

Quantitative Filter Papers

Whatman quantitative filters are designed for gravimetric analysis and the preparation of samples for instrumental analysis. They are available in three formats designed to meet your specific needs.

- **Ashless:** 0.007% ash maximum for Grades 40 to 44 and a maximum of 0.01% for the 589 Grades – very pure filters suitable for a wide range of critical analytical filtration procedures.
- **Hardened low ash:** 0.015% ash maximum – 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:** 0.006% ash maximum – 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 Paper – Ashless Grades

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. This filter is also available in the Disposable Filter Funnel. This is a convenient, disposable 47 mm filter funnel with a 250 ml capacity (catalog number 1920-1441). The 47 mm Grade 41 filter can be easily removed for further analysis or culturing.

Grade 42: 2.5 µm

A world standard 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.



Grade 589/1: 12-25 µm

“Black Ribbon Filter” – the established standard in quantitative analysis for the filtration of coarse precipitates (class 2a acc. to DIN 53 135). 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 prepleated as Grade 589/1 ½.

Grade 589/2: 4-12 µm

“White Ribbon Filter” – ashless standard filter paper for medium fine precipitates (class 2b acc. to DIN 53 135) 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 prepleated as Grade 589/2 ½.

Grade 589/3: 2 µm

“Blue Ribbon Filter” – ashless standard filter paper for very fine precipitates (class 2d acc. to DIN 53 135). 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. Also available prepleated as Grade 589/3 ½.

Typical Properties – Ashless Quantitative Papers

Grade	Description	Particle Retention in Liquid (µm)	Filtration Speed Herzberg (s)	Ash Content† (%)	Typical Thickness (µm)	Basis Weight (g/m ²)
40	Medium flow	8*	340	0.007	210	95
41	Fast	20*	54	0.007	220	85
42	Slow	2.5*	1870	0.007	200	100
43	Medium to fast	16*	155	0.007	220	95
44	Slow to medium	3*	995	0.007	180	80
589/1	Fast	12-25**	25	0.01	190	80
589/2	Medium fast	4-12**	70	0.01	180	85
589/3	Slow	< 2**	20	0.01	160	84

* Particle retention rating at 98% efficiency

** Approximate values

† Ash is determined by ignition of the cellulose filter at 900°C in air

Ordering Information – Quantitative Filter Papers – Ashless Grades

Dimensions (mm)	Catalog Number								Quantity/ Pack
	Grade 40	Grade 41	Grade 42	Grade 43	Grade 44	Grade 589/1	Grade 589/2	Grade 589/3	
Filter Circles									
12.7	1440-012	-	-	-	-	-	10300102	10300263	400
25	-	1441-325	-	-	-	-	-	-	100
25	-	1441-025	-	-	-	-	-	-	400
25	-	1441-6309	-	-	-	-	-	-	1000
30	1440-329	-	-	-	-	-	-	-	100

cont

Dimensions (mm)	Catalog Number								Quantity/ Pack
	Grade 40	Grade 41	Grade 42	Grade 43	Grade 44	Grade 589/1	Grade 589/2	Grade 589/3	
32	1440-032	-	-	-	-	-	-	-	100
40.5	-	1441-040	-	-	-	-	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
90	1440-090	1441-090	1442-090	1443-090	1444-090	10300009	10300109	-	100
105	-	1441-105	-	-	-	-	-	-	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
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
200	-	-	1442-200	-	-	-	-	-	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
Disposable Filter Funnel									
47	-	1920-1441	-	-	-	-	-	-	5
Filter Sheets									
25.4 × 90	-	-	1442-6551	-	-	-	-	-	100
203 × 254	-	1441-866	-	-	-	-	-	-	100
460 × 570	1440-917	1441-917	1442-917	-	1444-917	-	-	-	100
580 × 580	-	-	1442-930	-	-	-	-	-	500

* Product is only available in Europe

Ordering Information – Quantitative Ashless Filter Papers – Folded (Prepleated Grades)

Diameter (mm)	Catalog Number Grade 589/1 ½	Grade 589/2 ½	Grade 589/3 ½	Quantity/Pack
110	-	10300143	-	100
150	10300045	10300145	-	100
240	-	-	10300251*	100

* Product is only available in U.S.

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. Slow flow rate. Hardened and highly glazed surface. This finish 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. 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.



Hardened Low Ash Grades



Surface Wipes – Smear Tab

Typical Properties – Quantitative Hardened Low Ash Grades

Grade	Description	Particle Retention in Liquid (µm)	Filtration Speed Herzberg (s)	Ash Content* (%)	Typical Thickness (µm)	Basis Weight (g/m ²)
50	Slow	2.7**	2685	0.015	115	97
52	Medium	7**	235	0.015	175	101
54	Very fast	22**	39	0.015	185	92

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

** Particle retention rating at 98% efficiency

Ordering Information – Quantitative Filter Papers – Hardened Low Ash Grades

Dimensions (mm)	Catalog Number			Quantity/Pack
	Grade 50	Grade 52	Grade 54	
Filter Circles				
42.5	1450-042	-	-	100
50	1450-050	-	-	100
55	1450-055	-	1454-055	100
70	1450-070	1452-070	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
400	1450-400	-	-	100
500	1450-500	-	1454-500	100
609.6	1450-561	-	-	100
Smear Tab	1450-993	-	-	100
Filter Sheets				
150 × 230	1450-916	-	-	100
400 × 400	1450-925*	-	-	100
400 × 450	-	1452-923	-	500
410 × 400	1450-900	-	-	100
460 × 570	1450-917	-	1454-917	100
10 × 10"	1450-880	-	-	100

* Product is only available in the U.S.

Quantitative Filter Papers – Hardened Ashless Grades

These are the supreme quantitative filter papers featuring high wet strength and chemical resistance. These papers 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.

Grade 540: 8 µm

The 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

Fast filtration of coarse particles and gelatinous precipitates in acid/alkali solutions during gravimetric analysis. Typical applications include fiber in animal foodstuffs, gelatin in milk and cream, chloride in cement, and chloride and phosphorus in coal and coke.

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.

Typical Properties – Quantitative Hardened Ashless Grades

Grade	Description	Particle Retention in Liquid (µm)	Filtration Speed Herzberg (s)	Ash Content* (%)	Typical Thickness (µm)	Basis Weight (g/m ²)
540	Medium	8**	200	< 0.006	160	88
541	Fast	22**	34	< 0.006	155	82
542	Slow	2.7**	2510	< 0.006	150	93

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

** Particle retention rating at 98% efficiency

Ordering Information - Quantitative Filter Papers – Hardened Ashless Grades

Dimensions (mm)	Catalog Number			Quantity/Pack
	Grade 540	Grade 541	Grade 542	
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	1540-070	1541-070	1542-070	100
85		1541-085	-	
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	1540-270	1541-270	-	100
320	1540-320	1541-320	-	100
400	-	1541-400	1542-400	100
Filter Sheets				
460 × 570	-	1541-917	-	100



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