



Glass Microfiber Filters

Whatman offers two types of glass microfiber filters manufactured from 100% borosilicate glass: binder free glass microfiber that is chemically inert and glass microfiber with binder.

These depth filters combine fast flow rates with high loading capacity and the retention of very fine particles, extending into the sub-micron range. Glass microfiber filters can be used at temperatures up to 500°C and are ideal for use in applications involving air filtration and for gravimetric analysis of volatile materials where ignition is involved.



Whatman glass microfiber filters have a fine capillary structure and can absorb significantly larger quantities of water than an equivalent cellulose filter, making them suitable for spot tests and liquid scintillation counting methods. The filters can also be made completely transparent for subsequent microscopic examination.

The particle loading capacity of a filtration system can be greatly increased by using a prefilter. Whatman glass microfiber filters such as GF/B or GF/D are recommended because of the low resistance to fluid flow and high particle loading capacity. Whatman Multigrade GMF 150 is particularly valuable for the prefiltration of larger volumes and solutions that are normally difficult to filter.

Glass Microfiber GF Series

Binder Free Glass Microfiber Filters

Grade GF/A: 1.6 μm

Offers fine particle retention and high flow rate, as well as good loading capacity. Used for high-efficiency general purpose laboratory filtration, including water pollution monitoring of effluents, for filtration of water, algae and bacteria cultures, foodstuff analyses, protein filtration, and radioimmunoassay of weak β emitters. Recommended for gravimetric determination of airborne particulates, stack sampling, and absorption methods of air pollution monitoring.

This filter is also available in the FilterCup and Disposable Filter Funnel formats.

Grade GF/B: 1.0 μm

Three times thicker than GF/A with higher wet strength and significantly increased loading capacity. Combines fine particle retention with good flow rate. Particularly useful where liquid clarification or solids quantification is required for heavily-loaded, fine particulate suspensions. Can be used as a finely retentive membrane prefilter. Used in LSC techniques where high loading capacity is required.

Grade GF/C: 1.2 μm

Combines fine particle retention with good flow rate. The standard filter in many parts of the world for the collection of suspended solids in potable water and natural and industrial wastes.

Fast and efficient clarification of aqueous liquids containing low to medium levels of fine particulates. Widely used for cell harvesting, liquid scintillation counting, and binding assays where more loading capacity is required.

This filter is available in the FilterCup format.



Glass Microfiber GF Series

Grade GF/D: 2.7 μm

Considerably faster in flow rate and overall filtration speed than cellulose filter papers of similar particle retention. The filter is thick and consequently exhibits a high loading capacity. Designed as a membrane prefilter and available in sizes to fit most holders. GF/D will provide good protection for finely retentive membranes. Can be used in combination with GF/B to provide very efficient graded prefilter protection for membranes.

Grade GF/F: 0.7 μm

This high-efficiency filter will retain fine particles down to 0.7 μm . Unlike membrane filters with a comparable retention value, it has a very rapid flow rate and an extremely high loading capacity.

Because of the tight specification of 0.6 μm – 0.8 μm particle retention and pure borosilicate glass structure, GF/F is the material upon which the EPA Method TCLP 1311 for Toxicity Characteristic Leaching Procedure was developed. It remains today the filter of choice.

Recommended for DNA binding and purification. Very effective in filtering finely precipitated proteins, GF/F can be used in conjunction with GF/D as a prefilter for the successful clarification of extremely “difficult” biochemical solutions and fluids, and nucleic acids.

This filter is available in the FilterCup and Disposable Filter Funnel format.

Grade 934-AH: 1.5 µm

The fine particle retention of this popular grade is superior for its high retention efficiency at high flow rates and its high loading capacity. This is a smooth surface, high-retention borosilicate glass microfiber filter, which withstands temperatures over 500°C. Used for determining total suspended solids in water, removal of turbidity, and filtration of bacterial cultures. Grade 934-AH is used for a wide range of laboratory applications. It is recommended for water pollution monitoring, cell harvesting, liquid scintillation counting, and air pollution monitoring.

Quartz Filter – Grade QM-A: 2.2 µm

High-purity quartz (SiO₂) microfiber filters are used for air sampling in acidic gases, stacks, flues, and aerosols, particularly at high temperatures up to 500°C and in PM-10 testing. Due to the low level of alkaline earth metals, “artifact” products of sulfates and nitrates (from SO₂ and NO₂) are virtually eliminated. QM-A, sequentially numbered according to EPA standards, is suitable for most applications. Please refer to the Air Sampling Filter/Quartz Filters section for ordering information.

Grade EPM 2000: 2.0 µm

EPM 2000 has been developed especially for use in high volume air sampling equipment that collects atmospheric particulates and aerosols. It is manufactured from 100% pure borosilicate glass of special purity, enabling detailed chemical analysis of trace pollutants to take place with the minimum of interference or background. See Air Sampling Filter/Quartz Filters section for ordering details.

Grade GMF 150: 1 µm or 2 µm

The Whatman GMF 150 is a multilayer glass microfiber filter with a coarse top layer (10 µm) and meshed with a finer layer of 1 µm or 2 µm. Manufactured from 100% borosilicate glass microfiber, the filter is binder free. It is an excellent prefilter for higher particulate loading capacity with faster flow rates. See GMF 150 section for ordering information.

Typical Properties – Binder Free Glass Microfiber Grades

Grade	Description	Particle Retention in Liquid (µm)	Filtration Speed Herzberg (s)	Air Flow (s/100 ml/in ²)	Typical Thickness (µm)	Basis Weight (g/m ²)
GF/A	Fast, high loading	1.6*	62	4.3	260	53
GF/B	Medium to fast, very high loading	1.0*	195	12	675	143
GF/C	Medium to fast, high loading	1.2*	100	6.7	260	53
GF/D	Fast, very high loading	2.7	41	2.2	675	121
GF/F	Medium, high loading	0.7*	325	19	420	75
934-AH	Fast, high loading	1.5*	47	3.7	435	64
QM-A	Quartz	2.2*	–	6.4	450	85
EPM 2000	Used u/c PM-10 air monitoring	2.0*	–	4.7	450	85
GMF 150 1 µm	Multilayer	1.2*	–	3.1	730	139
GMF 150 2 µm	Multilayer	2.4*	–	1.5	750	149

* Particle retention rating at 98% efficiency

Ordering Information – Binder Free Glass Microfiber

Dimensions (mm)	Catalog Number						Quantity/Pack
	Grade GF/A	Grade GF/B	Grade GF/C	Grade GF/D	Grade GF/F	Grade 934-AH	
Filter Circles							
7	–	–	–	1823-007	–	–	100
10	–	–	–	1823-010	–	–	100
13	1820-8013	–	–	–	–	–	100
13	–	–	–	–	1825-0134	–	400
19.1	–	1821-019	–	–	–	–	50
21	1820-021	1821-021	1822-021	1823-021	1825-021	1827-021	100
24	1820-024	1821-024	1822-024	1823-024	1825-024	1827-024	100
25	1820-025	1821-025	1822-025	1823-025	1825-025	1827-025	100
25	–	–	1822-6580	–	–	–	400
27	–	–	–	–	–	1827-027	100
28	–	–	–	–	–	1827-028	100
30	1820-030	–	–	–	–	1827-030	100
32	–	–	–	–	–	1827-032	100
35	–	–	–	1823-035	–	1827-035	100
37	1820-037	1821-037	1822-037	–	1825-037	1827-037	100
42	–	–	–	1823-042	–	–	100
42.5	1820-042	1821-042	1822-042	–	1825-042	1827-042	100
47	1820-047	1821-047	1822-047	1823-047	1825-047	1827-047	100
50	1820-050	–	1822-050	–	–	–	100
55	1820-055	1821-055	1822-055	1823-055	1825-055	1827-055	100
60	1820-060	–	–	–	–	–	100
60	1820-061‡	–	–	–	–	–	50
70	1820-070	1821-070	1822-070	1823-070	1825-070	1827-070	100
81	1820-6537	–	–	–	–	1827-132	100
82	–	–	–	–	–	1827-082	100
85	–	–	–	–	–	1827-085	100
90	1820-090	1821-090*	1822-090	1823-090*	1825-090*	1827-090	100
100	–	–	1822-100	–	–	–	100
100	–	–	1822-9916**	–	–	–	100
105	–	–	–	–	–	1827-105	100
110	1820-110	1821-110*	1822-110#	1823-110*	1825-110*	1827-110	100
125	1820-125	1821-125*	1822-125	1823-125*	1825-125*	1827-125	100
142	–	–	1822-142	1823-142*	1825-142*	–	100
150	1820-150	1821-150*	1822-150	1823-150*	1825-150*	1827-150	100

* 25 per box

** Individually bagged

† Requires FilterCup stem, catalog number 1600-900

‡ With reinforced rim

Product is only available in Europe

Product is only available in the Americas

cont.

Dimensions (mm)	Catalog Number						Quantity/Pack
	Grade GF/A	Grade GF/B	Grade GF/C	Grade GF/D	Grade GF/F	Grade 934-AH	
155	–	1821-155*					100
185	–	1821-185*	–	–	–	1827-185	100
240	1820-240	–	–	–	–	1827-240	100
257	–	–	–	1823-257	1825-257	–	25
293	–	1821-293	–	–	1825-293	1825-295##	25
320	–	–	–	–	–	1827-320	100
FilterCup	1600-820†	–	1600-822†	–	1600-825†	–	25
Disposable Filter Funnel 25 ml	1922-1820	–	1922-1822	–	–	–	50
Filter Sheets							
102 × 254	–	–	1822-849	–	–	–	50
203 × 254	–	–	–	–	–	–	100
460 × 570	–	1821-914	1822-914	–	–	–	5
460 × 570	1820-915	1821-915	1822-915	1823-915	1825-915	–	25
1/5 × 9.5"	–	–	–	–	–	1827-262#	100
2 × 12"	–	–	–	–	–	1827-808	100
8 × 10"	1820-866	–	1822-866	–	–	1827-866	100
12 × 15"	–	–	–	–	–	1827-889	100
9 × 28"	–	–	–	–	–	1827-957	100

* 25 per box

** Individually bagged

† Requires FilterCup stem, catalog number 1600-900

‡ With reinforced rim

Product is only available in Europe

Product is only available in the Americas

Multigrade GMF 150

The Whatman GMF 150 is a multilayer glass microfiber filter with a coarse top layer (10 µm) meshed with a finer layer of 1 µm or 2 µm. Manufactured from 100% borosilicate glass microfiber, the filter is binder free. It is the ideal prefilter for higher particulate loading capacity with faster flow rates.

The GMF 150 allows for:

- Higher particulate loading capacity
- Faster flow rate
- Extended life of filter

Multiple Porosities, Greater Filtration Efficiency

The GMF 150 represents a new dimension in separation science leading to faster and more cost-effective filtration. In application, the GMF 150 traps larger particles in the pores or on the surface of the coarse layer while the medium sized particles are caught in the interface meshing. The smaller particles are netted in the interstices of the fine layer.



Typical Properties – GMF 150 Grades

Grade	Description	Particle Retention in Liquid (µm)	Air Flow (s/100 ml/in²)	Typical Thickness (µm)	Basis Weight (g/m²)
GMF 150 – 1 µm	Multilayer	1.2*	3.1	730	139
GMF 150 – 2 µm	Multilayer	2.4*	1.5	750	149

* Particle retention rating at 98% efficiency

Ordering Information – Multigrade GMF 150

Diameter (mm)	Pore Size 1 µm	2 µm	Quantity/Pack
47	1841-047	1842-047	40
90	1841-090	1842-090	20

Glass Microfiber Filters with Binder

Grade GF 6 – Inorganic Binder

Good retention for very fine particles. This filter is used in water pollution applications, for removing protein from difficult-to-filter beers, for determination of chlorophyll and phytoplankton residues, for the determination of filterable substances and the residue on ignition (dry weight), for the analysis of aggressive media (e.g., acidic gases), for scintillation measurements, and for determination of the elemental iron content in the presence of iron oxides.

Grade GF 8 – Inorganic Binder

This glass fiber filter is used in the filtration of coarse particles. Frequently used in environmental analysis, in the 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, dust measurements at the workplace, determination of the dust fraction in technical gases, and testing the effectiveness of dust collecting.

Grade GF 9 – Inorganic Binder

Used in similar applications to GF 8.

Grade GF 10 – Organic Binder

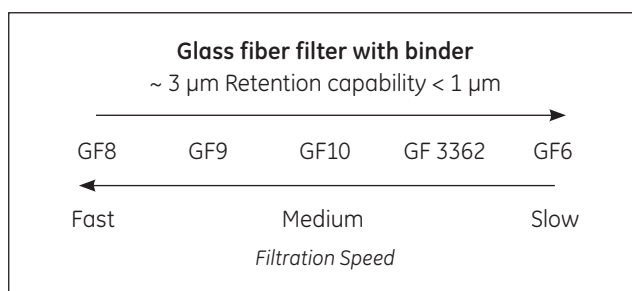
This filter with extreme mechanical stability and temperature resistant up to 180°C is used as a weighing aid for infrared weighing and as a roll filter in automatic air filtration units.

Grade GF 92 – Inorganic Binder

This filter is used as a membrane prefilter in applications such as the determination of crop protection agent residues by GC or HPLC, in cold sludge determination of beer, in soot separation before gas analyzers, and as roll filters in automatic air filtration units.

Grade GF 3362 – Inorganic Binder

Thicker and slightly denser than GF 9, for the fast filtration of large amounts of particles.



Typical Properties – Glass Microfiber Grades with Binder

Grade	Description	Air Flow (s/100 ml/1.56 cm²)	Typical Thickness (µm)	Basis Weight (g/m²)
GF 6	Inorganic binder	40	350	80
GF 8	Inorganic binder	12	350	80
GF 9	Inorganic binder	27	350	70
GF 10	Organic binder	12	350	70
GF 92	Inorganic binder	27	350	70
GF 3362	Inorganic binder	34	500	130

Ordering Information – Glass Microfiber Filters with Binder

Dimensions (mm)	Catalog Number						Quantity/Pack
	Grade GF 6	Grade GF 8	Grade GF 9	Grade GF 10	Grade GF 92	Grade GF 3362	
Filter Circles							
25	10370018	–	–	–	–	–	200
42	–	–	–	–	10421019	–	200
44	–	–	–	–	10421022	–	200
47	10370019	10370119	–	10370319	10421026	–	200
50	10370002	–	10370202	10370302	10421030	–	200
55	10370003	–	–	–	–	–	100
70	10370004		–	–	–	–	100
90	10370005	10370105	10370205	10370305	–	–	100
100	10370020	–	–	10370320	10421043	–	100
110	10370006	–	10370206	–	10421048	–	100
125	10370007	–	–	–	–	–	100
130	–	–	–	–	10421055	–	100
135	–	–	–	–	10421057	–	100
142	–	–	–	–	10421060	–	100
150	10370008	–	10370208	10370308	–	–	100
185	10370010	–	–	–	–	–	100
200	10370011	–	–	–	–	–	100
240	10370012	–	–	–	–	10372112	50
Roll							
50 mm × 100 m	–	–	–	10370394	–	–	1

Ordering Information – Glass Microfiber Filter Sheets with Binder

Dimensions (mm)	Catalog Number		Quantity/Pack
	Grade GF 6	Grade GF 8	
60 × 90	–	10370172	100
610 × 620	10370050	–	100

Whatman Acid Treated Low Metal TCLP Filters

Toxicity Characteristic Leaching Procedure (TCLP) is an analytical test designed to determine the leaching potential in a landfill for hazardous organic and inorganic contaminants that could potentially migrate into groundwater, threatening drinking water sources.

Used for EPA Method 1311

The Whatman TCLP Filter is manufactured using a binder free borosilicate glass microfiber with a particle retention rating of 0.6 to 0.8 µm.



These acid treated low metal filters are available in 47, 90, 110, 125, 142, and 150 mm diameters. The 90 mm filter is required for volatile samples and use with a Zero Headspace Extractor.

The 142 mm filter is typically used with nonvolatile samples in an approved jar.

Ordering Information – Acid Treated Low Metal TCLP Filters

Diameter (mm)	Catalog Number	Quantity/Pack
47	1810-047	100
90	1810-090	50
110	1810-110	50
125	1810-125	50
142	1810-142	50
150	1810-150	50

Air Sampling Filters

EPM 2000

EPM 2000 has been developed especially for use in high volume PM-10 air sampling equipment that collects atmospheric particulates and aerosols. It is manufactured from 100% pure borosilicate glass of special purity, enabling detailed chemical analysis of trace pollutants to take place with the minimum of interference or background.

Whatman EPM 2000 was selected by the EPA to be the standard filter for use in the nationwide network of HiVol air samplers. Sheets are individually numbered to facilitate identification.

Quartz Filters – QM-A

High-purity quartz (SiO₂) microfiber filters are used for air sampling in acidic gases, stacks, flues, and aerosols, particularly at high temperatures up to 500°C, and in PM-10 testing. Due to the low level of alkaline earth metals, “artifact” products of sulfates and nitrates (from SO₂ and NO₂) are virtually eliminated. QM-A, sequentially numbered according to EPA standards, is suitable for most applications.



Quartz Filters – QM-H

This is a pure quartz fiber filter with low heavy metal content, which can be used at temperatures up to 900°C.

PM 2.5 Air Monitoring Membranes – Please refer to the section on PM 2.5

Typical Properties – Air Sampling Filters

Grade	Description	Particle Retention in Liquid (µm)	Air Flow (s/100ml/in ²)	Typical Thickness (µm)	Basis Weight (g/m ²)
QM-A	Quartz	2.2*	6.4	450	85
QM-H	Quartz	–	–	430	85
EPM 2000	Pure borosilicate glass	2.0*	4.7	450	85

* Particle retention rating at 98% efficiency

Ordering Information – EPM 2000

Diameter (mm)	Catalog Number EPM 2000	Quantity/Pack
Filter Circles		
47	1882-047	100
Dimensions	EPM 2000	
Filter Sheets		
8 × 10" (prenumbered)	1882-866	100

Ordering Information – Quartz Filters

Diameter (mm)	Catalog Number QM-A	QM-H	Quantity/Pack
Filter Circles			
25	1851-025		100
32	1851-032		25
37	1851-037	1853-037	25
47	1851-047	1853-047	25
50	1851-050	1853-050*	100
55	1851-055		100
70	1851-070		100
82	1851-082		100
85	1851-085		100
90	1851-090		100
101.6	1851-101		100
110	1851-110		100
118	1851-118		100
150	1851-150	1853-150*	100
Dimensions	Catalog Number QM-A		Quantity/Pack
Filter Sheets			
8 × 10"	1851-8866 (prenumbered)		100
8 × 10"	1851-865		25

* 25 pack

Glass Microfiber Accessories

3-Piece Filter Funnel

The increased use of high-efficiency glass microfiber filters in modern laboratories has created a demand for simple and effective filter-holding systems. Whatman 3-Piece Filter Funnels have been designed to complement the range of Whatman fine particle retention, rapid flow rate glass microfiber filters.

Functional Design

Three-piece construction. The funnel is quickly dismantled, ready for the insertion of a new filter. The glass sealing flanges of the funnel and reservoir are ground flat to ensure a good filter seal.

Positive Filter Clamping

All retained solids are deposited within the filter circle. Edge clamping prevents peripheral loss and possible passage of solution around, rather than through, the filter circle.

Simple to Clean

The parts can be quickly and efficiently cleaned because of the simplicity of the design.

A Choice of Three Plates

For quick and easy filtration, Whatman 3-Piece Filter Funnels are available with a choice of three plates. They also come in several sizes to match your needs.



- **Acrylic Plate:** Supplied as standard. Suitable for filtration of most aqueous solutions. Maximum working temperature 65°C.
- **Polypropylene Plate:** Optional extra. Recommended for most acids (except concentrated nitric acid and fuming sulfuric acid) at room temperatures. Suitable also for most alcohols, glycols, ethers, and ketones. Maximum working temperature 100°C.
- **PTFE Plate:** Optional extra. For virtually all common acids, alkalis and solvents at temperatures up to 100°C. Maximum working temperature 200°C.

Ordering Information – 3-Piece Filter Funnel Details

Filter Dimensions (cm)	Catalog Number	Reservoir Volume (ml)	Effective Filtration Diameter (cm)	Effective Filtration Area (cm ²)	Filter Support Plate Diameter (cm)	Filter Funnel Height (cm)
2.5	1950-002	16	1.6	2	3	13.6
4.7	1950-004	36	3.2	8	4.7	12.1
7	1950-007	115	5	19.6	7	15.9
7	1950-017	210	5	19.6	7	20.8
7	1950-027	400	5	19.6	7	–
9	1950-009	200	7	38.5	9	17.9
12.5	1950-012	530	9.2	66.5	12.5	22

Ordering Information – Glass Microfiber Accessories

Type	Catalog Number	Optional Plates	Filter Funnel Plates – PTFE	Replacement Reservoirs
Dimensions (cm)		PTFE Plates		
47	1950-104		1950-114	–
70	1950-107		1950-117	1950-207 1950-217*
90	1950-109		1950-119	1950-209

* Large reservoir