Wide range of membranes, pore sizes and diameters • Pre-filter: no • Diameter: 4, 13, 25, or 30 mm • Available pore sizes: 0.1, 0.2, 0.45, 0.7, 0.8, 1.0, 1.2, 2, 5 µm • Membrane materials available: Cellulose acetate, nylon, PES, PVDF, PP, PTFE, GF, CA, RC, H-PTFE, CN	• HPLC certified • Pre-filter: no • Diameter: 13 or 30 mm • Available pore sizes: 0.2 or 0.45 µm • Membrane materials available: Regenerated cellulose	• For hard-to-filter samples • Pre-filter: multilayer glass filter • Diameter: 13 or 25 mm • Available pore sizes: 0.2, 0.45, 0.7, 1.0, 1.2, 1.6, 2.7, 5.0 µm • Membrane materials available: Cellulose acetate, nylon, PES, PVDF, PP, PTFE, RC, GF/A, GF/B, GF/C, GF/D, GF/F, 934-AH, H-PTFE • Also available in sterile option	• For hard-to-filter samples where analytes of interest are inorganic ions • Pre-filter: Multilayer polypropylene • Diameter: 25 mm • Available pore sizes: 0.45 µm • Membrane materials available: Nylon, PES, PVDF, PP, PTFE, DpPP	• All-in-one filter and polypropylene autosampler vial • Pre-filter: no • Slit-septum available • Translucent and amber housing available for light-sensitive samples • Dimensions: Once compressed equivalent to 12 mm × 32 mm vial • Available pore sizes: 0.2 or 0.45 µm • Membrane materials available: PTFE, RC, Nylon, PVDF, PES, PP, GMF, DpPP	• All-in-one filter and borosilicate glass autosampler vial • Pre-filter: no • Slit-septum available • Translucent and amber housing available for light-sensitive samples • Dimensions: Once compressed equivalent to 12 mm × 32 mm vial • Available pore sizes: 0.2 or • 0.45 µm • Membrane materials available: PTFE, Nylon, PVDF, PP, GMF, RC

RC = regenerated cellulose, PVDF = polyvinylidene difluoride, PTFE = polytetrafluoroethylene, PP = polypropylene, PES = polyethersulfone, GMF = glass microfiber filter, GF = glass fiber, CA = cellulose acetate, DpPP = Polypropylene depth filter and H-PTFE = Hydrophilic PTFE

Regenerated cellulose membranes

Suitable for filtration of both aqueous and organic samples. We offer a range of filters for sample preparation for commonly used analytical techniques in water monitoring such as:

• HPLC or UHPLC • Continuous flow analysis • Gas chromatography (GC)

Ordering information – chemical analysis of water

Puradisc™ syringe filters

Membrane type and diameter	Nylon 25 mm	PVDF 25 mm	PTFE 25 mm	PP 25 mm	PES 25 mm	H-PTFE 25 mm		CA 30 mm	
Pore size	Product code	Product code	Product code	Product code	Product code	Product code	Quantity	Product code	Quantity
0.2 µm	6751-2502	6747-2502	6785-2502	6788-2502	6781-2502	6773-2502	200/pack	10462710	100/pack
0.2 µm	6753-2502	–	6798-2502	6790-2502	6794-2502	6774-2502	1000/pack	10462700	500/pack
0.45 µm	6751-2504	6747-2504	6785-2504	6788-2504	6781-2504	6773-2504	200/pack	10462610	100/pack
0.45 µm	6753-2504	6749-2504	6798-2504	6790-2504	6794-2504	6774-2504	1000/pack	10462600	500/pack

SPARTAN™ syringe filters

Diameter		13 mm	13 mm with mini-tip	30 mm	
Membrane type	Pore size	Product code	Product code	Product code	Quantity
Regenerated cellulose	0.2 µm	10463100	10463040	10463060	100/pack
Regenerated cellulose	0.2 µm	10463102	10463042	10463062	500/pack
Regenerated cellulose	0.45 µm	10463110	10463030	10463050	100/pack
Regenerated cellulose	0.45 µm	10463112	10463032	10463052	500/pack

Ordering information – chemical analysis of water

Whatman GD/X™ syringe filters			Non-sterile		Sterile	
Membrane*	**Pore size (µm)**	**Diameter (mm)**	**150/pack**	**1500/pack**	**50/pack**	**500/pack**
Nylon high charge (positive)	0.2	25	6869-2502	–	–	–
	0.45	25	6869-2504	–	–	–
Nylon	0.2	13	6870-1302	6871-1302	–	–
	0.2	25	6870-2502	6871-2502	–	–
	0.45	13	6870-1304	6871-1304	–	–
	0.45	25	6870-2504	6871-2504	–	–
	5	25	6870-2550	6871-2550	–	–
PVDF	0.2	13	6872-1302	–	–	–
	0.2	25	6872-2502	6873-2502	6900-2502	–
	0.45	13	6872-1304	6873-1304	–	–
	0.45	25	6872-2504	6873-2504	6900-2504	–
PTFE	0.2	13	6874-1302	6875-1302	–	–
	0.2	25	6874-2502	6875-2502	–	–
	0.45	13	6874-1304	6875-1304	–	–
	0.45	25	6874-2504	6875-2504	–	–
PES	0.2	13	6876-1302	–	–	–
	0.2	25	6876-2502	6905-2502	6896-2502	6897-2502
	0.45	13	6876-1304	–	–	–
	0.45	25	6876-2504	6905-2504	6896-2504	6897-2504

* PP = Polypropylene; CA = Cellulose acetate; PES = Polyethersulfone; GF = Glass fiber; PVDF = Polyvinylidene difluoride; GMF = Glass microfiber; PTFE = Polytetrafluoroethylene, RC = Regenerated cellulose

			Non-sterile		Sterile	
Membrane*	**Pore size (µm)**	**Diameter (mm)**	**150/pack**	**1500/pack**	**50/pack**	**500/pack**
PP	0.2	13	6878-1302	–	–	–
	0.2	25	6878-2502	–	–	–
RC	0.2	25	6887-2502	–	–	–
	0.45	25	6882-2504	6883-2504	–	–
CA	0.2	13	6880-1302	–	–	–
	0.2	25	6880-2502	–	6901-2502	–
	0.45	13	6880-1304	–	–	–
	0.45	25	6880-2504	–	6901-2504	–
GF/A‡	1.6†	13	6882-1316	–	–	–
	1.6†	25	6882-2516	6883-2516	–	–
GF/B‡	1†	13	6884-1310	–	–	–
	1†	25	6884-2510	–	–	–
GF/C™‡	1.2†	13	6883-1312	–	–	–
	1.2†	25	6886-2512	–	–	–
GF/D‡	2.7†	13	6888-1327	–	–	–
	2.7†	25	6888-2527	–	–	–
GF/F‡	0.7†	13	6890-1307	–	–	–
	0.7†	25	6890-2507	6891-2507	–	–
	0.45†	13	6894-1304	–	–	–
934-AH™‡	1.5†	25	6892-2515	–	–	–
GMF†	0.45†	25	6894-2504	6895-2504	6902-2504	–

* PP = Polypropylene; CA = Cellulose acetate; PES = Polyethersulfone; GF = Glass fiber; PVDF = Polyvinylidene difluoride; GMF = Glass microfiber; PTFE = Polytetrafluoroethylene, RC = Regenerated cellulose

† Glass microfiber particle retention rating

‡ Contains GMF 150 without the GF/F prefilter

Whatman™ GD/XP syringe filters

Product code	Membrane*	Pore size (µm)	Diameter (mm)	Hydrophilic	Solvent resistance	Quantity/pack
6970-2504	Nylon	0.45	25	Yes	Good	150
6971-2504	Nylon	0.45	25	Yes	Good	1500
6972-2504	PVDF	0.45	25	Yes	Good	150
6973-2504	PVDF	0.45	25	Yes	Good	1500
6974-2504	PTFE	0.45	25	No	Very good	150
6978-2504	PP	0.45	25	No	Good	150
6993-2504	DpPP	0.45	25	No	Good	1500
6992-2504	DpPP	0.45	25	No	Good	150
6994-2504	PES	0.45	25	Yes	Poor	150
6995-2504	PES	0.45	25	Yes	Poor	1500

* PP = Polypropylene; PES = Polyethersulfone; PVDF = Polyvinylidene difluoride; PTFE = Polytetrafluoroethylene; DpPP = Polypropylene depth filter

Ordering information – chemical analysis of water

Mini-UniPrep™ G2 filter vials with inner glass storage vial

Note: Adjust autosampler needle height to a minimum of 5 mm from the bottom of the Mini-UniPrep™ (G2) Syringeless Filters.

Membrane	Pore size (µm)	Housing	Cap	Product code 100/pack	Product code 1000/pack	Product code Starter pack (100/pack + Hand compressor)
RC*	0.2	Translucent	Normal	GN203NPERC	GN503NPERC	GN203NPERCSP
RC	0.45	Translucent	Normal	GN203NPURC	GN503NPURC	GN203NPURCSP
PTFE*	0.2	Translucent	Normal	GN203NPEORG	GN503NPEORG	GN203NPEORGSP
PTFE	0.2	Translucent	Slit septum	GS203NPEORG	GS503NPEORG	GS203NPEORGSP
PTFE	0.2	Amber	Normal	GN203APEORG	–	GN203APEORGSP
PTFE	0.45	Translucent	Normal	GN203NPUORG	GN503NPUORG	GN203NPUORGSP
PTFE	0.45	Translucent	Slit septum	GS203NPUORG	GS503NPUORG	GS203NPUORGSP
PVDF*	0.2	Translucent	Normal	GN203NPEAQU	GN503NPEAQU	GN203NPEAQUSP
PVDF	0.2	Translucent	Slit septum	GS203NPEAQU	GS503NPEAQU	GS203NPEAQUSP
PVDF	0.2	Amber	Normal	GN203APEAQU	–	GN203APEAQUSP
PVDF	0.45	Translucent	Normal	GN203NPUAQU	GN503NPUAQU	GN203NPUAQUSP
PVDF	0.45	Translucent	Slit septum	GS203NPUAQU	GS503NPUAQU	GS203NPUAQUSP
Nylon	0.2	Translucent	Normal	GN203NPENYL	GN503NPENYL	GN203NPENYLSP
Nylon	0.2	Translucent	Slit septum	GS203NPENYL	GS503NPENYL	GS203NPENYLSP
Polypropylene	0.2	Translucent	Normal	GN203NPEPP	GN503NPEPP	GN203NPEPPSP
Polypropylene	0.2	Translucent	Slit septum	GS203NPEPP	–	GS203NPEPPSP
Glass fiber	0.45	Translucent	Normal	GN203NPUGMF	GN503NPUGMF	GN203NPUGMFSP
Glass fiber	0.45	Translucent	Slit septum	GS203NPUGMF	–	GS203NPUGMFSP

* PTFE = polytetrafluoroethylene; PVDF = polyvinylidene difluoride; RC = regenerated cellulose

Hand compressor	Product code
Mini-UniPrep™ G2 hand compressor 1/pack	MUPG2HCPWC1
Multi-compressor	
Mini-UniPrep™ G2 multi-compressor 1/pack, comes with one tray	MUPG2MCPWC8
Mini-UniPrep™ G2 multi-compressor tray 1/pack	MUPG2MCWT8

Hand compressor

Mini-UniPrep™ filter vial with polypropylene housing

Note: Adjust autosampler needle height to a minimum of 3 mm from the bottom of the Mini-UniPrep™.

Membrane	Pore size (µm)	Housing	Cap	Product code 100/pack	Product code 1000/pack
PTFE*	0.2	Translucent	Standard	UN203NPEORG	UN503NPEORG
PTFE	0.2	Translucent	Slit septum	US203NPEORG	US503NPEORG
PTFE	0.2	Amber	Standard	UN203APEORG	–
PTFE	0.45	Translucent	Standard	UN203NPUORG	UN503NPUORG
PTFE	0.45	Translucent	Slit septum	US203NPUORG	US503NPUORG
PTFE	0.45	Amber	Standard	UN203APUORG	–
PVDF*	0.2	Translucent	Standard	UN203NPEAQU	UN503NPEAQU
PVDF	0.2	Translucent	Slit septum	US203NPEAQU	US503NPEAQU
PVDF	0.2	Amber	Standard	UN203APEAQU	–
PVDF	0.45	Translucent	Standard	UN203NPUAQU	UN503NPUAQU
PVDF	0.45	Translucent	Slit septum	US203NPUAQU	US503NPUAQU
PVDF	0.45	Amber	Standard	UN203APUAQU	–
PES*	0.2	Translucent	Standard	UN203NPEPES	UN503NPEPES
PES	0.2	Translucent	Slit septum	US203NPEPES	US503NPEPES

* RC = regenerated cellulose; PVDF = Polyvinylidene difluoride; PTFE = Polytetrafluoroethylene; PP = Polypropylene; PES = Polyethersulfone;

Membrane	Pore size (µm)	Housing	Cap	Product code 100/pack	Product code 1000/pack
PES	0.2	Amber	Standard	UN203APEPES	–
PES	0.45	Translucent	Standard	UN203NPUPES	UN503NPUPES
PES	0.45	Amber	Standard	UN203APUPES	–
PES	0.45	Translucent	Slit septum	US203NPUPES	US503NPUPES
RC*	0.2	Translucent	Standard	UN203NPERC	UN503NPERC
RC	0.45	Translucent	Standard	UN203NPURC	UN503NPURC
Nylon	0.2	Translucent	Standard	UN203NPENYL	UN503NPENYL
Nylon	0.2	Translucent	Slit septum	US203NPENYL	US503NPENYL
Nylon	0.2	Amber	Standard	UN203APENYL	–
Nylon	0.45	Translucent	Standard	UN203NPUNYL	UN503NPUNYL
Nylon	0.45	Translucent	Slit septum	US203NPUNYL	US503NPUNYL
Nylon	0.45	Amber	Standard	UN203APUNYL	–
PP*	0.2	Translucent	Standard	UN203NPEPP	UN503NPEPP
PP	0.2	Translucent	Slit septum	US203NPEPP	US503NPEPP
PP	0.2	Amber	Standard	UN203APEPP	–
PP	0.45	Translucent	Standard	UN203NPUPP	UN503NPUPP
PP	0.45	Translucent	Slit septum	US203NPUPP	US503NPUPP
PP	0.45	Amber	Standard	UN203APUPP	–
DpPP*	0.45	Translucent	Standard	UN203NPUDPP	UN503NPUDPP
DpPP	0.45	Translucent	Slit septum	US203NPUDPP	US503NPUDPP
DpPP	0.45	Amber	Standard	UN203APUDPP	–
Glass fiber	0.45	Translucent	Standard	UN203NPUGMF	US503NPUGMF
Glass fiber	0.45	Translucent	Slit septum	US203NPUGMF	US503NPUGMF
Glass fiber	0.45	Amber	Standard	UN203APUGMF	–

* RC = regenerated cellulose; PVDF = Polyvinylidene difluoride; PTFE = Polytetrafluoroethylene; PP = Polypropylene; PES = Polyethersulfone; DpPP = Polypropylene depth filter

Multi-compressor

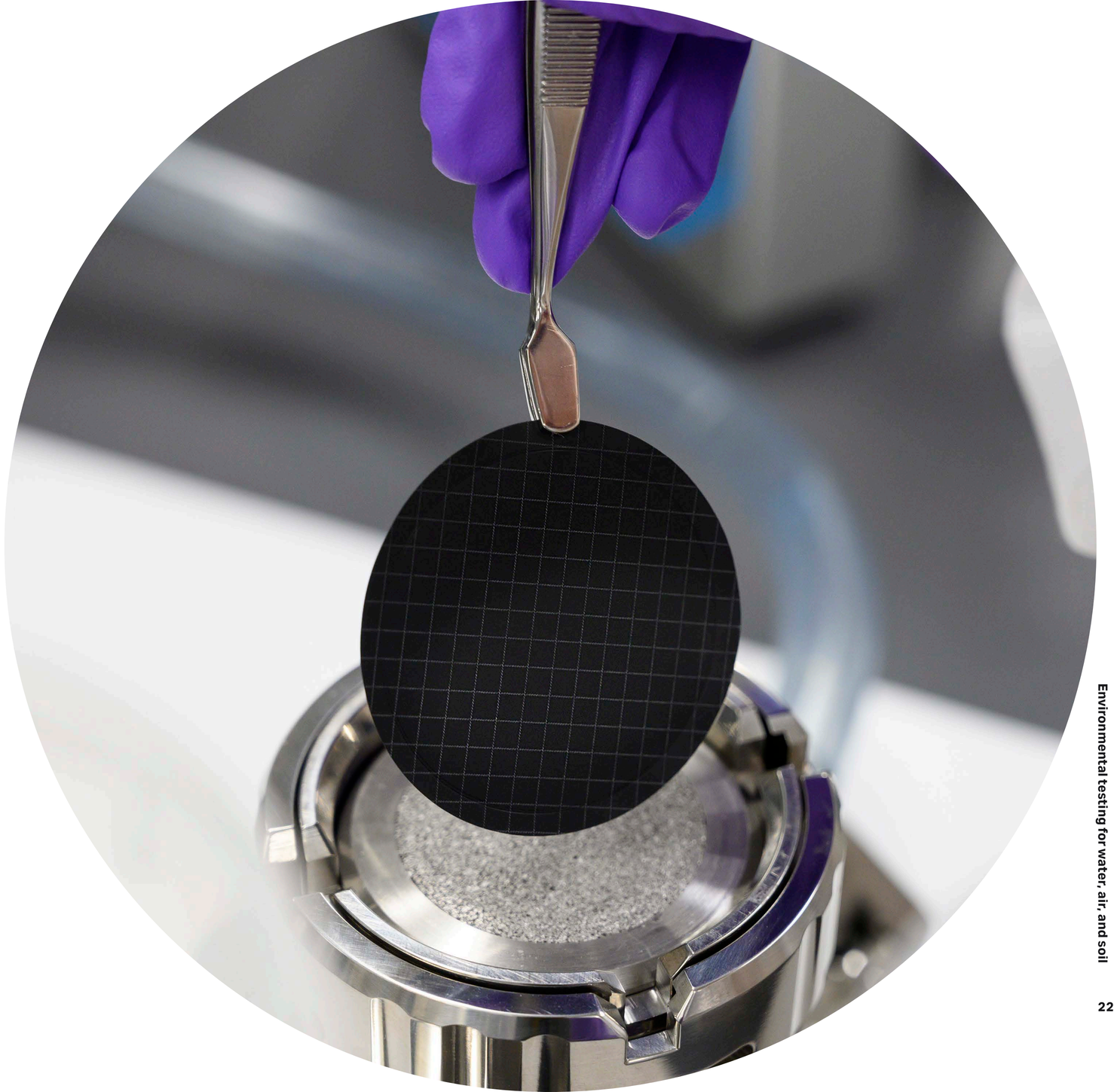
Description	Product Code
Mini-UniPrep™ multi-compressor 1/pack comes with one tray	MUPMCPBC8
Mini-UniPrep™ multi-compressor tray 1/pack	MUPMCBT8

Mini-UniPrep™ filter vial replaces syringe filter, syringe, autosampler vial, cap, and septum

Microbiological analysis

The membrane filtration (MF) technique is an effective and accepted method for testing fluid samples for microbiological contamination. In addition to the available range of pore sizes, diameters, material and color, MF Technique is a popular method for the following reasons:

- Improved sensitivity: allows for concentration of the content of larger sample volumes onto the surface of a membrane filter.
- Separation from inhibitory substances: organisms are captured on the membrane and any substance dissolved in the water, such as chlorine compounds or heavy metals, will flow through the membrane.
- Neutralization of inhibitory substances: the use of rinse buffers also acts to rinse away and neutralize substances that could impede or inhibit organism growth.
- Isolated colonies: the resulting growth on the membrane surface develops into discrete colonies that can be easily counted and selected for further characterization or identification, if necessary.



Membranes

We provide a wide and versatile range of filtration membranes that consistently deliver high-quality performance. The appropriate membrane filter choice will depend on the methodology being followed. ME and MicroPlus membranes are sterile and individually packed.

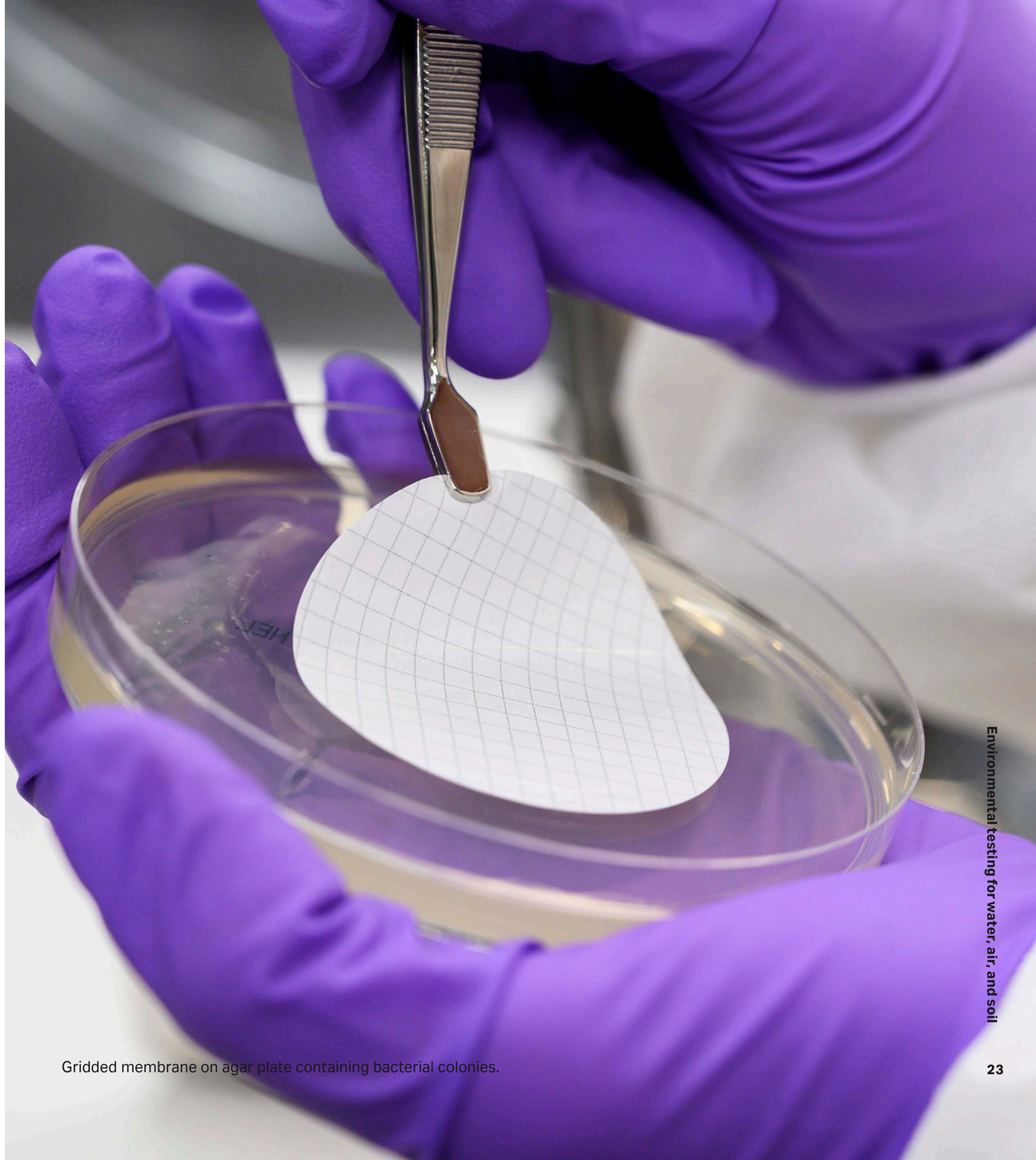
Membrane material	Cellulose mixed ester	High-flux cellulose nitrate	Polycarbonate
Product name	ME	MicroPlus	Nuclepore™
Color	White, black or green	White or black	White or black
Pore size	0.2 µm/0.45 µm/ 0.6 µm/0.8 µm	0.45 µm	0.2 µm/0.4 µm (and other pore sizes)
Application examples	*Enterococcus, E. coli, Clostridia,* Fecal coliforms, *Staphyloccus, Pseudomonas aeruginosa, Legionella etc*		*Legionella*

Filtration considerations

The first consideration for filter selection is often the published method for the particular organism which can be very specific or may allow some range of choice.

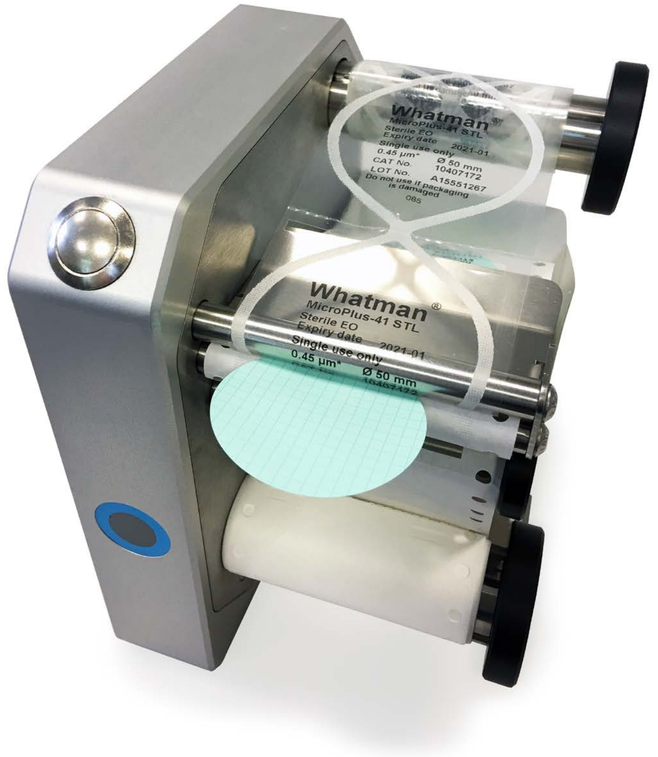
Physical properties including pore size, grid line, wettability, colony color vs. membrane color, and growth medium can all impact colony recoveries and accuracy of results.

Our membrane selection ensures you can select the most suitable filter for your microbiological application.



Gridded membrane on agar plate containing bacterial colonies.

What are you testing for?	Product	Characteristics and benefits
Bacterial count and/or detection	Membranes	• Both sterile and nonsterile options • Range of pore sizes available • ME and MicroPlus membranes are sterile and individually packed. They contain a folded strip of filters for use with our membrane dispenser
	Accessories: eButler Membrane Dispenser	• Push-button or touchless sensor dispense of an individual sterile membrane disc • Cross-contamination risks are minimized • Used packaging material contained on reels to provide a clutter-free, cleaner workspace
	Other microbiological control accessories: tweezers, autoclaving bags, standard manifolds	• Round-tip tweezers to protect from damage when transferring membrane • Autoclave sleeves useful for autoclaving plastic, glass or stainless steel funnels • 3 or 6-place standard manifolds in durable stainless steel construction accept a #8 stopper for use with a variety of filter funnels



Ordering information

Membrane filters

Diameter					25 mm	47 mm	50 mm	
Membrane	**Pore size**	**Color**	**Sterile**	**eButler compatible**	**Product code**	**Product code**	**Product code**	**Quantity**
Cellulose mixed ester, ME type	0.2 µm	white	yes	no	–	10406970	10406972	100/pack
	0.2 µm	white	yes	yes	–	10408712	10408714	400/pack
	0.45 µm	white	yes	no	–	10406870	10406872	100/pack
	0.45 µm	white	yes	yes	–	10407312	10407314	400/pack
	0.45 µm	black/white grid	yes	yes	–	10409770	–	100/pack
	0.45 µm	black/white grid	yes	yes	–	10407332	–	400/pack
Cellulose nitrate, MicroPlus	0.45 µm	white	yes	no	–	10407713	10407714	100/pack
	0.45 µm	white	yes	yes	–	10407112	10407114	400/pack
	0.45 µm	black	yes	no	–	–	10407734	100/pack
	0.45 µm	black	yes	yes	–	10407132	–	400/pack
Polycarbonate, Nuclepore™	0.2 µm	white	no	no	–	111106	111206	100/pack
	0.4 µm	white	no	no	–	111107	111207	100/pack
	0.8 µm	black	no	no	110659	–	–	100/pack

Whatman™ eButler membrane filter dispenser

Whatman™ eButler membrane filter dispenser from Cytiva is operated manually to dispense a sterile disc of membrane for microbiological applications.

- Durable design for reliable performance.
- Easy grasp handle to dispense filter.
- Minimized cross-contamination risks by eliminating handling of individually sealed filters.
- Suitable for use on sterile benches.
- Compact size for portability and preserve area of workspace.

Accessories for microbiological control

Product	Description	Quantity/pack	Product code
eButler Membrane Dispenser	eButler Membrane Dispenser	1	10477103
Forceps	PZ 001, smooth tip, stainless steel	1	10477602
3-place manifold	Standard design stainless steel	1	10498761
6-place manifold	Standard design stainless steel	1	10498762

Stainless steel filter funnel manifold.

02
Air monitoring

Particulate monitoring

Manual air sampling

Two of the most significant fractions of suspended particulate matter are the respirable fraction (< 2.5 µm) and the inhalable fraction (< 10 µm). Two important tests performed in air monitoring of particulate matter, PM 2.5 and PM 10, pertain to these two fractions. Whatman™ glass fiber filters from Cytiva are recommended for gravimetric determination of airborne particulates, such as PM 10, stack sampling, and absorption methods of air pollution monitoring.

In the analysis of collected particulate matter, select your filter medium carefully. The filter medium should give little or no background level for the elements and/or compounds being analyzed, and should cause minimal interference in the determination.

Glass fiber filters and thimbles

Whatman™ glass microfiber filters (such as GF/A and EPM 2000) and quartz filters (such as QM-A and QM-C) are particularly suitable for gravimetric determination of particulates due to the high retention efficiency of the media combined with rapid flow characteristics, low pressure drop, high loading capacity, and low affinity for moisture.

Stack gases are often monitored at high temperatures for which glass microfiber or quartz filters, such as QM-A and QM-C or thimbles, are appropriate.

PTFE membranes

PTFE membranes are often used for specific gravimetric analyses (e.g., PM 2.5 monitoring or vehicle emissions testing). Whatman™ TE type and PM 2.5 are chemically resistant and possess low chemical background interference (e.g., metals), allowing the user to carry out sensitive determinations.

Whatman™ TE membranes are general purpose PTFE membrane filters that have multiple applications in environmental analysis.

PM 2.5 filters are used for the measurement of fine particulate matter in the atmosphere for the EPA PM 2.5 Reference Method (under the requirements of 40 CFR Part 50 Appendix L).

What are you testing for?	Product	Characteristics and benefits
Particulate manual sampling: normal environment	• **Glass fiber filters such as GF/A and EPM 2000** • **PTFE TE type** • **Glass fiber thimbles** • **PM 2.5 membranes** Ordering information for all products p. 31-33 	**GF/A** • Binder free • Glass fiber • Fine particle retention • High flow rate • Good loading capacity **EPM 2000** • Binder free • Glass fiber • Used in high-volume PM-10 air sampling equipment • Detailed chemical analysis of trace pollutants **Glass fiber thimbles** • Binder and binder free • Glass fiber • Used at temperatures up to 500°C **GF 10** • Binder • Glass fiber • Extreme mechanical stability • Used up to 180°C	**TE type PTFE membranes** • Suitable for filtration of gases and liquids • Resistant to most acids, alkalis, and solvents such as sodium hydroxide and hexane • Laminated onto a nonwoven polypropylene support material • Increased durability for aggressive testing environments • Hydrophobic characteristics prevent passage of aqueous aerosols (e.g., during venting applications) **PM 2.5 membranes** • Used for PM 2.5 ambient air monitoring • Conform to EPA PM 2.5 reference method under the requirements of 40 CFR Part 50 Appendix L • Do not contain glues or adhesives • Sequentially numbered for easy traceability of the filter • Chemically resistant polypropylene support ring, which eliminates curling and makes the filter robot-friendly • Retain a minimum of 99.7% of 0.3 µm size particulates

* Please contact your Cytiva representative for information on SAS and PAS cards

What are you testing for?	Product	Characteristics and benefits	
Particulate manual sampling: aggressive environment (high temperature and acidic)	• **Quartz fiber filter such as QM-A, QM-C and QM-H** • **Quartz fiber thimbles** Ordering information for all products p. 38 	**QM-A quartz fiber filters** • High-purity quartz microfiber • Used for air sampling, particularly at high temperatures up to 500°C **QM-C quartz fiber filters** • 100% pure quartz microfiber, without any binder or organic chemicals • Temperature resistance up to 1200°C • Batch-specific metal report is available on the website for downloading • Each batch comes with certificate of analysis for the six most important metals (Pb, Ni, Cd, Cr, Ar and Zn), and trace metal report including 27 metals Certified to conform to European and US EPA standards for heavy metal analysis in air particulate matter **QM-H quartz fiber filters** • 100% pure quartz • Can be used up to 900°C • Low heavy metal content	**Quartz fiber thimbles** • Made from high-purity quartz microfiber • Able to withstand high temperatures up to 800°C • Suitable for both solvent extraction and air sampling applications
Particulate automated sampling	• **Glass microfiber reels** Ordering information p. 33	• Binder • Glass fiber	• Extreme mechanical stability • Used up to 180°C
Radioactivity	• **Grade 72** Ordering information p. 32 • **SAS cards for static air sampling*** • **PAS cards for personal air sampling*** • **Glass fiber filters such as GF/A** Ordering information p. 32	**Grade 72** • Glass fiber and cellulose • Used to absorb radioactive iodine in air pollution monitoring and in nuclear installations	
Metal chemical analysis	• **Mixed cellulose ester membranes** Ordering information p. 31	• Typically used in applications for the determination of metals in airborne particulates	

* Please contact your Cytiva representative for information on SAS and PAS cards

Ordering information – manual air sampling

Membrane filters

Diameter		25 mm	37 mm	46.2 mm	47 mm	50 mm	
Membrane type	**Pore size**	**Product code**	**Product code**	**Product code**	**Product code**	**Product code**	**Quantity**
PM 2.5 PTFE membrane	2 µm	–	–	7592-104	–	–	50/pack
TE type PTFE membrane	0.2 µm	10411405	–	–	10411411	10411413	50/pack
	0.45 µm	10411305	–	–	10411311	10411313	50/pack
	1 µm	10411205	–	–	10411211	10411213	50/pack
	5 µm	–	10411108	–	10411111	10411113	50/pack
Mixed cellulose ester membrane	0.2 µm	10401706	–	–	10401712	10401714	100/pack
	0.45 µm	10401606	–	–	10401612	10401614	100/pack
	0.8 µm	10400906	10400909	–	10400912	10400914	100/pack
	3 µm	10400706	–	–	10400712	10400714	100/pack

Ordering information – manual air sampling

Glass fiber filters: circles and sheets

Dimensions	25 mm	37 mm	47 mm	50 mm	90 mm	8 × 10 inches (sheet)	
Membrane type	**Product code**	**Product code**	**Product code**	**Product code**	**Product code**	**Product code**	**Quantity**
GF/A	1820-025	1820-037	1820-047	1820-050	1820-090	1820-866	100/pack
EPM 2000	–	–	1882-047	–	–	1882-866	100/pack
GF 10	–	–	–	–	10370305	–	100/pack
GF 10	–	–	10370319	10370302	–	–	200/pack
Grade 72	–	–	1872-047	–	–	–	100/pack

Glass fiber thimbles

Dimensions*	22 × 80 mm	25 × 100 mm	26 × 100 mm	33 × 94 mm	10 × 38 mm	19 × 90 mm	
Binder	**Product code**	**Product code**	**Product code**	**Product code**	**Product code**	**Product code**	**Quantity**
Inorganic binder	10371011	10371019	10371023	10371042	10371103	–	25/pack
No binder	–	–	–	–	–	2814-199	25/pack

* internal diameter × external length

Other dimensions available for thimbles (with or without binder). Please contact your Cytiva representative.

Cellulose Soxhlet extraction thimble

Dimensions	Single 1 mm wall, 25 × 80 mm	Single 1 mm wall, 33 × 80 mm	Single 1 mm wall, 33 × 94 mm	Single 1 mm wall, 43 × 123 mm	
Binder	**Product code**	**Product code**	**Product code**	**Product code**	**Quantity**
Cellulose Soxhlet extraction thimble	2800-258	2800-338	2800-339	2800-432	25/pack

High-purity glass Soxhlet extraction thimbles.

Quartz Extraction Thimble

Dimensions	25 x 90 mm	
Binder	**Product code**	**Quantity**
Quartz Extraction Thimble	2812-259	10/pack

Glass fiber reel for automated samplers.

Automated air sampling

Our microfiber filter can be customized in reel format for automated air sampling systems.

Glass fiber filters with binder, reels

Dimensions	70 mm × 50 m	35 mm × 30 m	40 mm × 42 m	50 mm × 100 m	30 mm × 20 m	40 mm × 17 m CORE 28 mm	
Grade	**Product code**	**Product code**	**Product code**	**Product code**	**Product code**	**Product code**	**Quantity**
GF 10	10370384	10370392	10370393	10370394	10370381	10370429	1/pack

Other reel dimensions are available. Please contact your Cytiva representative.

Chemical analysis

Heavy metals, organics, and inorganics

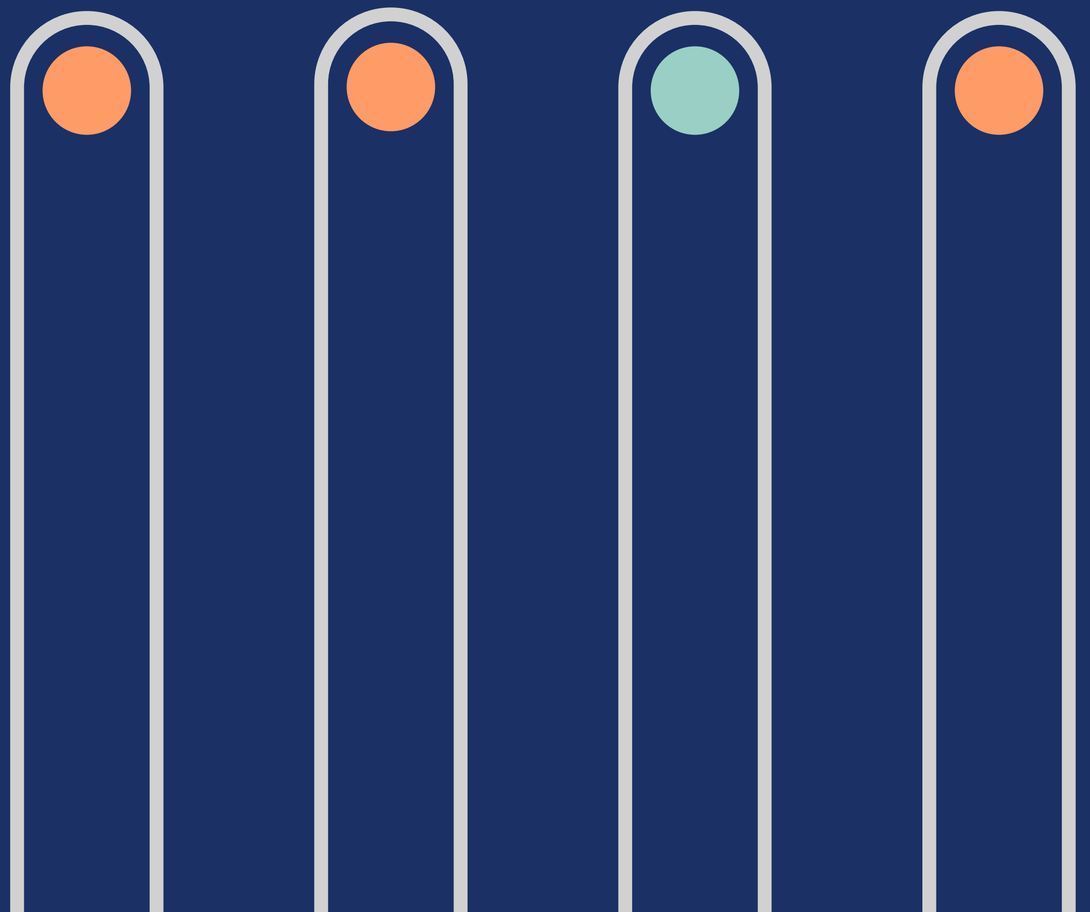
Air pollution monitoring from stacks, flues, and aerosols requires a filter that can withstand chemically harsh environments and high temperatures. For these reasons, high-purity quartz (SiO_2) microfiber filters are favored for air pollution monitoring as well as for heavy metals analysis.

Quartz fiber filters and thimbles

Cytiva offers three types of quartz filters — QM-A, QM-C and QM-H. The low level of alkaline earth metals in these filters virtually eliminates artifact products of sulfates and nitrates (from SO_2 and NO_2, respectively).

Mixed cellulose ester membranes

Mixed cellulose membranes from Cytiva can also meet your environmental air monitoring requirements. These membranes are typically used in applications for the determination of metals in airborne particulates.



What are you testing for?	Product	Characteristics and benefits
Heavy metals	• **Quartz fiber filters such as QM-A, QM-C and QM-H** Ordering information p. 38	**QM-A** • High-purity quartz microfiber • Used for air sampling, particularly at high temperatures up to 800°C **QM-C** • 100% pure quartz microfiber, without any binder or organic chemicals • Temperature resistance up to 1200°C • Batch-specific metal report is available on the website for downloading • Certified to conform to European and US EPA standards for heavy metal analysis in air particulate matter • Each batch comes with certificate of analysis for the six most important metals (Pb, Ni, Cd, Cr, Ar and Zn), and trace metal report including 27 metals **QM-H** • 100% pure quartz • Can be used up to 900°C • Low heavy metal content
Other organic or inorganic chemicals (such as ozone, volatile organic carbons, SO_2, NO_2, CO, Benzoate)	• **Glass fiber filters such as GF/A** Ordering information p. 32 • **Quartz fiber filters such as QM-A, add QM-C and QM-H** Ordering information p. 38 • **Cellulose filters*** • **PTFE membranes** Ordering information p. 31 • **EPM 2000 glass fiber filters** Ordering information p. 32	**Quartz fiber thimbles** • Made from high-purity quartz microfiber • Withstands high temperatures up to 800°C • Suitable for both solvent extraction and air sampling applications

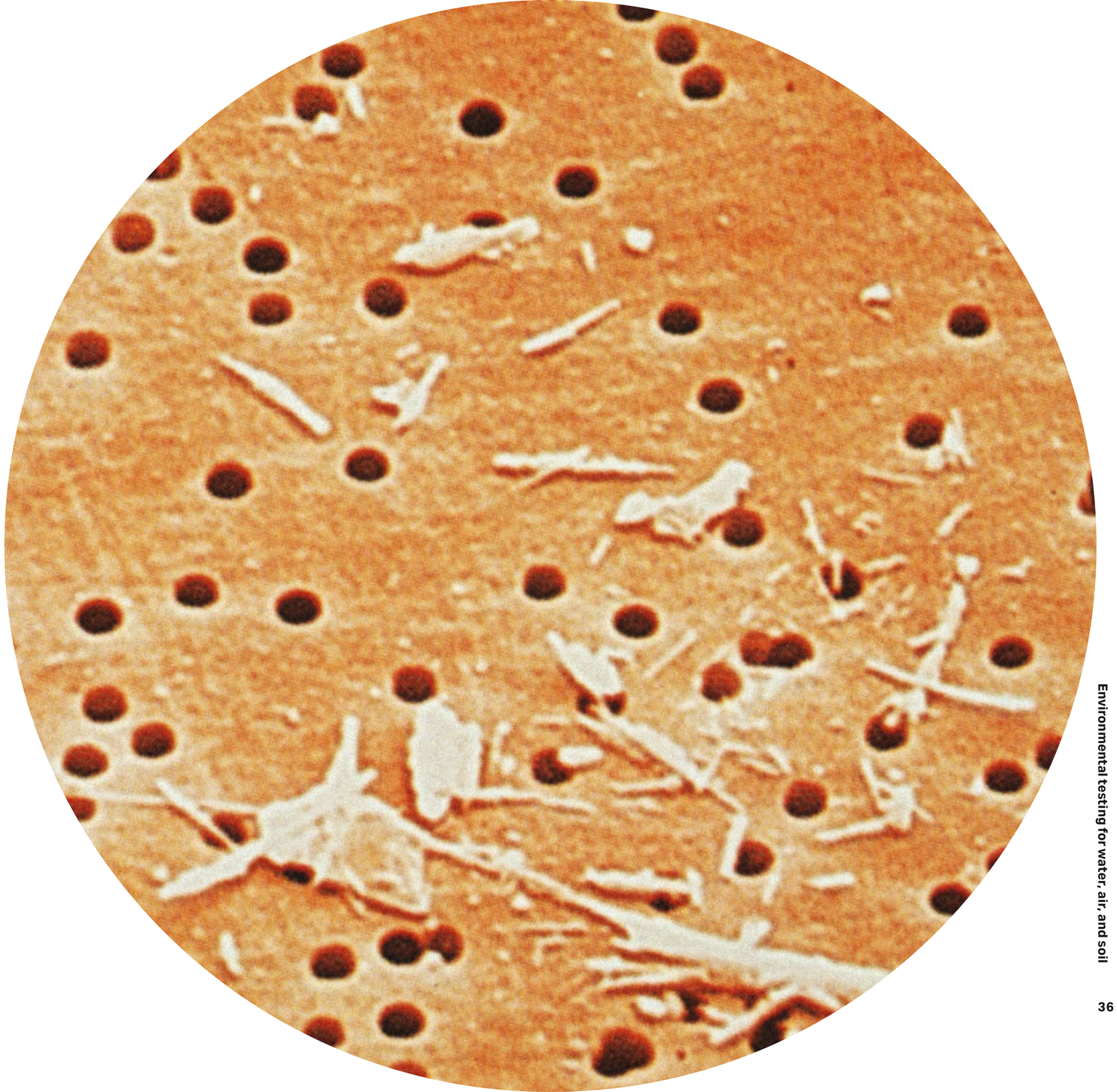
QM-C quartz fiber filter

* Please contact your Cytiva representative for information on cellulose filters

Asbestos testing

Asbestos analysis is commonly undertaken with microscopy techniques such as scanning electron microscopy (SEM), transmission electron microscopy (TEM), and phase contrast microscopy (PCM).

These methods usually involve sampling and/or observation, both of which involve the use of membrane filters such as polycarbonate or mixed cellulose ester membranes.



Optical analysis for asbestos sampling

Cytiva provides Whatman™ membranes for the main asbestos sampling methods.

Transmission electron microscopy method

Two membrane materials are typically recommended for this method:

- Mixed ester membrane (e.g., WME membrane)
- Polycarbonate membrane (e.g., Whatman™ Cyclopore™ or Nuclepore™ membranes)

See the following tables for more information.

Phase-contrast microscopy method

One of the techniques used to optically determine the asbestos fiber count is the “hot block” method. The membrane filter that is used to collect fibers from a defined volume of air is crucial to this method. During processing the membrane is made transparent with acetone vapor. Mixed cellulose ester membrane from Cytiva is recommended for this application.

Scanning electron microscopy method

Cytiva offers a range of polycarbonate membranes, Cyclopore™ and Nuclepore™. Nuclepore™ is also available in a gold-coated format.

What are you testing for?	Product	Characteristics and benefits
Asbestos	**Membraclear mixed cellulose ester membrane** Ordering information p. 35	• Typically used for phase contrast microscopy (PCM) and Transmission electron microscopy (TEM) • Cellulose mixed ester membrane • Gridded, 0.8 µm pore size, 25 mm surface area with high loading capacity • High flow rates
	Nuclepore™ and Cyclopore™ polycarbonate membrane Ordering information p. 35	• Manufactured with proprietary Whatman™ technology for controlled pore size distribution • Smooth, flat membrane; particles are retained on surface so are easily visible during optical analysis • Nuclepore™ polycarbonate membrane available in two versions: gold coated or not gold coated • Typically used for electron microscopy

Ordering information

Quartz fiber filters

Product name	Dimensions	Product code	Quantity
QM-A quartz fiber filter	25 mm diam.	1851-025	100/pack
	37 mm diam.	1851-037	100/pack
	47 mm diam.	1851-047	100/pack
	50 mm diam.	1851-050	100/pack
	90 mm diam.	1851-090	100/pack
	8 × 10 inches (sheet)	1851-8866	100/pack
QM-C (100% pure) quartz fiber filter	37 mm diam.	1855-037	100/pack
	45 mm diam.	1855-045	100/pack
	47 mm diam.	1855-047	100/pack
	50 mm diam.	1855-050	100/pack
	82 mm diam.	1855-082	100/pack
	90 mm diam.	1855-090	100/pack
	110 mm diam.	1855-110	100/pack
	150 mm diam.	1855-150	100/pack
	8 × 10 inches sheet	1855-865	25/pack
	8 × 10 inches sheet	1855-866	100/pack
QM-H (100% pure) quartz fiber filter	37 mm diam.	1853-037-50	50/pack
	47 mm diam.	1853-047-50	50/pack
	50 mm diam.	1853-050-50	50/pack
	90 mm diam.	1853-090-50	50/pack
	150 mm diam.	1853-150-50	50/pack

Glass fiber extraction thimbles, 1.5 mm thick

Dimensions*	Product code	Quantity
22 × 80 mm	10371011	25/pack
25 × 100 mm	10371019	25/pack
26 × 100 mm	10371023	25/pack
33 × 94 mm	10371042	25/pack
10 × 38 mm	10371103	25/pack

* internal diameter × external length

Quartz fiber extraction thimbles, 2 mm thick

Dimensions*	Product code	Quantity
25 x 90 mm	2812-259	10/pack

* internal diameter × external length

Membrane filters for asbestos sampling and analysis

Diameter		25 mm	37 mm	47 mm	
Membrane	**Pore size**	**Product code**	**Product code**	**Product code**	**Quantity**
Nuclepore™ polycarbonate membrane	0.2 µm	10417006	–	10417012	100/pack
	0.4 µm	10417106	–	10417112	100/pack
	0.8 µm	10417306	10417309	10417312	100/pack
Cyclopore™ polycarbonate membrane	0.2 µm	10417606	–	10417612	100/pack
	0.4 µm	10417706	–	10417712	100/pack
	1.0 µm	–	–	7060-4710	100/pack
Membraclear cellulose mixed ester membrane		7141-025	–	–	100/pack

03 Soil testing

Chemical analysis

Soil sample analysis requires that chemical compounds are first extracted from their matrix using pH, then heat modulated and concentrated. Filters and filtration-related products play key roles throughout this process. Quality is essential to maintain the integrity of results.

What are you testing for?	What testing method?	Product
Nitrogen	Kjeldahl analysis	**Weighing boats** Ordering information p. 48
Pesticide detection	Soxhlet extraction	**Thimbles (cellulose)** Ordering information p. 48
Trace elements	Spectrophotometry and chromatography	**Syringe filters** Ordering information p. 14-15
Phosphorus	Colorimetry	**Cellulose filter papers** Ordering information p. 48
pH	pH testing	**Indicator papers** Ordering information p. 48
Retained solids and clarified solution	Gravimetric analysis. Various quantitative and qualitative analytical techniques	**Quantitative or qualitative cellulose filter papers** Ordering information p. 48

Kjeldahl nitrogen analysis

Measuring soil nitrogen content can help refine nitrogen fertilizer addition before planting.

Nitrogen content analysis is typically done with Kjeldahl techniques, which involve sampling an exact amount of soil before transfer to a digestion tube. Weighing papers with low nitrogen content make the sample transfer easy and quick without loss of material and with minimal interference with the end result. The sample may need to be filtered through a Whatman™ qualitative filter paper prior to analysis.

Low nitrogen content weighing boats.

Soxhlet extraction for chemical detection

Prior to analysis by, for example, gas chromatography (GC), soils may be prepared using Soxhlet extraction or microwave digestion. Extraction thimbles are widely used for Soxhlet techniques. Qualitative filter papers or glass fiber filters can help clear extracts after microwave extraction. Samples may then be refiltered with a 0.45 µm filter to remove small particles and protect your GC instrument. The Mini-UniPrep™ syringeless filter, which is an all-in-one filter and autosampler vial, allows you to process samples faster than traditional syringe filters and eliminates multiple consumables. See pages 18-21 for Mini-UniPrep™ Syringeless filter ordering information.

Extraction thimbles in Soxhlet extraction apparatus.

Spectroscopy and chromatography for trace element analysis

Trace element analysis in soil generally involves determination of essential nutrients for plant growth (e.g., potassium, magnesium, calcium) and detection of potential heavy metal contamination (e.g., lead, chromium, arsenic, zinc, copper, cadmium, mercury, and nickel).

Most trace element tests are based on extracting soil and measuring the concentration of trace elements in the soil-free liquid phase using for example inductively coupled plasma atomic emission spectrometry (ICP-AES). Extraction methods can vary between laboratories. The sample then generally needs to be filtered through a qualitative filter paper or glass fiber filter to make sure it will not clog nebulizers or interfere with injection into the analysis instrument. If digested with aqua regia, the sample may be filtered through an ashless filter paper. If syringe filters are used as an additional sample preparation step, please see “HPLC, UHPLC, and other analytical techniques” on page 13.

Whatman™ cellulose filter paper.

Colorimetry for phosphorus analysis

The amount of phosphorus fertilizer required to achieve maximum plant growth can be determined through soil phosphorus testing. Soils with low or medium phosphorus content will likely show higher yields if extra phosphorus is added. However, crops are not likely to respond with a yield increase in soils with high or very high phosphorus content.

To determine the soil phosphorus content, the soil is extracted with a chemical solution and the phosphorus content in the extract is measured by colorimetry. Filtration of the extract through a qualitative filter paper is generally needed before analysis. If an automated method is used for determining phosphorus concentration, acid-resistant filter paper may be needed.

Whatman™ Grade 40 ashless filter paper.

Whatman™ folded filter paper

Ready-to-use paper solutions

Pre-folded filter papers can save valuable time in the lab, providing Convenience and ease of use when undertaking repetitive or multiple analyses.

Customized formats

Whatman™ qualitative and quantitative grade filter papers are now available in new folded cone, pyramid, and flat quadrant formats, in our full range of diameters and grades to support your application needs.

Product	Key benefits
Pyramid folded Cone folded Quadrant folded	• The ready-to-use prefolded/prepleated filter papers are offered in wide range grades, diameters, formats, and versions (circle/sheets) • Products are folded using automation—making sure optimal folding/pleating angle, stacking alignment and labelling is maintained • Robust and standard packaging materials to ensure prefolded prepleating formats are secured till the end user or the application • Customization to support user needs—ability to quickly develop a new product (grade, diameter, format, pack size) • Automation and robust manufacturing practice, ensure product quality, performance and reliable results

Ordering information

Filter papers quadrant folded

Grade	Nominal thickness (µm)	Nominal basis weight (g/m²)	Nominal ash content (%)[1]
1 FF	180	87	0.06
40 FF	210	95	0.007
41 FF	215	85	0.007
0858 FF	170	75	–

Filter papers—pyramid folded and cone grades

Grade	Nominal thickness (µm)	Nominal basis weight (g/m²)	Nominal ash content (%)[1]
1	180	87	0.06
4	210	92	0.06
6	180	100	0.15
40	210	95	0.007
41	215	85	0.007
42	200	100	0.007
540	160	85	0.005

Filter papers quadrant folded

Diameter (mm)	Description	Product code	Quantity/pack
110	Grade 1 FF Quadrant	10380404	500
125	Grade 1 FF Quadrant	10380405	500
150	Grade 1 FF Quadrant	10380406	500
110	Grade 40 FF Quadrant	10380004	500
125	Grade 40 FF Quadrant	10380005	500
150	Grade 40 FF Quadrant	10380006	500
110	Grade 41 FF Quadrant	10380204	500
125	Grade 41 FF Quadrant	10380205	500
150	Grade 41 FF Quadrant	10380206	500
185	Grade 0858 FF Quadrant	10334348	100

[1] Ash is determined by ignition of the cellulose filter at 900°C in air

44 FF quadrant flat folded filter papers

Filter papers—pyramid folded grades

Diameter (mm)	Grade	Product code	Quantity/pack
90	42	989610137	1000
90	540	1540-10123	1000
110	4	989810116	1000
110	41	989510116	1000
110	42	989610116	1000
110	540	1540-10124	1000
125	1	989710112	1000
125	4	989810112	1000
125	6	9891-128	1000
125	40	9892-128	1000
125	41	989510112	1000
125	42	989610112	1000

Filter papers—cone folded grades

Diameter (mm)	Grade	Product code	Quantity/pack
110	Grade 1	990110116	1000
110	Grade 40	990010116	1000
125	Grade 40	990010112	1000

This is an example of products set-up; please contact us at scientific.support@cytiva.com for a full listing of available products.

Pyramid folded filter papers and Cone folded filter papers

pH testing

The pH of soil is vital to evaluate how well it holds minerals. When the soil it too acidic, minerals will be leached out by rainwater before the plants have a chance to use them. Highly alkaline soils are often associated with mineral deficiencies due to the low solubility of minerals under alkaline conditions. Neutral or slightly acidic soils are ideal for growing plants. However, some plants have very particular pH requirements.

There are many different ways to measure soil pH. Litmus (pH) paper is a quick and inexpensive method to test soil pH when a pH-meter is unavailable or when highly precise values are not necessary. When preparing your soil sample, use a weighing paper to weigh the soil before adding water. Filter papers can be used to remove unnecessary particles from the suspension.

Color bonded pH strips.

Clarification and solids retention

Various test methods require that liquid components of a solution be separated from suspended solids prior to analysis. Cytiva offers a wide choice of cellulose filter papers with different levels of flow rate, loading capacity, and chemical resistance to support these applications.

Whatman™ quantitative filter papers are designed for gravimetric analysis and the preparation of samples for instrumental analysis. They are available in three formats: ashless, hardened low ash, and hardened ashless. Hardened low ash grade papers are acid-treated to remove trace metals, produce high wet strength, and provide chemical resistance. The tough, smooth surface of these filters makes it easy to recover precipitates, rendering them particularly suitable for Büchner filtration. Hardened ashless grade filters combine acid-hardening with extremely low ash content, making them suitable for applications requiring the filter and retained solids to be burned.

Qualitative cellulose filters are used to determine and identify the presence of materials. Two formats are available: standard filters and wet-strengthened filters. Some standard and wet-strengthened filters are available in pre-pleated forms which improves flow rate and increases loading capacity compared to equivalent flat filters. Whatman™ qualitative filter papers are manufactured from high-quality cotton linters, ensuring quality, reproducibility, and uniformity.

Ordering information

For what use?	Product	Quantity	Product code
Kjeldahl analysis	Grade 609 weighing boats	100/pack	10313032
	Grade B-2 weighing paper, 4 × 4 in	500/pack	10347672
Soxhlet extraction	Thimbles (cellulose)	25/pack	2800-105
Spectrophotometry and chromatography	Various syringe filters	N/A	See pages 14-15
Colorimetry	Grade 5, 15 cm cellulose filter paper	100/pack	1005-150
pH testing	Indicator papers	100/pack	10362000
Sample clarification and solids retention	Quantitative cellulose paper grade 41, 15 cm*	100/pack	1441-150
	Qualitative cellulose paper grade 4, 40 cm*	100/pack	1004-400

* For a full list of cellulose paper grades please visit cytiva.com/whatman

04

Other lab filtration essentials

General laboratory accessories

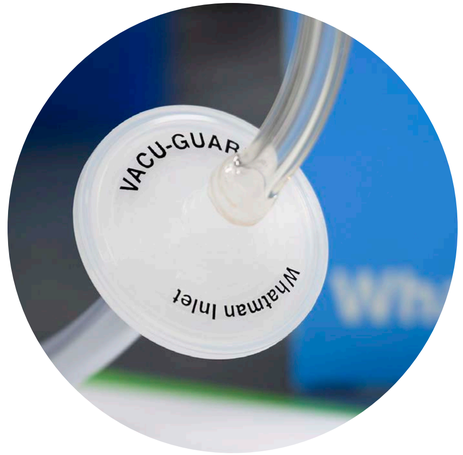
We provide a comprehensive range of accessories for routine work in your laboratory.

1PS phase separator

Grade 105 lens cleaning tissue

Benchkote™ protection paper

pH paper



Vacu-Guard Pump protection filter

Description	Product name	Dimension	Quantity	Product code
Phase separation paper • Separatory funnel replacement: Automatic cut-off • Ease of use: No special training required	1PS Phase separator paper	Diam. 125 mm	100/pack	2200-125
		Diam. 150 mm	100/pack	2200-150
Optical lens cleaning tissue • Soft tissue for removing surface moisture and grease from lenses and other optical surfaces	Grade 105	100 × 150 mm	25 wallets of 25 sheets	2105-841
		200 × 300 mm	100/pack	2105-862
Benchkote™ bench protection papers • High-quality, smooth, absorbent Whatman™ paper • Quickly absorbs liquid spills and protects the working surface • Benchkote™ Plus is thicker and more absorbent	Benchkote™	460 × 570 mm	50/pack	2300-916
		460 mm × 50 m	1/pack	2300-731
	Benchkote™ Plus	500 × 600 mm	50/pack	2301-6150
		600 mm × 50 m	1/pack	2301-6160
pH Indicator Paper • Range of pH indicator and test papers for rapid results	Color Bonded, 0.0 to 14.0 range	6 × 80 mm	100 strips, 1/pack	2613-991
	Standard Full Range, Reel, 1.0 to 14.0 range	7 mm × 5 m	1/pack	2600-100A
	Standard Narrow Range, Reel, 4.0 to 7.0 range	7 mm × 5 m	1/pack	2600-102A
Pump protection filters • Protects vacuum pump systems from aqueous aerosols. Hydrophobic PTFE membranes retain 99.99% of airborne particles > 0.1 µm	Vacu-Guard	50 mm	10/pack	6722-5000

Description	Product name	Dimension	Quantity	Product code
Filtration flask for batch filtration • Consists of a 250 mL glass filtration funnel and 1000 mL flask, funnel base, top, and clamp • Good choice for use with Whatman™ filtration membranes	Whatman™ GV050/2 vacuum filtration unit			10442200
Pressure filtration apparatus • Stainless steel • Infusion vessel 2200 mL	MD142/5/3	142 mm	1	10451610
Pressure filter holder • PTFE • Infusion vessel 1500 mL	MD142/7/3	142 mm	1	10451710
In-line filtration degasser (IFD) Connects directly into an HPLC line to simultaneously filter and degas the mobile phase as it is being used • Flexibility: available with either nylon or polypropylene membranes • Polypropylene housing with security ring sealing • No need for preliminary mobile phase separation	Aqueous IFD, nylon, ferrule connectors with o-ring for 1/32"- 5/32" tubing	50 mm (16 cm² EFA)	10	6726-5002
	Aqueous IFD, Nylon, ferrule connectors for 1/8" tubing	50 mm (16 cm² EFA)	10	6726-5002A
	Solvent IFD, PP, ferrule connectors with o-ring for 1/32"- 5/32" tubing	50 mm (16 cm² EFA)	10	6725-5002
	Solvent IFD, PP, ferrule connectors for 1/8" tubing	50 mm (16 cm² EFA)	10	6725-5002A
3-piece filter funnel • For quick and easy filtration • Choice of 3 plates	Filter funnel	47 mm	1	1950-004
	Filter funnel	90 mm	1	1950-009
	Filter funnel	70 mm	1	1950-017
Membrane holder • Produced from borosilicate glass • Suitable for aqueous and organic solvent filtration	Vacuum-type glass membrane holder	47 mm	1	1960-004
	Vacuum-type glass membrane holder	90 mm	1	1960-009

Chemical compatibility of membranes and housings*

Selecting the right filter depends on the solvent that you are using for your application.
This table will help ensure that you get it right the first time.

Solvent	ANP	CA	CN	PC	PE	GMF	NYL	PP	DpPP	PES	H-PTFE	PTFE‡	PVDF	RC
Acetic acid, 5%	R	LR	R	R	–	R	R	R	R	R	R	R	R	R
Acetic acid, glacial	R	NR	NR	–	–	R	LR	R	R	R	R	R	R	NR
Acetone	R	NR	NR	NR	R	R	R	R	R	NR	R	R	NR	R
Acetonitrile	R	NR	NR	–		R	R	R	R	NR	R	R	R	R
Ammonia, 6 N	NR	–	NR	NR	LR	LR	R	R	R	R	R	R	LR	LR
Amyl acetate	LR	NR	NR	NR	R	R	R	R	R	LR	R	R	LR	R
Amyl alcohol	R	LR	LR	–	–	R	R	R	R	NR	R	R	R	R
Benzene†	R	R	R	NR	R	R	LR	NR	NR	R	R	R	R	R
Benzyl alcohol†	R	LR	LR	LR	R	R	LR	R	R	NR	R	R	R	R
Boric acid	R	R	R	R	R	R	LR	R	R	–	–	R	R	R
Butyl alcohol	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Butyl chloride†	–	–	–	–	–	R	NR	NR	NR	–	–	R	R	–
Carbon tetrachloride†	R	NR	R	LR	R	R	LR	NR	NR	NR	R	R	R	R
Chloroform†	R	NR	R	NR	R	R	NR	LR	LR	NR	R	R	R	R
Chlorobenzene†	R	–	LR	NR	–	R	NR	LR	–	NR	–	R	R	R
Citric acid	–	–	–	–	–	R	LR	R	–	R	–	R	R	R
Cresol	–	NR	R	–	–	R	NR	NR	NR	NR	–	R	NR	R
Cyclohexane	R	NR	NR	R	R	R	NR	NR	NR	NR	–	R	R	R
Cyclohexanone	R	NR	NR	–	–	R	NR	R	R	NR	R	R	R	R
Diethylacetamide	–	NR	NR	–	–	R	R	R	R	–	–	R	NR	R
Dimethylformamide	LR	NR	NR	–	–	R	R	R	R	NR	R	R	NR	LR
Dioxane	R	NR	NR	NR	R	R	R	R	R	LR	–	R	LR	R
DMSO	LR	NR	NR	NR	R	R	R	R	R	NR	R	R	LR	LR
Ethanol	R	R	NR	R	R	R	R	R	R	R	–	R	R	R
Ethers	R	LR	LR	R	R	R	R	NR	NR	R	R	R	LR	R

Solvent	ANP	CA	CN	PC	PE	GMF	NYL	PP	DpPP	PES	H-PTFE	PTFE‡	PVDF	RC
Ethyl acetate	R	NR	NR	NR	R	R	R	R	R	NR	R	R	NR	R
Ethylene glycol	R	LR	LR	R	R	R	R	R	R	R	R	R	R	R
Formaldehyde	LR	LR	R	R	R	R	R	LR	LR	R	R	R	R	LR
Freon TF	R	R	R	R	R	R	NR	NR	NR	R	–	R	R	–
Formic acid	–	LR	LR	–	–	R	NR	R	R	R	–	R	R	LR
Hexane	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Hydrochloric acid, conc.	NR	NR	NR	NR	NR	R	NR	LR	LR	R	R	R	R	NR
Hydrofluoric acid	–	NR	NR	–	–	NR	NR	LR	LR	–	–	R	R	NR
Isobutyl alcohol	R	LR	LR	R	R	R	R	R	R	–	R	R	R	R
Isopropyl alcohol	R	R	LR	–	–	R	R	R	R	–	R	R	R	R
Methanol	R	R	NR	R	R	R	R	R	R	R	R	R	R	R
Methyl ethyl ketone	R	LR	NR	NR	R	R	R	R	R	NR	R	R	NR	R
Methylene chloride†	R	NR	LR	–	–	R	NR	LR	LR	NR	R	R	R	R
Nitric acid, conc.	–	NR	NR	LR	NR	R	NR	NR	NR	NR	R	R	R	NR
Nitric acid, 6 N	–	LR	LR	–	–	R	NR	LR	LR	LR	R	R	R	LR
Nitrobenzene†	LR	NR	NR	NR	R	R	LR	R	R	NR	–	R	R	R
Pentane	R	R	R	R	R	R	R	NR	NR	R	–	R	R	R
Perchloroethylene	R	R	R	–	–	R	LR	NR	NR	NR	R	R	R	R
Phenol 0.5%	LR	LR	R	–	–	R	NR	R	R	NR	–	R	R	R
Pyridine	R	NR	NR	NR	R	R	LR	R	R	NR	R	R	NR	R
Sodium hydroxide, 6N	NR	NR	NR	NR	NR	NR	LR	R	R	R	R	R	NR	NR
Sulfuric acid, conc.	NR	NR	NR	NR	NR	R	NR	NR	NR	NR	R	R	NR	NR
Tetrahydrofuran	R	NR	NR	–	–	R	R	LR	LR	NR	R	R	R	R
Toluene†	R	LR	R	NR	R	R	LR	LR	LR	NR	R	R	R	R
Trichloroethane†	R	NR	LR	NR	R	R	LR	LR	LR	NR	R	R	R	R
Trichloroethylene†	R	–	R	–	–	R	NR	LR	LR	NR	R	R	R	R
Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Xylene†	R	R	R	–	–	R	LR	LR	LR	LR	R	R	R	R

*ANP = Anopore; CA = Cellulose acetate; CN = Cellulose nitrate; DpPP = Polypropylene depth filter; GMF = Glass microfiber; NYL = Nylon; PC = Polycarbonate; PE = Polyester; PES = Polyethersulfone; PP = Polypropylene; PTFE = Polytetrafluoroethylene; PVDF = Polyvinylidene difluoride; RC = Regenerated cellulose R = Resistant; LR = Limited Resistance; NR = Not Recommended.
† Short Term Resistance of Housing. ‡ Membrane may need pre-wetting with isopropanol/methanol if filtering a polar liquid.
The above data is to be used as a guide only. Testing prior to application is recommended.

The majority of products presented in this brochure are available from Cytivas's distributors. A list of these distributors can be found at cytiva.com/distributors.

cytiva.com/whatmanfilterselector

For local office contact information, visit cytiva.com/contact

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