Whatman filtration

Product guide



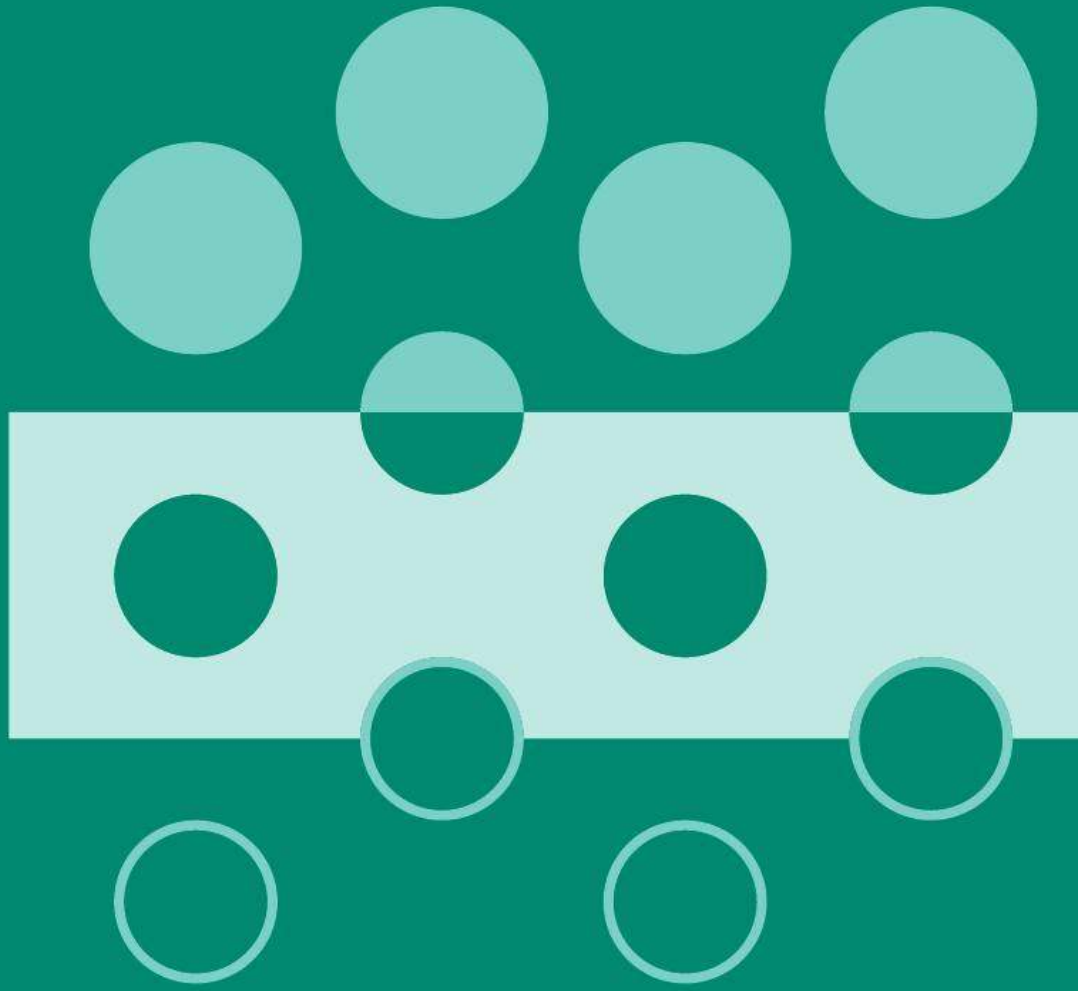
cytiva

What's new?

We are now Cytiva! We have a new name, a new energy, the same great Whatman™ products and support that you know and trust. Cytiva is a global provider of technologies and services that advance and accelerate the development and manufacture of therapeutics that transform human health.

New products

- Whatman Puradisc™ H-PTFE Syringe filters: 0.2 and 0.45 µm pore size, 13 and 25 mm diameters
- Whatman Uniflo™ H-PTFE Syringe filters: 0.2 and 0.45 µm pore size, 13 and 25 mm diameters
- Whatman 850-DS Channel Filter plate with expanded range of membranes
- FFHP Plus Thick Nitrocellulose filters — new grades
- Benchkote™ surface protectors for ÄKTA™ systems
- Whatman pre-folded filter papers in new grades and formats: pleated, pyramid and flat quadrant
- Grade 597 Optima cellulose filter papers, a standard grade for a wide variety of routine applications
- Whatman QM-C, pre-ignited silica microfiber filter without any additives or binder



Welcome to Whatman filtration by Cytiva

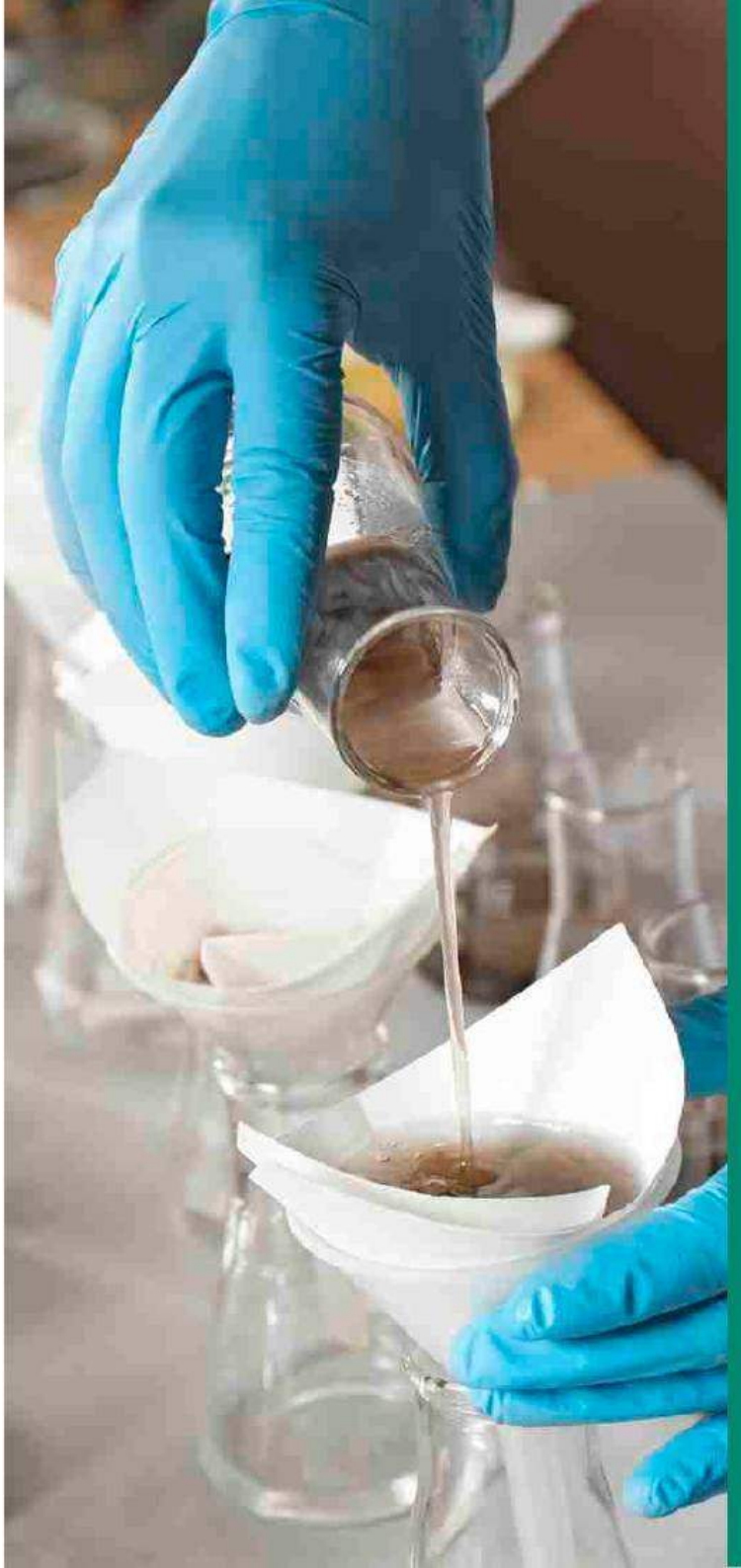
In laboratories across the globe, the Whatman name is synonymous with quality, reliability, and ease of use. Our instinct for simplification helps customers reduce costs, save time, and accelerate the rate of discovery. Our products have a reputation for working right the first time—every time, which is why they are specified for the most exacting applications across a wide range of industries around the globe.

We are where you are

We can meet the filtration and separations needs of virtually any laboratory with the right Whatman product at the right time. Through partnerships with the world's leading laboratory supply distribution companies, we ensure speedy delivery of products to your lab.

How to buy

1. Shop online at **cytiva.com/shop/whatman-laboratory-filtration**.



Whatman filtration works for you

Basic analytical testing

In the vast and disparate world of analytical chemistry, Whatman products are used for basic laboratory processes that range from simple clarification to solvent extraction. Products range from filter papers, thimbles and Benchkote benchtop protectors, to membrane filters and phase separator papers.

Food and beverage

Our filter papers are used to prepare food samples prior to a wide range of analyses. Our syringe filters prevent fatty or particulate laden samples from damaging valuable equipment. Our membranes are used to test for harmful bacteria.

Pharmaceutical

Whatman products enable pharmaceutical companies to increase productivity. Mini-UniPrep™ syringeless filters and vials reduce high-performance liquid chromatography (HPLC) sample preparation time and consumables usage, and track-etched and Anopore™ membranes are also vital to extruding liposomes for encasing and targeting drugs.

Environmental monitoring

Whatman products are cited in U.S. Environmental Protection Agency (EPA) and American Society for Testing and Materials (ATSM) and ISO protocols for environmental monitoring. Whether it is detecting suspended solids in water, measuring air for dangerous particulates, or supporting asbestos analysis to maintain healthy spaces there is a Whatman filter that is central to the test.

Diagnostic testing

Whatman products are designed into a wide range of registered diagnostic products, from application such as cancer detection, though to infectious diseases and even pregnancy tests. Our products include cellulose fiber, glass fiber and membrane products for use in rapid tests.

Industrial

Whatman products can be found in analytical testing laboratories across many industries. Whatman filters and equipment can stand up to the rigors of petrochemical, mining and cement testing, and deliver the precision required for testing microelectronics.

Filter papers

Whatman filter papers are associated with quality, reliability, and customer service. We maintain high standards for reproducibility and uniformity by using only the highest quality raw materials and strict quality control measures.

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Cellulose filters

Whatman cellulose filters are manufactured from high-quality cotton linters which have been treated to achieve a minimum alpha cellulose content of 98%. These cellulose filter papers are used for general filtration and exhibit particle retention levels down to 2.5 µm. We offer a wide choice of retention/flow rate combinations to suit numerous laboratory applications.

The different groups of cellulose filters offer increasing degrees of purity, hardness, and chemical resistance.



Grade 5 qualitative filter papers

Cellulose filters, trace element composition

Typical values (µg/g paper)

Grade	1	42	542
Aluminum	3.6	2.5	3.4
Antimony	< 0.5	< 0.5	< 0.5
Arsenic	< 0.5	< 0.5	< 0.5
Barium	< 0.5	< 0.5	< 0.5
Boron	< 1.0	< 1.0	< 1.0
Calcium	27.5	8.3	14.7
Chromium	1.0	1.5	1.1
Copper	0.9	2.0	8.2
Iron	13.7	12.0	16.3
Lead	< 0.5	< 0.5	< 0.5
Magnesium	21.0	4.0	3.3
Manganese	< 0.5	< 0.5	< 0.5
Mercury	< 0.5	< 0.5	< 0.5
Potassium	6.2	2.3	3.7
Silicon	8.8	6.2	< 6.0
Sodium	32.3	16.8	17.0
Zinc	58.3	64.5	87.8

Typical values for additional grades can be found in Appendix A.

Qualitative filter papers

These cellulose filters are used in qualitative analytical techniques to determine and identify materials. Fluted qualitative filters are available, which give improved flow rate and increased loading capacity compared to equivalent flat filters.

Grade 1 (11 µm*)

The most widely used filter paper for routine applications with medium retention and flow rate. This grade covers a wide range of laboratory applications and is frequently used for clarifying liquids. Traditionally, the grade is used in qualitative analytical separations for precipitates such as lead sulfate, calcium oxalate (hot), and calcium carbonate.

- In agriculture, it is used for soil analysis and seed testing procedures.
- In the food industry, Grade 1 is used for numerous routine techniques to separate solid foodstuffs from associated liquid, or extracting liquid and is widely used in education for teaching simple qualitative analytical separations.
- In air pollution monitoring, using circles or rolls, atmospheric dust is collected from airflow and the stain intensity measured photometrically.
- For gas detection, the paper is impregnated with a chromogenic reagent and color formation is quantified by optical reflectance.

Available fluted as Grade 1V.

Grade 2 (8 µm*)

Slightly more retentive and absorbent than Grade 1, with a corresponding increase in filtration time (i.e. slightly slower filtration speed). In addition to general filtration in the 8 µm particle size range, the extra absorbency is utilized, for example, to hold soil nutrient in plant growth trials. Also used for monitoring specific contaminants in the atmosphere and in soil testing.

Available fluted as Grade 2V.

Grade 3 (6 µm*)

Double the thickness of Grade 1 with still finer particle retention and excellent loading capacity; more precipitate can be held without clogging.

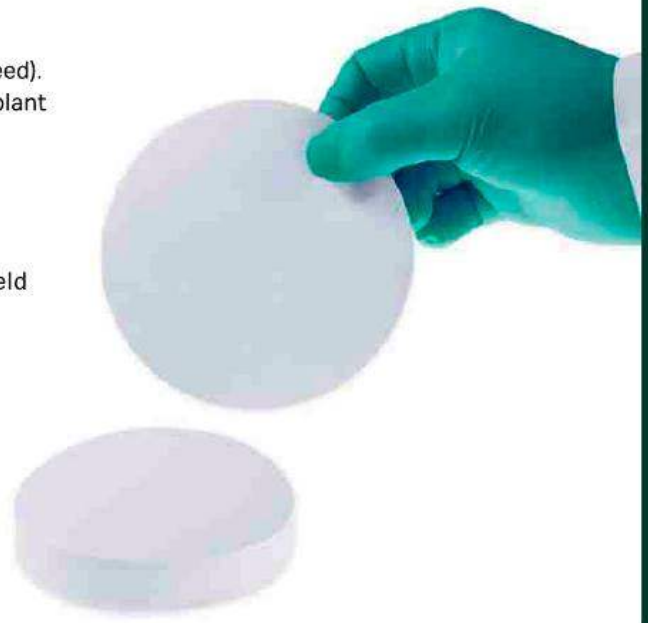
- The extra thickness gives increased wet strength and makes this grade highly suitable for use in Büchner funnels.
- The high absorbency is particularly valuable when the paper is used as a sample carrier.

Grade 4 (25 µm*)

Extremely fast filtering with excellent retention of coarse particles and gelatinous precipitates such as ferric hydroxide and aluminum hydroxide.

- Very useful as a rapid filter for routine clean-up of biological fluids or organic extracts during analysis.
- Used when high flow rates in air pollution monitoring are required and the collection of fine particles is not critical.

Available fluted as Grade 4V.



Grade 4 qualitative filter papers

* *Particle retention rating at 98% efficiency.*

Grade 5 (2.5 µm*)

The maximum degree of fine particle filtration in the qualitative range. Capable of retaining the fine precipitates encountered in chemical analysis. Slow flow rate.

- Excellent clarifying filter for cloudy suspensions and for water and soil analysis.

Also available fluted as Grade 5V.

Grade 6 (3 µm*)

Twice as fast as Grade 5 with similar fine particle retention. Often specified for boiler water analysis applications.

Grade 591 (7–12 µm*)

A thick filter paper with very high loading capacity for fast filtration of medium to coarse precipitates. Offers high absorbency and increased wet strength.

Also available fluted as Grade 591 ½.

Grade 595 (4–7 µm*)

Very popular, thin filter paper, medium-fast with medium to fine particle retention. Used for many routine analytical applications in different industries (e.g. particle separation from food extracts or filtration of solids from digested environmental samples for ICP/AAS analysis).

Also available fluted as Grade 595 ½.

Grade 597 Optima (4–7 µm)

A standard Whatman grade filter paper for a variety of routine applications in food and beverage industries.

- Well-suited for determination of fat content in food or removal of carbon dioxide and turbidity from beverages such as beer.

Available in sheets and circles.

Grade 597 (4–7 µm*)

A medium fast filter paper with medium to fine particle retention.

- Used for a wide variety of routine analytical applications in different industries like food testing (e.g. determination of fat content) or removal of carbon dioxide and turbidity from beverages (as in beer analysis).

Available fluted as Grade 597 ½.

Grade 597L (7 µm*)

A qualitative filter paper with low fat content. Suitable for nitrate determination in foodstuffs to §35 LMBG* (* LMBG = German law for food and consumer products).



Grade 597 Optima filter papers

* *Particle retention rating at 98% efficiency.*

Grade 598 (8–10 µm*)

A thick filter paper with high loading capacity. Combines medium retention with medium-fast to fast filtration speed.

Available fluted as Grade 598 ½.

Grade 602 h (< 2 µm*)

A dense filter paper for collecting very small particles and removing fine precipitates.

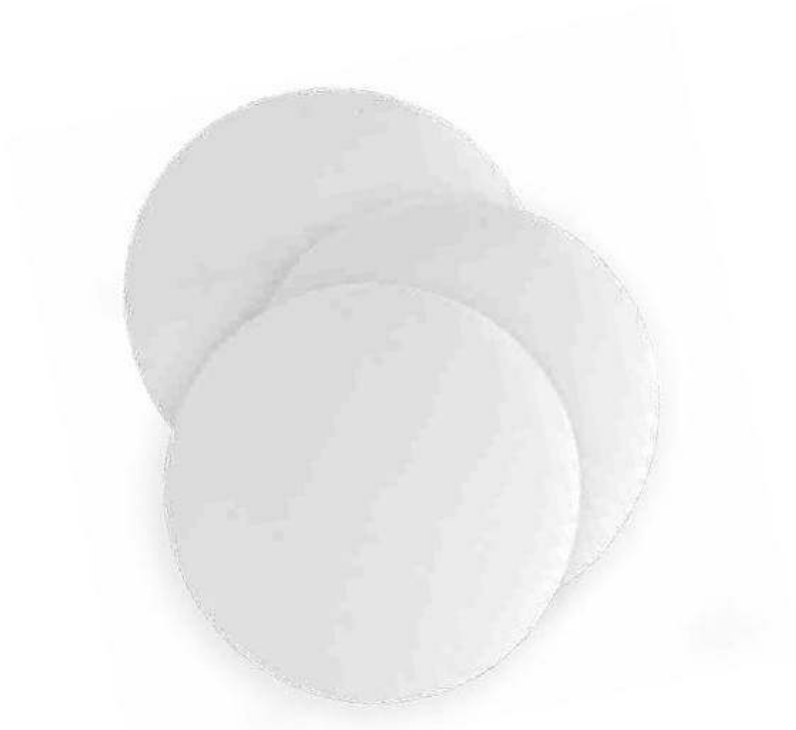
- Used in sample preparation (e.g. in the beverage industry for residual sugar determination, acidic spectra, refractometric analysis, and HPLC.

Available fluted as Grade 602 h ½.

Grade 602 eh (2 µm*)

These cellulose filters are used in qualitative analytical techniques to determine and identify materials. A standard grade filter paper for very fine precipitates. Used for recovery of microfine ultrapure crystalline components (< 1 µm) in alkaline tests in waste analysis (e.g. soils, filter dust, ash, ore/slag waste).

Available fluted as Grade 602 eh ½.



Grade 602 eh filter papers

* *Particle retention rating at 98% efficiency.*

Technical specifications

Qualitative filter papers—standard grades

Grade	Description	Typical particle retention in liquid (µm)[1]	Filtration speed (approx) herzberg (s)	Nominal air flow (s/100 mL/in²)	Nominal thickness (µm)	Nominal basis weight (g/m²)	Typical water flow rate (mL/min)[2]	Nominal ash content (%)[3]
1	–	11	–	13	180	87	57	0.06
2	–	8	–	20	190	97	38	0.06
3	Thick	6	–	26	390	185	28	0.06
4	–	25	37	4	210	92	247	0.06
5	–	2.5	1420	96	200	100	5	0.06
6	–	3	–	32	180	100	22	0.15
591	Medium fast, thick	7–12	45	5.9	350	161	–	–
595	Medium fast, thin	4–7	80	–	150	68	–	–
597	Medium fast	4–7	140	–	180	85	–	–
597L	Medium fast, low fat	7	170	–	180	82	–	–
597 Optima	Medium fast	4–7	300	–	190	85	–	–
598	Medium fast, thick	8–10	50	–	320	140	–	–
602 h	Slow, dense	< 2	375	–	160	84	–	–
602 eh	Very slow, very dense	2	3000	–	150	85	–	–

[1] *Particle retention rating at 98% efficiency*
[2] *For 9 cm diameter*
[3] *Ash is determined by ignition of the cellulose filter at 900˚C in air*

Ordering information

Qualitative filter circles—standard grades

	Catalog number						
Diameter (mm)	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Quantity/pack
10	1001-6508	–	–	–	–	–	500
15	1001-0155	–	–	–	–	–	500
20	1001-020	–	–	–	–	–	400
23	–	–	1003-323	–	–	–	100
25	1001-325	–	–	–	1005-325	–	100
25	1001-025	–	–	–	–	–	400
27	–	–	–	1004-027	–	–	400
30	1001-329	–	–	–	–	–	100
30	1001-030	–	–	–	–	–	400

Ordering information

Qualitative filter circles—standard grades (continuation)

	Catalog number						
Diameter (mm)	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**	**Quantity/pack**
32	1001-032	–	–	–	–	–	100
41	–	–	–	1004-041	–	–	100
42.5	1001-042	1002-042	–	1004-042	1005-042	1006-042	100
47	1001-047	1002-047	–	1004-047	1005-047	–	100
50	–	–	–	1004-050	–	–	100
55	1001-055	1002-055	1003-055	1004-055	1005-055	–	100
60	–	–	–	–	1005-060	–	100
70	1001-070	1002-070	1003-070	1004-070	1005-070	1006-070	100
76.2	1001-10035						500
82	1001-082	–	–	–	–	–	100
85	1001-085	–	–	–	–	–	100
90	1001-090	1002-090	1003-090	1004-090	1005-090	1006-090	100
90	1001-10048	1002-10048					5000
110	1001-110	1002-110	1003-110	1004-110	1005-110	1006-110	100
125	1001-125	1002-125	1003-125	1004-125	1005-125	1006-125	100
145	1001-045	–	–	–	–	–	100
150		1002-147	–	–	–	–	100
150	1001-150	1002-150	1003-150	1004-150	1005-150	1006-150	100
185	1001-185	1002-185	1003-185	1004-185	1005-185	1006-185	100
240	1001-240	1002-240	1003-240	1004-240	1005-240	1006-240	100
270	1001-270	1002-270	–	1004-270	–	–	100
320	1001-320	1002-320	1003-320	1004-320	1005-320	–	100
385	1001-385	1002-385	–	–	–	–	100
400	1001-400	–	–	1004-400	–	–	100
500	1001-500	1002-500	–	–	–	–	100

Ordering information

Qualitative filter circles—standard grades

	Catalog number					
Diameter (mm)	**Grade 595**	**Grade 597 Optima**	**Grade 597**	**Grade 598**	**Grade 602 h**	**Quantity/pack**
12.7	–	989410108	10311862	–	–	1000
45	–	989410101	10311804	–	–	100
55	–	98949552	10311807	–	–	100
70	–	989410102	10311808	–	–	100
90	–	98949329	10311809	10312209	10312609	100
110	10311610	989410103	10311810	–	–	100
125	10311611	989410104	10311811	–	10312611	100
150	10311612	98949613	10311812	-	10312612	100
185	10316114	989410105	10311814	–	10312614	100
240	–	989410106	10311820	–	10312620	100
320	–	989410107	10311822	–	–	100

Ordering information

Qualitative filter sheets—standard grades

Dimensions (mm)	**Catalog number**	**Quantity/pack**
Grade 1		
26 × 31	1001-813	1000
75 × 100	1001-824	500
460 × 570	1001-917	100
460 × 570	1001-918	500
580 × 680	1001-931	100
580 × 680	1001-932	500
600 × 600	1001-929	100
Grade 2		
460 × 570	1002-917	100
580 × 680	1002-931	100
600 × 600	1002-929	100
Grade 3		
460 × 570	1003-917	100

Ordering information

Qualitative filter sheets—standard grades (continuation)

Dimensions (mm)	Catalog number	Quantity/pack
Grade 4		
460 × 570	1004-917	100
580 × 580	1004-930	100
6 × 6 in	1004-492	100
Grade 591		
580 × 580	10311387	250
Grade 595		
580 × 580	10311687	500
Grade 597		
580 × 580	10311887	500
580 × 580	10311897	100
Grade 597 Optima		
580 × 580	989410110	100
580 × 580	989410109	500
Grade 598		
580 × 580	10312287	250

Ordering information

Qualitative filter reels—standard grades

	Catalog number				
Dimensions	**Grade 4**	**Grade 597L**	**Grade 598**	**Grade 602 eh**	**Quantity/pack**
10 mm × 50 m	–	–	–	10312500	20
38 mm × 30 m*	1004-648	–	–	–	1
40 mm × 100 m	–	10312070		–	10
500 mm × 100 m	–	–	10312000	–	1

* *Approximate dimensions*

Quantitative filter papers—ashless grades

Whatman quantitative filters are designed for gravimetric analysis and the preparation of samples for instrument analysis. They are available in three formats designed for specific requirements.

- **Ashless:** 0.007% ash nominal for Grades 40 to 44 and a typical nominal ash content of 0.01% for the 589 Grades. These filters are very pure and suitable for a wide range of critical analytical filtration procedures.
- **Hardened low ash:** 0.015% ash nominal—treated with a strong acid to remove trace metals and produce high wet strength and chemical resistance. These filters are particularly suitable for Büchner filtration where the tough, smooth surface of the filter makes it easy to recover precipitates.
- **Hardened ashless:** 0.005% ash nominal, acid hardened to give high wet strength and chemical resistance with extremely low ash content. The tough surface makes these filters suitable for a wide range of critical filtration procedures.



Quantitative filter papers, ashless

Grade 40: 8 µm*

The classic general purpose ashless filter paper with medium speed and retention. Typical applications include gravimetric analysis for numerous components in cements, clays, iron, and steel products; as a primary filter for separating solid matter from aqueous extracts in general soil analysis; quantitative determination of sediments in milk, and as a pure analytical grade clean-up filter for solutions prior to AA spectrometry. Also used as a high-purity filter in the collection of trace elements and radionuclides from the atmosphere.

Grade 41 (20 µm*)

The fastest ashless filter paper, recommended for analytical procedures involving coarse particles or gelatinous precipitates (e.g. iron or aluminum hydroxides). Also used in quantitative air pollution analysis as a paper tape for impregnation when determining gaseous compounds at high flow rates.

Grade 42 (2.5 µm*)

Used for critical gravimetric analysis with the finest particle retention of all Whatman cellulose filter papers. Typical analytical precipitates include barium sulfate, metastannic acid, and finely precipitated calcium carbonate.

Grade 43 (16 µm*)

Intermediate in retention between Grades 40 and 41, and twice as fast as Grade 40. Typical applications include foodstuffs analysis, soil analysis, particle collection in air pollution monitoring for subsequent analysis by XRF techniques, and inorganic analysis in the construction, mining, and steel industries.

Grade 44 (3 µm*)

Thin version of Grade 42 retaining very fine particles but with lower ash weight per sample and almost twice the flow rate of Grade 42.

* *Particle retention rating at 98% efficiency.*

Grade 589/1 (12-25 µm*)

Black Ribbon Filter: ashless filter paper with very high flow rate. Used for many quantitative standard methods, especially for gravimetric applications (e.g. determination of the ash content in foodstuffs or for the Blaine test in the cement industry).

Also available fluted as Grade 589/1 ½.

Grade 589/2 (4-12 µm*)

White Ribbon Filter: ashless standard filter paper for medium fine precipitates offering medium filtration speed. Applied in a variety of routine methods in quantitative analysis, (e.g. determination of the sand content in foodstuffs, determination of the grade of flour or analysis of aqueous suspensions in the paper industry).

Also available fluted as Grade 589/2 ½.

Grade 589/3 (2 µm*)

Blue Ribbon Filter: ashless standard filter paper for very fine precipitates. Slow filter paper with highest efficiency for collecting very small particles. Also used for many analytical routine methods in different industries (e.g. determination of the amount of insoluble contaminants in animal and vegetable fats and oils).

* *Particle retention rating at 98% efficiency*



Whatman ashless quantitative filter paper circles

Technical specifications

Quantitative filter papers—ashless grades

Grade	Typical particle retention in liquid (µm)[1]	Filtration speed (approx) herzberg (s)	Nominal ash content (%)[3]	Nominal thickness (µm)	Nominal basis weight (g/m²)	Typical water flow rate (mL/min)[2]	Nominal air flow rate (s/100 mL/in²)
40	8	–	0.007	210	95	25	21
41	20	–	0.007	215	85	254	4
42	2.5	–	0.007	200	100	5	96
43	16	–	0.007	220	95	62	11
44	3	–	0.007	176	80	11	56
589/1	12–25	25	0.01	190	80	–	–
589/2	4–12	70	0.01	180	85	–	–
589/3	2	375	0.01	160	84	–	–

1 *Particle retention rating at 98% efficiency*
2 *For 9 cm diameter*
3 *Ash is determined by ignition of the cellulose filter at 900°C in air*

Ordering information

Quantitative filter papers—ashless grades

	Catalog number								
Diameter (mm)	**Grade 40**	**Grade 41**	**Grade 42**	**Grade 43**	**Grade 44**	**Grade 589/1**	**Grade 589/2**	**Grade 589/3**	**Quantity/pack**
Filter circles									
12.7	1440-012	–	–	–	–	–	–	–	400
12.7	–	–	–	–	–	–	10300102	10300263	1000
25	1441-6309	1441- 6309	–	–	–	–	–	–	10000
30	1440-329	–	–	–	–	–	–	–	100
32	1440-032	–	–	–	–	–	–	–	100
40.5	–	–	–	–	–	–	10300103	–	100
42.5	1440-042	1441-042	1442-042	–	–	–	–	–	100
47	1440-047	1441-047	1442-047	–	–	–	–	–	100
50	–	1441-050	–	–	–	–	10300106	–	100
55	1440-055	1441-055	1442-055	–	–	–	10300107	–	100
60	–	1441-060	–	–	–	–	–	–	100
70	1440-070	1441-070	1442-070	–	1444-070	–	10300108	–	100
79	–	–	1442-10055	–	–	–	–	–	100
90	1440-090	1441-090	1442-090	1443-090	1444-090	10300009	10300109	–	100
110	1440-110	1441-110	1442-110	1443-110	1444-110	10300010	10300110	10300210	100
125	1440-125	1441-125	1442-125	1443-125	1444-125	10300011	10300111	10300211	100
142	–	–	–	–	–	–	–	10300213	100
150	1440-150	1441-150	1442-150	1443-150	1444-150	10300012	10300112	10300212	100
185	1440-185	1441-185	1442-185	1443-185	1444-185	10300014	10300114	10300214	100
240	1440-240	1441-240	1442-240	–	1444-240	–	10300120	–	100
320	1440-320	1441-320	1442-320	–	–	–	–		100
450	1440-6168	–	–	–	–	–	–	–	100
500	–	–	–	–	–	–	–	–	100
700	–	–	–	–	–	–	–	–	100
Filter sheets									
25.4 × 90	–	–	1442-6551	–	–	–	–	–	100
203 × 254	–	1441-866	–	–	–	–	–	–	100
460 × 570	1440-917	1441-917	1442-917	–	–	–	–	–	100
Flag shape	–	–	1442-971	–	–	–	–	–	100

Quantitative filter papers—hardened low ash grades

The maximum ash content of these grades is intermediate between ashless and qualitative grades. They are particularly suitable for Büchner filtrations where it is desirable to recover the precipitate from the filter surface after filtration. Other characteristics include high wet strength and chemical resistance, which are similar to the acid hardened ashless filter papers.

Grade 50 (2.7 µm*)

Retention of very fine crystalline precipitates. The thinnest of all Whatman filter papers with a slow flow rate, these filters have a hardened and highly glazed surface, which also keeps the paper free from loose surface fibers. Highly suitable for qualitative or quantitative filtrations requiring vacuum assistance on Büchner or 3-piece filter funnels. Very strong when wet and will withstand wet handling and precipitate removal by scraping. In the electronics industry, the virtual absence of fiber shedding is utilized in carriers for integrated circuits.

This grade is also available in Smear Tab format for wipe testing (e.g. testing of surfaces for radionuclide contamination).

Grade 52 (7 µm*)

The general purpose hardened filter paper with medium retention and flow rate. Very hard surface.

Grade 54 (22 µm*)

Very fast filtration and high wet strength makes this grade very suitable for vacuum assisted fast filtration of difficult coarse or gelatinous precipitates.

* *Particle retention rating at 98% efficiency.*



Hardened low ash quantitative filter papers

Technical specifications

Quantitative filter papers—ashless grades

Grade	Typical particle retention in liquid (µm)[1]	Nominal ash content (%)[3]	Nominal thickness (µm)	Nominal basis weight (g/m²)	Typical water flow rate (mL/min)[2]	Nominal air flow rate (s/100 mL/in²)	Nominal air flow rate (s/100 mL/in²)
50	2.7	0.015	115	96	10	144	21
52	7	0.015	175	96	66	15	–
54	22	0.015	185	90	453	3	–

1 *Particle retention rating at 98% efficiency*
2 *For 9 cm diameter*
3 *Ash is determined by ignition of the cellulose filter at 900°C in air*

Ordering information

Quantitative filter papers—hardened low ash grades

	Catalog number			
Dimensions (mm)	**Grade 50**	**Grade 52**	**Grade 54**	**Quantity/pack**
Filter circles				
42.5	1450-042	–	–	100
55	1450-055	–	1454-055	100
63.5	1450-063	–	–	100
70	1450-070	–	1454-070	100
90	1450-090	1452-090	1454-090	100
110	1450-110	1452-110	1454-110	100
125	1450-125	1452-125	1454-125	100
150	1450-150	1452-150	1454-150	100
185	1450-185	–	1454-185	100
240	1450-240	1452-240	1454-240	100
320	1450-320	–	1454-320	100
500	1450-500	–	1454-500	100
Smear Tab	1450-993	–	–	100
Filter sheets				
150 × 230	1450-916	–	–	100
460 × 570	1450-917	–	1454-917	100



Hardened low ash quantitative filter papers

Quantitative filter papers—hardened ashless grades

Hardened ashless filter papers are suited for a variety of precipitate sizes. Along with general filtration Grade 540, the range includes Grade 542 for retention of fine precipitates and Grade 541 for fast filtration. All three grades are designed for use in gravimetric analysis.

These filter papers exhibit high wet strength and chemical resistance and are acid hardened, which reduces ash to an extremely low level. Their tough surfaces make them suitable for a wide range of critical analytical filtration operations. Each grade offers a convenient combination of filtration speed and particle retention.



Hardened ashless quantitative filter papers, Grade 540

Grade 540 (8 µm*)

A general purpose hardened ashless filter paper with medium retention and flow rate. Extremely pure and strong with a hard surface. High chemical resistance to strong acid and alkali. Frequently used in the gravimetric analysis of metals in acid/alkali solutions and in collecting hydroxides after precipitation by strong alkalis.

Grade 541 (22 µm*)

The general purpose hardened filter paper with medium retention and flow rate. Very hard surface.

Grade 542 (2.7 µm*)

High retention of fine particles under demanding conditions. Slow flow rate. Very hard and strong with excellent chemical resistance. Often used in gravimetric metal determinations.

* *Particle retention rating at 98% efficiency.*

Technical specifications

Quantitative filter papers—hardened ashless grades

Grade	Typical particle retention in liquid (µm)[1]	Nominal ash content (%)[3]	Nominal thickness (µm)	Nominal basis weight (g/m²)	Typical water flow rate (mL/min)[2]	Nominal air flow rate (s/100 mL/in²)
540	8	0.005	160	85	97	13
541	22	0.005	155	78	359	3
542	2.7	0.005	150	96	13	64

[1] *Particle retention rating at 98% efficiency*
[2] *For 9 cm diameter*
[3] *Ash is determined by ignition of the cellulose filter at 900°C in air*

Ordering information

Quantitative filter papers—hardened ashless grades

	Catalog number			
Dimensions (mm)	**Grade 540**	**Grade 541**	**Grade 542**	**Quantity/pack**
Filter circles				
21	1540-321	–	–	100
24	1540-324	–	–	100
42.5	1540-042	1541-042	–	100
47	–	1541-047	–	100
55	1540-055	1541-055	1542-055	100
70	–	1541-070	1542-070	100
90	1540-090	1541-090	1542-090	100
110	1540-110	1541-110	1542-110	100
125	1540-125	1541-125	1542-125	100
150	1540-150	1541-150	1542-150	100
185	1540-185	1541-185	1542-185	100
240	1540-240	1541-240	1542-240	100
270	–	1541-270	–	100
320	1540-320	1541-320	–	100
400	–	1541-400	1542-400	100
Filter sheets				
460 × 570	–	1541-917	–	100

Hardened ashless quantitative filter paper circles

Wet strengthened general purpose filter papers

Wet strengthened grades

These extremely strong filter papers have a high wet strength due to the addition of a small quantity of chemically stable resin. Their use in normal qualitative applications will not introduce any significant impurities into the filtrate. The resins do, however, contain nitrogen, so these grades should not be used in Kjeldahl estimations, etc. Some wet strengthened grades are available in folded (fluted) forms.



Qualitative filter papers, Grade 91

Grade 91 (10 µm*)

A general purpose creped filter for less critical routine analysis. Widely used to assay sucrose in cane sugar and within pharmaceutical laboratories for routine filtration.

Grade 93 (10 µm*)

This filter paper is intermediate in speed and retention between Grades 1 and 4. Available in a dispenser pack, which can be attached to the wall or bench, placed on a shelf either upright or flat, and used as a normal carton or as a convenient dispenser. The envelopes are released individually for easy one-at-a-time removal. Package and envelopes are clearly marked for size and content.

Grade 113 (30 µm*)

A fast, open filter paper with creped surface and high loading capacity — making it highly suited for use with coarse or gelatinous precipitates. Fastest flow rate of the qualitative grades.

Also available as Grade 113V.

Grade 114 (25 µm*)

Half the thickness of Grade 113 and suitable for coarse or gelatinous precipitates. Smooth surface for easy recovery of precipitates.

Also available fluted as Grade 114V.

Grade 1573 (12–25 µm*)

A fast filter paper with high wet strength. It has a very smooth surface, making it easy to scrape or wash off precipitate. Resistant against: sulfuric and nitric acid solutions (up to 40% at 50°C), hydrochloric (up to 10% at 100°C, 20% at 60°C, 25% at 20°C) and alkalis (up to 10% at 20°C).

Also available fluted as Grade 1573 ½.

Grade 1574 (7–12 µm*)

A medium fast filter paper with high wet strength. This paper has the same chemical resistance characteristics as Grade 1573 (see above).

Available fluted as Grade 1574 ½.

Grade 1575 (< 2 µm*)

Slow filter paper with high wet strength. This paper has the same chemical resistance characteristics as Grade 1573 (see above).

* *Particle retention rating at 98% efficiency.*

Technical specifications

Wet strengthened grades

Grade	Description	Typical particle retention in liquid (µm)[1]	Filtration speed (approx) herzberg (s)	Nominal air flow (s/100 mL/in²)	Nominal thickness (µm)	Nominal basis weight (g/m²)	Typical water flow rate (mL/min)[2]
91	Creped	10	–	6	205	65	274
93	Medium	10	–	7	145	65	194
113	Creped	30	–	2	420	125	774
114	–	25	–	4	190	75	333
1573	Fast, smooth	12–25	25	–	170	88	–
1574	Medium fast, very low fiber release	7–12	85	–	160	90	–
1575	Slow	< 2	700	–	140	92	–

[1] *Particle retention rating at 98% efficiency*
[2] *For 9 cm diameter*

Ordering information

Wet strengthened grades

	Catalog number							
Dimensions (mm)	Grade 91	Grade 93	Grade 113	Grade 114	Grade 1573	Grade 1574	Grade 1575	Quantity/pack
Filter circles								
90	–	–	1113-090	1114-090	–	–	–	100
110	1091-110	–	–	–	–	–	–	4000[†]
110	–	1093-110	1113-110	–	–	–	–	100
110	–	1093-111*	–	–	–	–	–	1250
125	1091-125	–	–	–	–	–	–	4000[†]
125	–	1093-125	1113-125	1114-125	–	–	–	100
125	–	1093-126*	–	–	–	–	–	1250
150	1091-150	1093-6215**	–	–	–	–	–	1000[†]
150	–	–	1113-150	1114-150	10314712	–	10314915	100
165	1091-165	–	–	–	–	–	–	1000[†]
185	1091-185	–	–	–	–	–	–	1000[†]
185	–	–	1113-185	1114-185	10314714	–	10314914	100
190	1091-190	–	–	–	–	–	–	1000[†]

* *Packed 50 envelopes of 25 circles*
** *Packed 10 bags of 100 circles*
[†] *Subdivided into 100*

Ordering information

Wet strengthened grades (continuation)

	Catalog number							
Dimensions (mm)	**Grade 91**	**Grade 93**	**Grade 113**	**Grade 114**	**Grade 1573**	**Grade 1574**	**Grade 1575**	**Quantity/pack**
200	–	–	–	–	–	–	10314916	100
240	1091-240	–	–	–	–	–	–	1000[†]
240	–	–	1113-240	1114-240	10314720	–	–	100
290	–	–	–	–	10314726	–	-	100
320	–	–	1113-320	–	–	–	–	100
330	1091-330	–	–	–	–	–	–	100
400	–	–	–	1114-400	–	–	–	100
500	–	–	1113-500	–	–	–	–	100
685	–	–	–	–	–	10314828	–	100
Filter sheets								
580 mm × 580 mm	–	–	–	1114-930	–	–	–	100
580 mm × 580 mm	1091-930	1093-930	–	–	–	–	–	500
610 mm × 610 mm	1091-935	1093-935	–	–	–	–	–	500
460 mm × 570 mm	–	–	1113-917	–	–	–	–	100
Rolls								
25 mm × 145 m	–	–	–	–	10314769	–	–	1
25.5 mm × 210 m	–	–	–	–	10314766	–	–	1
70 mm × 80 m	–	–	–	–	10314765	–	–	1
70 mm × 100 m	–	–	–	–	–	10314871	–	1

* *Packed 50 envelopes of 25 circles*
** *Packed 10 bags of 100 circles*
† *Subdivided into 100*

General purpose filter papers

These filter papers are made from super-refined cellulose and have been specifically designed to have particular properties for each application, ranging from the filtration of beverages to the purification of electroplating baths.

Grade 520 a (15–18 µm*)
A thin paper with great wet strength and a very high flow rate. Frequently used in technical applications such as the filtration of viscous liquids and emulsions (e.g. sweetened juices, spirits and syrups, resin solutions, oils, or plant extracts).

Available fluted as Grade 520 a ½.

Grade 520 bII (15–19 µm*)
A thick paper with high wet strength offering a very high flow rate.

Grade 0858 (7–12 µm*)
Medium retention and flow rate with a grained surface. Used for the filtration of extracts, oils, beer, syrups, etc. Also suitable for use in filter presses or for the aspiration of liquids.

Available fluted as Grade 0858 ½.

Grade 0903 (7 µm*)
A thin filter paper with smooth surface. Offers medium to slow flow rate and good retention for small particles.

Grade 0905 (12–25 µm*)
A creped paper for coarse particles, offering a very high filtration speed.

Grade 2294 (8–15 µm*)
A very thick filter card with high wet strength. Offers very high flow rate and retains medium to coarse particles.

Grade 2589 a (6–12 µm*)
A fast to medium fast filter with high wet strength offering medium retention.

Grade 2589 c (4–8 µm*)
Thick filter with medium to slow filtration speed, high wet strength, and good retention for smaller particles.

Grade 2589 d (2–6 µm*)
A very thick filter with high wet strength. Offers medium to slow flow rate and retains very fine precipitates.

Grade Shark Skin (8–12 µm*)
Creped, medium to slow filter paper. Resistant to weak acids and bases. Often used as a protective paper for filter press cloths, as well as in processing of cocoa butter and edible oils.

* *Particle retention rating at 98% efficiency.*



Grade 2294 filter papers for technical use

Technical specifications

General purpose filter papers

Grade	Description	Typical particle retention in liquid (µm)	Filtration speed (approx) herzberg (s)	Nominal air flow (s/100 mL/in²)	Nominal thickness (µm)	Nominal basis weight (g/m²)
520 a	Very fast, creped, high wet strength	15–18	17.5	–	300	90
520 b II	Very fast, creped, wet strength, thick	15–19	15	–	500	135
0858	Medium fast, grained	7–12	55	4.9	170	75
0903	Medium to slow, smooth	7	175	–	140	65
0905	Very fast, creped	12–25	20	–	270	75
2294	Fast, wet strength, thick	8–15	27.5	4.4	1500	556
2589 a	Medium fast, wet strength	6–12	60	–	430	200
2589 c	Medium to slow, wet strength	4–8	160	–	750	400
2589 d	Medium to slow, wet strength, thick	2–6	235	–	1000	500
Shark Skin™	Medium to slow, wet strength, thin, creped	8–12	77.5	–	170	44

Ordering information

General purpose filter papers

	Catalog number						
Dimensions (mm)	Grade 0858	Grade 0903	Grade 0905	Grade 520 a	Grade 520 bII	Shark Skin	Quantity/pack
Filter sheets							
110 × 580	10334365	–	–	–	–	–	500
390 × 390	10334383	–	–	–	–	-	500
450 × 450	10334385	10334885	–	–	–	–	500
580 × 580	–	–	10334987	–	–	–	500
580 × 580	–	–	–	10331487	10331687	–	250
300 × 250	–	–	–	–	–	10538877	100
Filter reels							
21" × 750'	–	–	–	–	–	10537138	1

Ordering information

General purpose filter papers

	Catalog number			
Filter sheets	Grade 2589 a	Grade 2589 c	Grade 2589 d	Quantity/pack
25 × 75	–	10343876	10343976	100
580 × 580	10343687	–	–	100

Ordering information

General purpose filter papers (continuation)

Dimensions (mm)	Catalog number			Quantity/pack
	Grade 2294	Grade 2589 a	Shark Skin	
Filter circles				
90	–	–	10347509	100
110	10342810	–	10347510	100
125	–	–	10347511	100
140	–	10343630	–	500
150	–	–	10347513	100
180	10342860[1]	–	–	100
185	–	–	10347512	100
210	10342862[2]	–	–	100
240	–	–	10347519	100
270	–	–	10347521	100
290	–	–	10347577	100
320	–	–	10347530	100
340	–	–	10347522	100
385	–	–	10347523	100
500	–	–	10347525	100

[1] *180 mm with central hole 33 mm*

[2] *210 mm with central hole 60 mm*

Folded and fluted filter papers

Ready-to-use paper solutions

Many grades of our qualitative and quantitative filter paper are available as fluted circles. We also offer a selection of prefolded cones, quadrant-folded and pyramid-folded filter papers. These convenient formats eliminate time-consuming manual pleating or folding, streamlining operations in busy labs.

Whatman ready-to-use folded filter papers from Cytiva support your application needs, save valuable time and provide ease of use when undertaking repetitive or multiple analyses.



Folded and fluted filter papers, 113V

Fluted filter papers

This convenient format has major advantages over flat circles.

- Savings in time required to quadrant-fold circles to fit conical filter funnels in repetitive or multiple analyses
- Decreased overall filtration time because of the extra surface area exposed; the normal slow-down of filtration speed due to the loading of particulate is postponed
- Increased total loading capacity as more filter area is available
- Maintained flow rate due to the reduction in filter paper contact with funnel side and the self-supporting shape of the filter itself
- The prepleating does not significantly affect any of the technical data and the same figures may be used for the flat circles

Additional folded formats

Qualitative and quantitative grades are now available in several convenient folded formats. These ready-to-use paper filters are available in cone, pyramid, and flat quadrant folded formats, in diameters and grades to support your applications.

Whatman pyramid, flat quadrant-folded and cone filters come in a range of media and diameters, and fit conical funnels. Convenient stacking and packaging options are available.

Folded and fluted papers

Available formats and grades

Equivalent flat stock grade	Type	Fluted	Quadrant-folded	Cone folded	Pyramid-folded
1	Qualitative	1V	1 FF	1	–
2	Qualitative	2V	–	–	–
4	Qualitative	4V	–	–	4
5	Qualitative	5V	–	–	–
6	Qualitative	–	–	–	6
40	Ashless	–	40 FF	40	40
41	Ashless	–	41 FF	–	41
42	Ashless	–	–	–	42
113	Wet strengthened	113V	–	–	–
114	Wet strengthened	114V	–	–	–
–	Kieselguhr paper	287 ½	–	–	–
–	Qualitative	512 ½	–	–	–
520 a	General purpose	520 a ½	–	–	–
520 b II	General purpose	520 b FF	–	–	–
540	Hardened ashless	–	–	–	540
–	Qualitative	–	–	–	–
–	Qualitative	593 ½	–	–	–
–	Qualitative	594 ½	–	–	–
595	Qualitative	595 ½	–	–	–
597	Qualitative	597 ½	–	–	–
598	Qualitative	598 ½	–	–	–
602 h	Qualitative	602 h ½	–	–	–
602 eh	Qualitative	602 eh ½	–	–	–
–	Qualitative	604 ½	–	–	–
–	Qualitative	0790 ½	–	–	–
–	Qualitative	802	–	–	–
858	General purpose	0858 ½	0858 FF	–	–
–	Qualitative	0860 ½	–	–	–
1573	Wet strengthened	1573 ½	–	–	–
1574	Wet strengthened	1574 ½	–	–	–
–	Qualitative	2555 ½	–	–	–

Grade 1V and 1 FF (11 µm*)

A folded filter paper for routine applications with medium retention and flow rate. Covers a wide range of laboratory applications and is frequently used for clarifying liquids.

Grade 2V (8 µm*)

Widely used for general purpose filtration. Has excellent particle retention and a good filtration speed and loading capacity.

Grade 4V (25 µm*)

Extremely fast filtering with excellent retention of coarse particles and gelatinous precipitates such as ferric hydroxide and aluminum hydroxide.



Quadrant flat folded filter papers

Grade 5V (2.5 µm*)

The maximum degree of fine particle filtration in the qualitative range. Capable of retaining the fine precipitates encountered in chemical analysis. Slow flow rate. Excellent clarifying filter for cloudy suspensions and for water and soil analysis.

Grade 6

Twice as fast as Grade 5 with similar fine particle retention. Often specified for boiler water analysis applications.

Grade 40 and 40 FF

The classic general purpose ashless filter paper with medium speed and retention. Typical applications include gravimetric analysis for numerous components in cements, clays, iron, and steel products; as a primary filter for separating solid matter from aqueous extracts in general soil analysis; quantitative determination of sediments in milk, and as a pure analytical grade clean-up filter for solutions prior to AA spectrometry. Also used as a high-purity filter in the collection of trace elements and radionuclides from the atmosphere.

Grade 41 and 41 FF

The fastest ashless filter paper, recommended for analytical procedures involving coarse particles or gelatinous precipitates (e.g. iron or aluminum hydroxides). Also used in quantitative air pollution analysis as a paper tape for impregnation when determining gaseous compounds at high flow rates.

Grade 42

Used for critical gravimetric analysis with the finest particle retention of all Whatman cellulose filter papers. Typical analytical precipitates include barium sulfate, metastannic acid, and finely precipitated calcium carbonate.

Grade 113V (30 µm*)

Very thick and strong filter with creped surface for extremely high loading capacity, particularly in folded form. Fastest flow rate of any qualitative grade. Excellent for coarse particles and gelatinous precipitates.

Grade 114V (25 µm*)

Strong filter with very fast flow rate. Excellent for coarse particles and gelatinous precipitates. Smooth surface.

* *Particle retention rating at 98% efficiency.*

Grade 287 ½

Kieselguhr paper with a medium to slow flow rate. Additional adsorption effect (e.g. for the separation of very fine semi-colloidal turbidity, for clarifying milk serum, starch solutions, soil suspensions, or sugar-containing solutions prior to polarimetry or refractometry).

Grade 512 ½

Low phosphate papers approximately 1.5 ppm phosphate, for the filtration of calcium lactate extracts from soil samples for the determination of K and P according to Egnér, Riehm and Lederle

Grade 520 a ½ (15–18 µm*)

A thin paper with great wet strength and a very high flow rate. Frequently used in technical applications such as the filtration of viscous liquids and emulsions (e.g. sweetened juices, spirits and syrups, resin solutions, oils or plant extracts).

Grade 520 b FF

A filter paper with high wet strength offering a very high flow rate.



Pyramid folded filter papers

Grade 540

A general purpose hardened ashless filter paper with medium retention and flow rate. Extremely pure and strong with a hard surface. High chemical resistance to strong acid and alkali. Frequently used in the gravimetric analysis of metals in acid/alkali solutions and in collecting hydroxides after precipitation by strong alkalis.

Grade 593 ½ (5 µm*)

A standard grade filter paper for fine precipitates.

Grade 594 ½ (4 µm*)

A standard grade filter paper for fine precipitates.

Grade 595 ½ (4–7 µm*)

A thin filter paper, medium-fast with medium to fine particle retention. Used for many routine analytical applications in different industries (e.g. particle separation from food extracts or filtration of solids from digested environmental samples for ICP/AAS analysis).

Grade 597 ½ (4–7 µm*)

A medium fast filter paper with medium to fine particle retention. Used for a wide variety of analytical routine applications in different industries like food testing (e.g. determination of fat content) or removal of carbon dioxide and turbidity from beverages (e.g. beer analysis).

Grade 598 ½ (8–10 µm*)

A thick filter paper with high loading capacity. Combines medium retention with medium-fast to quick filtration speed.

* *Particle retention rating at 98% efficiency.*

Grade 602 h ½ (< 2 µm*)

A dense filter paper for collecting very small particles and removing fine precipitates. Used in sample preparation (e.g. in the beverage industry for residual sugar determination, acidic spectra, refractometric analysis, and HPLC).

Grade 602 eh ½ (2 µm*)

A qualitative filter paper for very fine precipitates..

Grade 604 ½ (25 µm*)

Grade 604½ qualitative filter paper for coarse precipitates.

Grade 802

A fluted filter for use with a conical filter funnel, offering fast filtration and high loading capacity for analysis involving coarse particles or gelatinous precipitates.

The filter is wet-strengthened and for normal qualitative application it will not introduce any significant impurities into the filtrate. However, it is not recommended for Kjeldahl nitrogen analysis.



Cone folded filter papers

Grade 0858 ½ and 858 FF (7–12 µm*)

Medium retention and flow rate with a grained surface. A universal filter paper used for the filtration of extracts, oils, beer, syrups, etc., also suitable for use in filter presses or for the aspiration of liquids.

Grade 1573 ½ (12–25 µm*)

A fast filter paper with high wet strength. It has a very smooth surface, making it easy to scrape or wash off precipitate. Resistant against: sulfuric and nitric acid solutions (up to 40% at 50°C), hydrochloric (up to 10% at 100°C, 20% at 60°C, 25% at 20°C), alkalis (up to 10% at 20°C).

Grade 1574 ½ (7–12 µm*)

A medium fast filter paper with high wet strength. This paper has the same chemical resistance characteristics as Grade 1573 ½ (see above).

Grade 2555 ½ (12 µm*)

A medium fast filter paper. Used for the filtration of the mash for the determination of the extract in malt and wort and for removing carbon dioxide from beer.

Grade 0790 ½

Acid-washed paper with ash content of approximately 0.01%, low magnesium, and phosphorus for the determination of trace elements (Mg, Mn, Co, Cu, Mo, B).

* *Particle retention rating at 98% efficiency.*

Technical specifications

Fluted grades

Grade	Description	Typical particle retention in liquid (µm)[1]	Filtration speed (approx) herzberg (s)	Nominal thickness (µm)	Nominal basis weight (g/m²)	Typical water flow rate (mL/min)[2]	Nominal ash content (%)[3]
1V	Medium flow	11	–	180	87	57	0.06
2V	–	8	–	190	97	38	–
4V	Very fast	25	–	210	92	247	0.06
5V	Slow	2.5	–	200	92	5	–
113V	Creped	30	–	420	125	774	–
114V	–	25	–	190	75	333	–
287 ½	Kieselguhr	–	330	360	154	–	–
520 a ½	Very fast, creped, high wet strength	15-18	17.5	300	90	–	–
520 b FF	Very fast, wet strength, extra thick	20	30	500	155	–	–
593 ½	Medium to slow	5	450	170	85	–	–
594 ½	Slow	4	800	150	75	–	–
595 ½	Medium fast, thin	4-7	80	150	68	–	–
597 ½	Medium fast	4-7	70	180	85	–	–
598 ½	Medium fast, thick	8-10	50	320	140	–	–
602 h ½	Slow, dense	< 2	375	160	84	–	–
602 eh ½	Very slow, very dense	2	3000	150	85	–	–
604 ½	Fast	25	50	190	80	–	–
802	Fast	–	–	–	73	–	–
0858 ½	Medium fast, grained	7-12	55	170	75	–	–
0860 ½	Medium fast, smooth	12	60	170	75	–	–
1573 ½	Fast, smooth	12-25	25	170	88	–	–
1574 ½	Medium fast, very low fiber release	7-12	85	160	90	–	–
2555 ½	Medium fast	12	55	170	75	–	–

[1] *Particle retention rating at 98% efficiency*
[2] *For 9 cm diameter*
[3] *Ash is determined by ignition of the cellulose filter at 900°C in air*

Ordering information

Filter papers—fluted grades

Dimensions (mm)	Catalog number								Quantity /pack
	Grade 1V	Grade 2V	Grade 4V	Grade 5V	Grade 113V	Grade 114V	Grade 287 ½	Grade 520 a ½	
110	–	–	–	1205-110	–	–	–	–	100
125	1201-125	1202-125	1204-125	–	1213-125	1214-125	–	–	100
125	–	–	–	–	–	–	10310244	–	50
150	–	–	–	–	–	–	10310245	–	50
150	1201-150	1202-150	1204-150	–	1213-150	1214-150		–	100
185	–	–	–	–	–	–	10310247	–	50
185	1201-185	1202-185	1204-0185	1205-185	1213-185	1214-185		–	100
240	1201-240	1202-240	1204-240	–	1213-240	1214-240	–	10331451	100
270	1201-270	1202-270	1204-270	–	1213-270	–	–	–	100
320	1201-320	1202-320	1204-320	–	1213-320	1214-320		–	100
385	–	1202-385	–	–	–	–	–	–	100
400	–	1202-400	–	–	–	–	–	–	100
500	–	1202-500	–	–	1213-500	–	–	10331456	100

Ordering information

Filter papers—fluted grades

Dimensions (mm)	Catalog number							Quantity /pack
	Grade 520 b FF	Grade 593 ½	Grade 594 ½	Grade 595 ½	Grade 597 ½	Grade 598 ½	Grade 602 h ½	
70	–	–	–	10311641	10311841	–	–	100
90	–	–	–	10311642	10311842	–	10312642	100
110	–	–	–	10311643	10311843	–	–	100
125	–	–	–	–	–	10312244	–	50
125	–	–	–	10311644	10311844	–	10312644	100
150	–	–	–	10311645	10311845	–	10312645	100
185	–	–	–	–	–	10312247	–	50
185	–	10311447	10311547	10311647	10311847		10312647	100
210	–	–	–	10311649	–	–	–	100
240	10331551	–	–	–	–	10312251	–	50
240	–	10311451	–	10311651	10311851	–	10312651	100
270	–	–	–	10311652	10311852	–	–	100
320	10331553	–	–	–	–	–	–	50
320	–	–	–	10311653	10311853	–	–	100
385	10331554	–	–	–	–	–	–	50
385	–	–	–	10311654	10311854	–	–	100
500	10331556	–	–	–	–	10312256	–	50
500	–	–	–	10311656	10311856	–	–	100
600	10331558	–	–	–	–	–	–	50

Ordering information

Filter papers—fluted grades

Dimensions (mm)	Catalog number							Quantity /pack
	Grade 602 eh ½	Grade 604 ½	Grade 0858 ½	Grade 0860 ½	Grade 1573 ½	Grade 1574 ½	Grade 2555 ½	
110	–	–	–	–	–	10314843	–	100
125	10312544	10312744	–	–	10314744	10314844	–	100
150	10312545	10312745	10334345	–	10314745	–	–	100
185	–	10312747	10334347	10334547	10314747	–	10313947	100
240	–	10312751	10334351	10334551	10314751	–	10313951	100
270	–	–	10334352	–	10314752	–	–	100
320	–	10312753	10334353	10334553	10314753	–	10313953	100
Sheets								
100 mm × 300 mm	–	–	–	10334500	–	–	–	500
570 mm × 870 mm	–	–	10334346	–	–	–	–	100
670 mm × 770mm	–	–	10334435	–	–	–	–	100

Ordering information

Quantitative filter papers—ashless fluted grades

Dimensions (mm)	Catalog number		Quantity /pack
	Grade 589/1 ½	Grade 589/2 ½	
110	–	10300143	100
150	10300045	10300145	100

For further information on these grades see Quantitative Filter Papers section.

Ordering information

Filter papers—wet strengthened fluted grades

Dimensions (mm)	Grade 589/1 ½	Grade 589/2 ½	Quantity /pack
125	Grade 802	5802-125	100
150	Grade 802	5802-150	100
185	Grade 802	5802-185	100
240	Grade 802	5802-240	100
240	Grade 802	5802-6698	1000
320	Grade 802	5802-320	100
385	Grade 802	5802-385	100

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	–

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



44 FF quadrant flat folded filter papers

Ordering information

Filter papers quadrant folded

Diameter (mm)	Description	Catalog number	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

Ordering information

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

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

Ordering information

Filter papers—pyramid folded grades

Diameter (mm)	Grade	Catalog number	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



Pyramid folded filter papers

Ordering information

Filter papers—cone folded grades

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

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



Cone folded filter papers

Application specific filter papers

Cytiva offers Whatman cellulose filter papers for specific applications. The product range includes filter papers for use in soil analysis and for the sugar industry.



Whatman application filter papers

Grade 0048

Filter mat made from a mixture of cellulose and polyester. This mat is used for optically testing baby food (artificial milk) for textile fibers.

Grade 72

Composite cellulose/glass filter loaded with activated carbon. Used to absorb radioactive iodine in air pollution monitoring and in nuclear installations.

Grade 71

Similar to Grade 72 but has a higher level of activated carbon.

Grade 8 ruled filter paper

A white filter paper with printed green lines for optical assessment (5 mm intervals). For routine investigations of foreign substances in a variety of sample types.

Grade 1450CV

Filter paper for the identification of undissolved dyes in the textile industry.

Grade 0965

A coarse filter mat with high wet strength.

Grade 287 ½

Kieselguhr paper with a medium to slow flow rate. Additional adsorption effect (e.g. for the separation of very fine semi-colloidal turbidity, for clarifying milk serum, starch solutions, soil suspensions, or sugar-containing solutions prior to polarimetry or refractometry). Fluted.

Grade 2555 ½

A medium fast filter paper. Used for the filtration of the mash for the determination of the extract in malt and wort and for removing carbon dioxide from beer. Fluted.

Soil analysis filter papers

Grade 0790 ½

Acid-washed paper with ash content of approximately 0.01%, low magnesium, and phosphorus for the determination of trace elements (Mg, Mn, Co, Cu, Mo, B). Fluted.

Grade 512 ½

Low phosphate papers approximately 1.5 ppm phosphate, for the filtration of calcium lactate extracts from soil samples for the determination of K and P according to Egnér, Riehm and Lederle. Fluted.

Sugar and food industry filter papers

Grade 3459

A creped filter paper, Grade 3459 has good retentivity at a relatively high filtration speed. Used for the clarifying filtration of:

- Dried beet pulp extracts
- Beet juice after the addition of lead acetate for subsequent polarimetric sugar determination
- Grade 3459 is specifically designed for the Venema unit (lead acetate method)

Technical specifications

Application specific filters

Grade	Properties	Filtration speed (approx) herzberg (s)	Nominal thickness (µm)	Nominal basis weight (g/m²)
Soil analysis filter papers				
0790 ½	Low Mg and P	225	–	84
512 ½	Low phosphate	375	–	84
Specially for the venema unit				
3459	Fast, creped	55	–	75
Malt and beer filter				
2555 ½	Medium fast	55	–	75
Food industry mat (cellulose/polyester)				
0048	–	–	0.86	130
Activated carbon loaded paper				
72	–	–	–	195
71	–	–	702-898	160-230
Kieselguhr paper				
287 ½	Kieselguhr	330	360	154
Filter mat				
0965	–	–	250	30
Identification of undissolved dyes				
1450CV	–	30	–	120
Routine investigations				
8	–	–	–	65

Ordering information

Application specific filters

Dimensions (mm)	Catalog number							Quantity /pack
	Grade 0048	Grade 72	Grade 71	Grade 0965	Grade 1450CV	Grade 8	Grade 3459	
Filter circles								
32	10348903	–	–	–	–	–	–	1000
45	–	–	–	–	–	10347004	–	100
47	–	1872-047	–	–	–	–	–	100
50	–	1872-050	–	–	–	–	–	100
55	–	1872-055	–	–	–	–	–	100
60	–	1872-060	–	–	–	–	–	100
70	–	–	–	–	–	10347008	–	100
75	–	–	–	–	–	10347033	–	100
90	–	–	–	–	10313209	–	–	50
90	–	–	–	–	–	10347009	–	100
110	–	–	–	10340810	–	–	–	100
230	–	–	–	–	–	–	10316619	1000

Ordering information

Application specific filters (continuation)

Diameter (mm)	Catalog number				Quantity/pack
	Grade 287 ½	Grade 512 ½	Grade 0790 ½	Grade 2555 ½	
Folded filters					
110	–	10310643	–	–	100
125	10310244	–	–	–	50
150	10310245	–	–	–	50
150	–	10310645	10301645	–	100
185	10310247	10301647	–	–	50
185	–	10310647	10301647	10313947	100
240	–	–	–	10313951	100
320	–	–	–	10313953	100
Sheets					
1060 mm × 560 mm	–	–	10390046	–	100

Seed germination testing papers

Seed testing papers are made from pure cellulose without any additives and do not contain any substances which could influence the growth of the seeds. The constant water absorption of the papers ensures the continuous provision of the required amount of water.

The contrast of the color seed testing papers makes evaluation easier, particularly for seeds with fine white rootlets or under artificial light. This makes work easier, improves the results, and saves time. The dyes used have been thoroughly investigated and have no influence on the growth of the seeds.

Seed testing papers are available for both the pleated paper (PP) method and the top of paper (TP) method.



Seed germination testing papers, pleated strips

Product selection

Seed germination testing papers

Grade	Description	Nominal thickness (µm)	Nominal weight (g/m²)
PP method			
3014	Pleated strips, white*	0.22	113
3236	Pleated strips, white*	0.22	110
TP method			
597	For Petri dishes or Jacobsen/Copenhagen tanks, white	0.18	85
598	For Petri dishes or Jacobsen/Copenhagen tanks, white	0.32	140
3621	Blotter, light blue	1.44	710
3633	Blotter, light blue	0.65	300
3644	Blotter, blue	1.4	720
3645	Yellow	0.35	165

* *50 double pleats*

Applications

Seed germination testing papers

Grade	Description
597, 598	Small seeds (e.g. grasses, flowers)
3014, 3236	Medium-large and coated seeds (e.g. sugar beet, fodder beet, grain, sunflower, rapeseed, mustard)
3014	Particularly sensitive seeds
3645	Seeds with small white rootlets

Ordering information

Seed germination testing papers

Dimensions (mm)	Grade	Catalog number	Color	Description	Quantity/pack
Circles					
70	597	10311808	–	Circles	100
85	3645	10342555	Yellow	Circles	100
90	597	10311809	–	Circles	100
90	598	10312209	–	Circles	100
90	181	2181-090	White	Circles	100
60	–	1872-060	–	–	–
Sheets					
100 × 100	3645	10342500	–	Sheets	1000
105 × 190	3645	10342596	Yellow	Sheets	1000
110 × 170	3645	10342583	Yellow	Sheets	100
110 × 170	3645	10342594	–	Sheets	1000
115 × 115	3645	10342595		Sheets	1000
140 × 200	3644	10342580	Blue	Sheets	1000
140 × 200	3621	10342579	White	Sheets	1000
280 × 340	3644	10342582	–	Sheets	100
420 × 594	3644	10342581	–	Sheets	50
450 × 690	3645	10342570	Yellow	Sheets	100
Pleated strips					
110 × 20	3014	10344672	White	Double pleated strips, without wrap strips	1000
110 × 20	3014	10344676	White	Double pleated strips, with wrap strips	1000
110 × 20	3236	10345572	Grey	Double pleated strips, without wrap strips	1000
110 × 20	3236	10345576	Grey	Double pleated strips, with wrap strips	1000
110 × 20	3236	10345573	Grey	Double pleated strips	500



Qualitative filter papers, Grade 597

Glass microfiber filters

Whatman glass microfiber filters are manufactured from 100% borosilicate glass and are available with or without 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 550°C and are excellent 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.



Grade EPM 2000 air sampling filter

Glass microfiber and quartz filters: trace element composition

Typical values (µg/g paper)

	QM-A*	EPM 2000	934-AH	GF/A and GF/C
Arsenic (As)	< 1	< 1	24	5
Beryllium (Be)	< 1	< 1	< 1	< 1
Cobalt (Co)	< 1	1	< 1	< 1
Cadmium (Cd)	< 1	< 1	< 1	< 1
Copper (Cu)	< 1	5	3	< 1
Lead (Pb)	< 1	3	9	5
Manganese (Mn)	2	20	18	6
Mercury (Hg)	< 1	< 1	< 1	< 1
Nickel (Ni)	1	1	3	1
Selenium (Se)	< 3	< 3	< 3	< 3
Silver (Ag)	< 1	< 1	< 1	< 1
Thallium (Tl)	< 1	< 1	< 1	< 1

Typical composition based on ICP-MS analysis

* *Trace element report can be downloaded from the Cytiva website for each lot of QM-A*

Standard binder-free glass microfiber filter papers

Grade GF/A (1.6 µm*)

This grade filter paper 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, food stuff analyses, protein filtration, and radioimmunoassay of weak ß emitters.
- Recommended for gravimetric determination of airborne particulates, stack sampling, and absorption methods of air pollution monitoring.

Whatman Grade GF/A card-mounted filters are used in static sample and personal air sampler applications. These aerosol sampling and particulate monitoring filters provide high flow rates and minimal sample interference.

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.

Ready-to-use (RTU) formats available for total suspended solids (TSS) and total dissolved solids (TDS). (See page 60).



Binder-free glass microfiber filters, Grade GF/C

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.

Recommended for nucleic acid 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.



Binder-free glass microfiber filters, Grade GF/F

** Particle retention rating at 98% efficiency.*

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 has been pre-fired and withstands temperatures over 550°C. Grade 934-AH is used for a wide range of laboratory applications.

- Used for determining total suspended solids in water, removal of turbidity, and filtration of bacterial cultures.
- Recommended for water pollution monitoring, cell harvesting, liquid scintillation counting, and air pollution monitoring.

Ready-to-use (RTU) formats are available for Total Suspended Solid (TSS), Total Dissolved Solids (TDS) and Volatile Suspended Solids (VSS). See page 60.

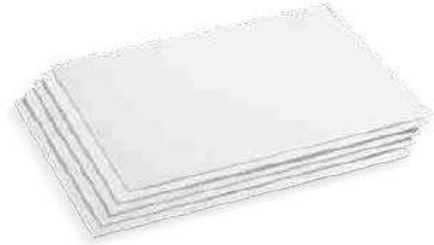


Grade 934-AH filters

Grade EPM 2000

EPM 2000 has been selected by the U.S. Environmental Protection Agency (EPA) 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, and pre-fired to enable the detailed chemical analysis of trace pollutants with the minimum of interference or background.

** Particle retention rating at 98% efficiency.*



Grade EPM 2000 air sampling filter

Technical specifications

Glass microfiber and quartz microfiber filters

Grade	Minimum retention efficiency in air (% @ 0.3 µm)	Typical retention efficiency in air (% @ 0.3 µm)	Typical particle retention in liquid (µm)[1]	Nominal air flow (s/100 mL/in²)	Nominal thickness (µm)	Nominal basis weight (g/m²)	Maximum recommended temperature (°C)	Typical water flow rate (mL/min)[2]
GF/A	≥ 99.85	≥ 99.99	1.6	4.3	260	53	550	143
GF/B	–	–	1.0	12	675	143	550	81
GF/C	–	–	1.2	6.7	260	53	550	105
GF/D	–	–	2.7	2.6	675	121	550	681
GF/F	–	–	0.7	19	420	75	550	41
934-AH	–	–	1.5	3.7	435	64	550	341
EPM 2000	≥ 99.85	≥ 99.99	–	5.6	450	85	550	–

[1] *Particle retention rating at 98% efficiency*
[2] *Normalized for 9 cm diameter. Measured under gravity for comparative purposes*

Ordering information

Binder-free glass microfiber grades

Dimensions (mm)	Catalog number							Quantity /pack
	Grade GF/A	Grade GF/B	Grade GF/C	Grade GF/D	Grade GF/F	Grade 934-AH	EPM 2000	
Filter circles								
7	–	–	–	1823-007	–	–	–	100
10	–	–	–	1823-010	–	–	–	100
13	1820-8013	–	–	–	–	–	–	100
15	–	–	–	–	1825-015	–	–	100
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
28	–	–	–	–	–	1827-028	–	100
30	–	–	–	–	–	1827-030	–	100
32	182082964	–	1822-320	–	–	1827-032	–	100
34	1820900086[4]	–	–	–	–	–	–	80
34	1820-10026[4]	–	–	–	–	–	–	100
35	–	–	–	1823-035	–	1827-035	–	100
37	1820-037	1821-037	1822-037	–	1825-037	1827-037	–	100
42.5	1820-042	1821-042	1822-042	1823-042	1825-042	1827-042	–	100
47	1820-047	1821-047	1822-047	1823-047	1825-047	1827-047	1882-047	100
50	1820-050	–	1822-050	–	–	–	–	100
55	1820-055	1821-055	1822-055	1823-055	1825-055	1827-055	–	100
60	1820-061[3]	–	–	–	–	–	–	50
60	1820-060	1821-060	–	–	–	–	–	100
70	1820-070	1821-070	1822-070	1823-070	1825-070	1827-070	–	100
81	1820-6537	–	–	–	–	–	–	100
82	–	–	–	–	–	1827-082	–	100
85	–		–	–		1827-085	–	100
90	1820-090	1821-090[1]	1822-090	1823-090[1]	1825-090[1]	1827-090	–	100
100	–	–	1822-100	–	–	–	–	100
100	–	–	1822-9916[2]	–	–	–	–	100
105	–	–	–	–	–	1827-105	–	100
110	1820-110	1821-110[1]	1822-110	1823-110[1]	1825-110[1]	1827-110	–	100
125	1820-125	1821-125[1]	1822-125	1823-125[1]	1825-125[1]	1827-125	–	100
142	–	–	–	1823-142[1]	1825-142[1]	–	–	100
150	1820-150	1821-150[1]	1822-150	1823-150[1]	1825-150[1]	1827-150	–	100
185	–	1821-185[1]	1822-185	–	–	1827-185	–	100
240	1820-240	–	–	–	–	1827-240	–	100
257	–	–	–	1823-257	1825-257	–	–	25
293	–	–	–	–	1825-293	–	–	25
320	–	–	–	–	–	1827-320	–	100

* *Particle retention rating at 98% efficiency*

[1] *25 per box*
[2] *Individually bagged*
[3] *With reinforced rim*
[4] *Filter in holder for personal air samplers*

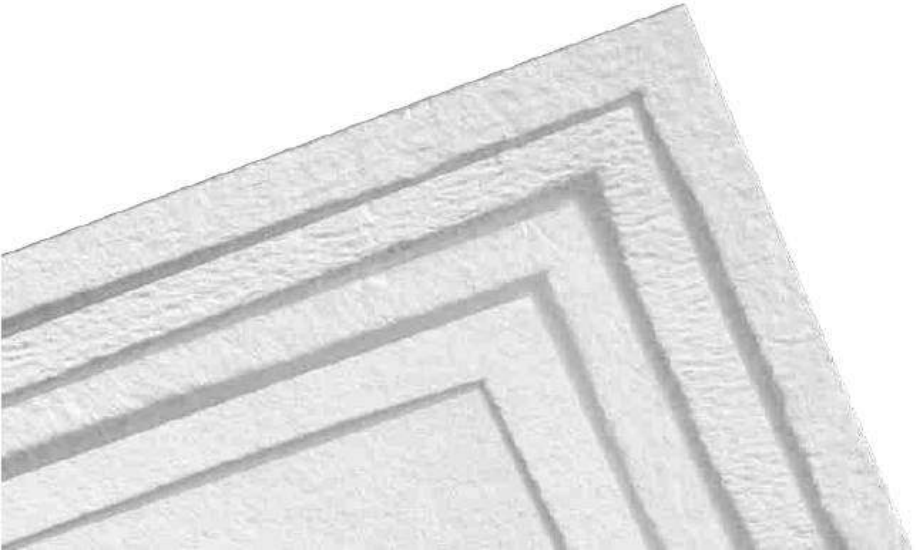
Ordering information

Binder-free glass microfiber grades (continuation)

Dimensions (mm)	Catalog number							Quantity /pack
	Grade GF/A	Grade GF/B	Grade GF/C	Grade GF/D	Grade GF/F	Grade 934-AH	EPM 2000	
Filter sheets								
102 × 254	–	–	1822-849	–	–	–	–	50
460 × 570	–	1821-914	–	–	–	–	–	5
460 × 570	1820-915	1821-915	1822-915	1823-915	1825-915	–	–	25
2" × 12"	–	–	–	–	–	1827-808	–	100
2.25" × 12.25"	–	1821-271	–	–	–	–	–	100
8" × 10"	1820-866	–	1822-866	–	–	1827-866	–	100
8" × 10" (prenumbered)	–	–	–	–	–	–	1882-866	100
12" × 15"	–	–	–	–	–	1827-889	–	100
19" × 28"	–	–	–	–	–	1827-957	–	100
50 mm × 87 mm	1820-10026	–	–	–	–	–	–	100
50 mm × 87 mm	1820900086	–	–	–	–	–	–	80

* *Particle retention rating at 98% efficiency*

[1] *25 per box*
[2] *Individually bagged*
[3] *With reinforced rim*
[4] *Filter in holder for personal air samplers*



Binder-free glass microfiber filter sheets

Multigrade GMF 150

Whatman GMF 150 is a multilayer glass microfiber filter with a coarse top layer meshed with a finer layer. 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, extending the life of the filter.

Multigrade GMF 150 grades filter

Multilayer design delivers greater filtration efficiency

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.

Technical specifications

Multigrade GMF 150 grades

Grade	Description	Typical particle retention in liquid (µm)[1]	Nominal air flow (s/100 mL/in)	Nominal thickness (µm)	Nominal basis weight (g/m)	Typical water flow rate (mL/min)[2]	Maximum recommended temperature (°C)
GMF 150 1 µm	Multilayer	> 1	4	730	145	222	550
GMF 150 2 µm	Multilayer	> 2	1.6	750	145	887	550

[1] *Particle retention rating at 98% efficiency*
[2] *Normalized for 9 cm diameter. Measured under gravity for comparative purposes*

Ordering information

Multigrade GMF 150 grades

	Catalog number		
Diameter (mm)	1 µm	2 µm	Quantity/pack
47	1841-047	1842-047	40
90	–	1842-090	40
90	1841-090	–	20

Whatman acid-treated low metal TCLP filter papers

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 a variety of diameters. The 90 mm filter is required for volatile samples and used with a Zero Headspace Extractor.

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



TCLP testing filters

Technical specifications

Acid treated low metal TCLP filters

Nominal air flow (s/100 mL/in²)	Nominal thickness (µm)	Nominal basis weight (g/m²)	Maximum recommended temperature (°C)	Typical particle retention in liquid (µm)	Typical water flow rate (mL/min)
19	420	75	550	0.7	60

Ordering information

Acid treated low metal TCLP filters

Diameter (mm)	Catalog number	Quantity/pack
47	1810-047	100
90	1810-090	50
90	5925-090	100
110	1810-110	50
125	1810-125	50
142	1810-142	50
142	5925-142	100
150	1810-150	50

Glass microfiber filter papers with binder

Grade GF 6: inorganic binder

Good retention for very fine particles. This filter is used for:

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



Grade GF 8 glass microfiber filters with binder

Grade GF 8: inorganic binder

This glass fiber filter is used in the filtration of coarse particles. Frequently used in:

- 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
- dust measurements in the workplace
- determination of the dust fraction in technical gases
- 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 resistance 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:

- determination of crop protection agent residues by GC or HPLC
- cold sludge determination of beer
- soot separation before gas analyzers
- as roll filters in automatic air filtration units

Grade F319-04: organic binder

Cambridge filter pad F319-04 meets the requirements of Standard ISO3308:2012.

Grade HGF61: organic binder

This glass fiber paper has excellent mechanical strength and it can retain < 99% air particulate matter which make it very suitable as a filter tape in continuous air monitoring. The grade is also used as venting filter due to its water-repellent feature.

Grade HGF65: organic binder and inorganic binder

This glass is very similar to HGF61. It can retain > 99% air particulate matter @ 0.3 µm. It is mainly used as filter tape in continuous air monitoring and as venting filter in industrial applications.

Glass fiber filter with binder: filtration speed

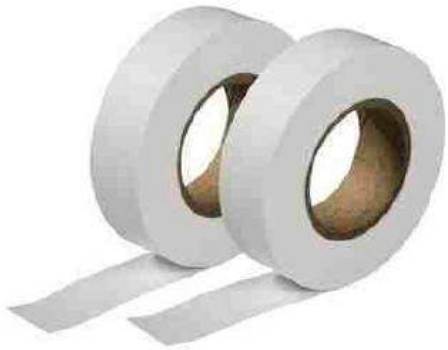
~ 3 µm retention capability < 1 µm



Technical specifications

Glass microfiber filter papers with binder

Grade	Nominal air flow (s/100 mL/in²)	Nominal air flow (s/100 mL/1.56 cm²)	Nominal thickness (µm)	Nominal basis weight (g/m²)	Filtration speed	Operating temperature (°C)
GF 6	40	–	350	80	Slow	< 500
GF 8	–	12	350	80	Fast	< 500
GF 9	–	27	350	70	Medium	< 500
GF 10	–	12	350	70	Medium	< 180
GF 92	–	27	350	70	Medium	< 500
HGF61	–	–	285	54	–	–
HGF65	–	–	280	54	–	–
F319-04	–	–	1300	215	–	–



HGF61 glass fiber tape

Ordering information

Glass microfiber filter papers with binder

Dimensions (mm)	Catalog number								Quantity /pack
	GF 6	GF 8	GF 9	GF 10	GF 92	HGF61	HGF65	F319-04	
Filter circles									
25	10370018	–	–	–	–	–	–	–	200
42	–	–	–	–	10421019	–	–	–	200
44	–	–	–	–	–	–	–	97039654	960
47	10370019	10370119	–	10370319	10421026	–	–	–	200
50	10370002	–	10370202	10370302	10421030	–	–	–	200
55	10370003	–	–	–	–	–	–	9703900241	100
70	10370004	–	–	–	–	–	–	–	100
90	10370005	10370105	10370205	10370305	–	–	–	–	100
92						–	–	97039944	100
100	10370020	–	–	10370320	10421043	–	–	–	100
110	10370006	–	10370206	–	–	–	–	–	100
125	10370007	–	–	–	–	–	–	–	100
135	–	–	–	–	10421057	–	–	–	100
142	–	–	–	–	10421060	–	–	–	100
150	10370008	–	–	10370308	–	–	–	–	100
185	10370010	–	–	–	–	–	–	–	100
200	10370011	10370111	–	–	–	–	–	–	100
240	10370012	–	–	–	–	–	–	–	100
Filter sheets									
60 × 90	–	10370172	–	–	–	–	–	–	100
610 × 620	10370050	–	–	–	–	–	–	–	100
Filter reels									
30 mm × 13 m	–	–	–	–	–	–	95039860	–	1
30 mm × 20 m	–	–	–	–	–	1830-6236	–	–	1
30 mm × 100 m	–	–	–	–	–	1830-640	–	–	1
40 mm × 42 m	–	–	–	10370393*	–	–	–	–	1
60 mm × 42 m				10370391*					1
600 mm × 228 m				10370434					1

* *Core 28 mm*

Quartz fiber filter papers



Grade QM-A filter paper circles

Grade QM-A

These high-purity quartz (SiO_2) microfiber filters are used for air sampling in acidic gases, stacks, flues, and aerosols, particularly at high temperatures up to 800°C and in PM2.5/PM10 and trace element analysis.

- Due to the low level of alkaline earth metals, artifact products of sulfates and nitrates (from SO_2 and NO_2) are virtually eliminated.
- QM-A, sequentially numbered according to EPA standards, is suitable for most applications.
- Grade QM-A filter papers are pre-fired.

Grade QM-B

QM-B is a thicker quartz fiber filter than QM-A. It has higher loading capacity and is suitable for air sampling.

Grade QM-C

QM-C is made of 100% silica microfiber without any additive or binder. It is pre-ignited and has a temperature resistance up to 1200°C. QM-C has very low trace metals (Cr, Ar, Pb, Cd, Ni, Zn) and it can address critical challenges in heavy metal analysis of air particulate matter and high temperature testing.

Grade QM-H

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

Technical specifications

Quartz fiber filter grades

Grade	Minimum retention efficiency in air (% @ 0.3 µm)	Typical retention efficiency in air (% @ 0.3 µm)	Nominal air flow (s/100 mL/in²)	Nominal thickness (µm)	Nominal basis weight (g/m²)	Maximum recommended temperature (°C)
QM-A	≥ 99.85	≥ 99.99	6.3	475	85	800
QM-B	≥ 99.85	≥ 99.99	12	950	170	800
QM-C	≥ 99.85	≥ 99.99	19	475	85	1200
QM-H	-	≥ 99.97	-	430	85	900

Ordering information

Quartz fiber filter grades

	Catalog number				
Diameter (mm)	**QM-A**	**QM-B**	**QM-C**	**QM-H**	**Quantity/pack**
Filter circles					
25	1851-025	–	–	–	100
32	1851-032	–	–	–	100
37	–	–	–	1853-037-50	50
37	1851-037	–	1855-037	–	100
40	–	1852-040	–	–	50
42	–	1852-042	–	–	50
47	–	–	–	1853-047-50	50
47	1851-047	–	1855-047	–	100
50	–	–	–	1853-050-50	50
50	1851-050	–	–	–	100
55	1851-055	–	–		100
82	1851-082	–	1855-082	–	100
85	1851-085	–	–	–	100
90	–	–	–	1853-090-50	50
90	1851-090	–	1855-090	–	100
101.6	1851-101	–	–	–	100
110	1851-110	–	1855-110	–	100
118	1851-118	–	–	–	100
150	–	–	–	1853-150-50	50
150	1851-150	–	1855-150	–	100
Filter sheets					
8" × 10"	1851-8866 (prenumbered)	–	1855-866	–	100
8" × 10"	1851-865	–	1855-865	–	25

Ready-to-use (RTU) glass fiber filters for solids

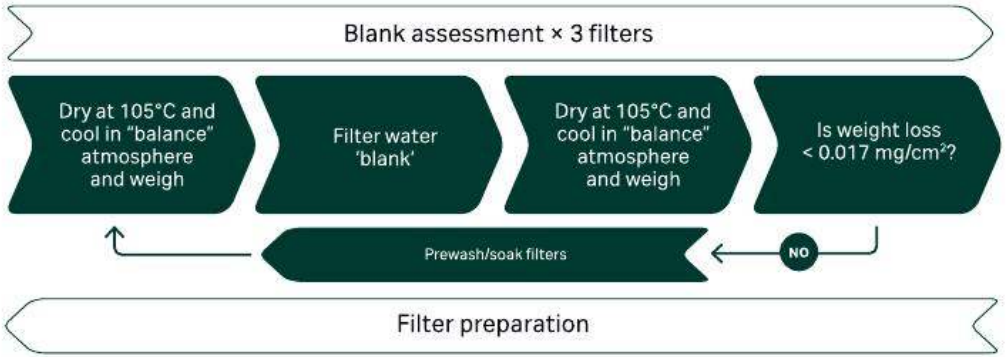
Solids testing, a key measurement in water quality and wastewater analysis, includes testing for total solids (TS), total dissolved solids (TDS), total suspended solids (TSS) and volatile suspended solids (VSS). It can be challenging for a lab staff to maintain accuracy and daily productivity under time pressure. Whatman RTU filters help lab staff simplify filter preparation steps in solids measurement, streamlining workflows and saving time. The RTU series filters are pretreated (washing, drying/ignition and weighing) to ensure weight loss less than 4% or 0.5 mg, whichever is less. 934-AH RTU filters meet the requirements of SM2540C/D/E, and GF/C RTU filters conform to EN872. The RTU filter family includes an economy range which is washed and dried but not weighed.



934AH RTU tray

Filter preparation workflows

EN872



Standard method 2540



Filter selection made easy

